

Republic of Rwanda

RWANDA DAIRY DEVELOPMENT PROJECT (RDDP)

Detailed design report

Main report and appendices

Document Date: 04 August 2016
Project No.

East and Southern Africa Division
Programme Management Department

Contents

Currency equivalents	ii
Weights and measures	ii
Abbreviations and acronyms	iii
Map of the project area	v
Executive Summary	vi
Logical framework	xiii
I. Strategic context and rationale	1
A. Country and rural development context	1
The dairy sector	3
B. Project Rationale	13
II. Project description	14
A. Project area and target group	14
B. Development objective and impact indicators	17
C. Components	18
D. Lessons learned and adherence to IFAD policies	27
III. Project implementation	28
A. Approach	28
B. Organizational framework	28
C. Partnerships with other initiatives	29
D. Planning, M&E, learning and knowledge management	30
E. Financial management, procurement and governance	31
F. Supervision	34
G. Risk identification and mitigation	34
IV. Project costs, financing, benefits and sustainability	35
A. Project costs	35
B. Project financing	36
C. Summary benefits and economic analysis	37
D. Sustainability	39

List of Tables

Table 1:	Project targeted districts
Table 2:	Project costs by component
Table 3:	Financing plan by component
Table 4:	IFAD financing by expenditure categories
Table 5:	Famer models – summary of financial analysis results
Table 6:	MCC models – summary of financial analysis results
Table 7:	Sensitivity analysis results

Appendices

Appendix 1:	Dairy sector context	41
Appendix 2:	Poverty, targeting and gender	58
Appendix 3:	Country performance and lessons learned	68
Appendix 4:	Detailed project description	73
Appendix 5:	Institutional aspects and implementation arrangements	88
Appendix 6:	Planning, M&E and learning and knowledge management	115
Appendix 7:	Financial management and governance	120
Appendix 8:	Procurement arrangements	130
Appendix 9:	Project cost and financing	135
Appendix 10:	Economic and financial analysis	154
Appendix 11:	Mainstreaming nutrition into RDDP	164
Appendix 12:	Compliance with IFAD Policies	173
Appendix 13:	Rural finance strategy	190

Currency equivalents

Currency Unit	=	Rwandan Frank (RwF)
US\$1.0	=	RwF 743.916

Weights and measures

1 kilogram	=	1000 g
1 000 kg	=	2.204 lb.
1 kilometre (km)	=	0.62 mile
1 metre	=	1.09 yards
1 square metre	=	10.76 square feet
1 acre	=	0.405 hectare
1 hectare	=	2.47 acres

Abbreviations and acronyms

AfDB	African Development Bank
AGIN	Agriculture Infrastructure (agriculture ICT platform)
AHW	Animal Health Worker
AI	Artificial Insemination
AMS	Alternative Market System
AnGR	Animal Genetic Resources
ASAP	Adaptation for Smallholder Agriculture Programme
ASWG	Agriculture-Sector Working Group
BDF	Business Development Foundation
BRD	Banque Rwandaise de Développement
CAADP	Comprehensive Africa Agriculture Development Programme
CFSVA/NS	Comprehensive Food Security and Vulnerability Analysis and Nutrition Survey
CICA	Agricultural Information & Communication Centre
CIP	Crop Intensification Programme
COSOP	Country Strategic Opportunities Programme
CPE	Country Programme Evaluation
CPI	Corruption Perception Index (Transparency International)
CPIS	Country Programme Issues Sheet
DMG	Dairy Management Group
EAC	East African Community
EADD	East Africa Dairy Development Program
EDP	Enterprise Development Plan
EDPRS	Economic Development and Poverty Reduction Strategy
EICV	<i>Enquete integrale sur les conditions de vie des menages</i>
ESA	East and Southern Africa region
FAO	Food and Agriculture Organization (of the United Nations)
FFS	Farmer Field School
FHH	Female Headed Household
GALS	Gender Action Learning System
GCF	Green Climate Fund
GDI	Gender Development Index
GDPPs	Good Dairy Production Practices
GDP	Gross Domestic Product
HDI	Human Development Index
HPI	Heifer Project International
IAKB	<i>Kooperative Ihuza Aborozi ba Kiyambere Bafantaniye</i>
IFAD	International Fund for Agricultural Development
INDC	Intended Nationally Determined Contributions
ISAR	<i>Institute des Sciences Agronomiques du Rwanda</i>
JADF	Joint Action Development Forum
KWAMP	Kirehe Community-based Watershed Management Project
L-FFS	Livestock Farmer Field School
LODA	Local Administrative Entities Development Agency
MCC	Milk Collection Centre
MFI	Microfinance Institution
MINAGRI	Ministry of Agriculture and Animal Resources
MINALOC	Ministry of Local Government
MINECOFIN	Ministry of Finance and Economic Planning
MINICOM	Ministry of Trade and Industry
MINIRENA	Ministry of Lands, Environment, Forestry, Water and Mines
NAEB	National Agricultural Export Development
NAPA	National Plan for Adaptation
NBR	National Bank of Rwanda
NCCLCD	National Strategy on Climate Change and Low-Carbon Development

NCCR	National Cooperative Confederation of Rwanda
NDFFR	National Dairy Farmers' Federation of Rwanda
NDS	National Dairy Strategy
NISR	National Institute for Statistics of Rwanda
NPPS	National Plant protection Services
NSEM	National Multi-sectoral Strategy to Eliminate Malnutrition
PASP	Post-Harvest and Agribusiness Support Project
PADEBL	Dairy Cattle Development Support Project
PBAS	Performance-based allocation system
PSF	Private Sector Federation
RADA	Rwanda Agricultural Development Authority
RDB	Rwanda Development Bank
RDCP II	Rwanda Dairy Competitiveness Project – Phase II (of USAID)
PPPP/4P	Public-Private Partnership with Producers
PRICE	Project for Rural Incomes through Exports
PSTA III	Strategic Plan for the Transformation of Agriculture in Rwanda – Phase III
RAB	Rwanda Agriculture Board
RALIS	Rwanda Agricultural and Livestock Inspection Services
RCA	Rwanda Cooperative Agency
RCVD	Rwanda Council of Veterinary Doctors
RDDP	Rwanda Dairy Development Project
REMA	Rwanda Environment Management Authority
RIMS	Results and Impact Measurement System
RSB	Rwanda Standards Board
SACCO	Savings and Credit Cooperative
SNV	Netherlands Development Organization
SPIU	Single Project Implementation Unit
TI	Transparency International
UNFCCC	UN Framework Convention on Climate Change
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
VCA	Value Chain Analysis

Executive Summary¹

1. **Economy.** The Rwandan economy has remained resilient and continues to grow at a sustained pace while recording moderate inflation. Between 2001 and 2015, real GDP growth rate averaged about 8% and despite a slowdown to 5.1% in 2012/13 following aid shortfall in 2012, the economy registered 7.2% growth in 2014, 6.9% in 2015 and is projected to grow at 7.6% in 2016 (World Bank). Buoyed by this remarkable economic performance, the country has recorded rapid poverty reduction from 59% in 2001 to 39% in 2014 with a corresponding increase in annual per capita income from USD 191 in 2001 to USD 720 in 2015. This successful performance has been driven by stable macro-economic and market-oriented policies, improved regulatory frameworks and relatively transparent interactions between government and the private sector. A strong anti-corruption policy increased business confidence with the country now ranked by the World Bank at 45th position worldwide, and 3rd in Africa in ease of doing business.

2. **Rural poverty.** While Rwanda has had an impressive record in translating its sustained growth into poverty reduction across the country, poverty still remains a key challenge. The latest national poverty survey identified 39.1% of the population to be poor and 16.3% as extremely poor. Poverty in the country is mostly a rural phenomenon: the incidence of poverty in rural areas is estimated at 43% compared to 22% in urban areas, and it is highest among households with little or no land who obtain more than half of their income working on other people's farms. Women are more likely to fall into this category. In addition, women provide the bulk of labour in the agricultural sector, but operate mainly at subsistence level with insufficient skills, access to markets, and control over land, other assets and agricultural services. If Rwanda is to achieve its targets of reducing the number of people living below the national poverty line to less than 20% and to eliminate extreme poverty by 2020, it will be necessary to continue investing in pro-poor all-inclusive programmes.

3. **Agriculture and smallholder farming.** Agriculture is a key sector in Rwanda contributing to 33% of the total GDP in 2014 (NISR, 2015). The sector also provides employment to over 80% of the labour force, 90% of the country's food requirements and over 95% of the country's exports. Out of the five sub-sectors constituting agriculture, food crops dominate the sector accounting for 68.8% of total agricultural GDP. Overall, agriculture growth was 5.5% per annum (p.a.) between 2000 and 2012 and recorded a slowdown in 2013 to 3% before rebounding to 5% in 2014 and 2015. Continued food and high-value commodity production and productivity increases are essential to secure further reductions in rural poverty and to convert the largely subsistence sector to a more knowledge-intensive, competitive, and market-oriented sector.

4. Improvements in the agriculture sector in the last five years have principally been driven by improvements in sustainable land management, input provision, and small-scale irrigation. The crop and livestock intensification agenda for Rwandan agriculture has been and continues to be critical. Given limited arable land, yield increases of staple crops are vital for increasing rural incomes and agricultural growth. Expanding high-value commodity crops and reducing post-harvest losses are also important for increasing exports and foreign exchange, reducing imports, and sustaining higher incomes over the long term. In the last five years, significant interventions have driven productivity

¹ GOR-HPI-IFAD-FAO/TCIA design team composition: Dr. Rutagwenda Theogen, (Director General, Animal Resources, MINAGRI); Dr. Christine Kanyandekwe (Head of Animal Resources and Extension Department, RAB/MINAGRI); Gasirabo Claver (Coordinator, SPIU, MINAGRI); Jean Paul Ntaganda (Market Support Specialist, SPIU, MINAGRI); Didace Rushigajiki (Livestock Policy Specialist, MINAGRI); Dr. Charles Kayumba (Country Director, HPI/Rwanda); Elisee Kamanzi (Country Operations Manager, HPI/Rwanda); William Matovu (Country Director, HPI/Uganda); Francisco Pichon (Country Programme Manager, IFAD); Aimable Ntukanyagwe (Country Programme Officer, IFAD/Rwanda); Celie Manuel (M&E Analyst, IFAD); Antonio Rota (Lead Technical Advisor – Livestock, IFAD); Clare Bishop (Lead Technical Specialist - Gender and Social Inclusion, IFAD); Anja Soanala Rabezahary (Gender and Targeting Specialist, IFAD); Lauren Philips (Senior Technical Specialist – Policy, IFAD); Juliana Friedrich (Senior Nutrition Specialist, IFAD); Stephen Twomlow (Climate Adaptation Advisor, IFAD); Rauno Zander (Rural Finance Specialist, IFAD consultant); Marie Clarisse Chanoine Dusingize (Climate Resilience Specialist, IFAD consultant); Raphael Rurangwa (Institutional Development Specialist, IFAD consultant); Fred Kagaba (Financial Management Specialist, IFAD consultant); Muli Musinga (Value Chain Specialist, FAO/TCIA); Marc Moens (Senior Livestock Specialist, FAO/TCIA); Iburo Manomi (Economist, FAO/TCIA); Clarisse Ingabire (Livestock Investment Officer, FAO/TCIA); Toko Kato (Nutrition Specialist, FAO/ESN); and Badi Besbes (Animal Production Officer, FAO/AGAG).

gains, including: implementation of the Land-Use Consolidation Policy and the Crop Intensification Program; greater protection against soil erosion; and increased area under small-scale irrigation, including more productive utilization of extensive fertile marshlands areas.

5. **Food and nutrition security.** Rwanda has recently subscribed to the Global Compact to end hunger and malnutrition by 2025 and has also joined the Scaling up Nutrition (SUN) movement and remains committed towards enhancement of nutrition in the country. Official estimates show that 19% of households are food insecure. Food insecurity follows a similar distribution across districts as poverty, and is highest in the Northern (46.2%) and Western (45.3%) Provinces. In many cases, food insecurity relates to the stability of rural incomes, access to land as well as the ownership of animals, and events such as crop failures and seasonal scarcities, which reduce access to food. Resource-poor rural households who farm small plots are the most food insecure. While there have been marked reductions in the prevalence of chronic malnutrition over the last decade, stunting continues to be above the WHO high severity threshold and is a major public health concern. Almost 38% of children under 5 are chronically malnourished, with very high stunting levels (>40%) reported in slightly over 30% of districts in the country. Only three districts have moderate stunting rates (<30%)².

6. In Rwanda only 17% of children 6-23 months have an acceptable minimum diet and only 26% of children in this age group enjoy a minimum dietary diversity. This is an indication for the inadequacy of infant and young child feeding practices. Additionally, 37% of children are reported to suffer from some degree of anaemia, with the prevalence decreasing with age - from a high of 66% among children aged 6-11 months, to a low of 21% among children aged 48-59 months. Malnutrition is costing Rwanda a lot. The Cost of Hunger Study conducted by key ministries in 2013 concluded that undernutrition in children costs the country around USD 90 million every year in related illnesses and health care needs, most of which is born by families, and one quarter by public health services. It also estimates that the reason 13.5% of all students who repeated grades at school in 2012 was because of stunting, and that nearly half of all adults of working age in Rwanda suffered stunting as children, thus affecting their ability to contribute to the economy.

7. **Dairy a strategic commodity.** The dairy subsector is crucial for rural development, poverty reduction and food and nutrition security for the country. It offers a pathway out of poverty for the large number of households keeping livestock, and for those who provide services and value addition throughout the supply chain. The current "farm gate" value of annual milk production is approximately RwF 117.0 billion (USD 162.4 million)³. The dairy subsector is the largest segment of the livestock sector in Rwanda, which accounts for 10.5% of agricultural GDP and is the fastest growing sub-sector within agriculture.

8. In recognition of the strategic importance of the sector, the Government has over the past decade made significant investments in the industry aimed at transforming it from subsistence orientation to a business-oriented, modern sector capable of meeting the country's demand for dairy products and producing surpluses for the regional market. The results of these investments are clearly visible today and include the rebuilding of the national cattle herd from an insignificant level after the 1994 genocide during which over 80% of cattle were decimated to a herd of 1.35 million in 2015, where more than half (54%) are improved dairy breeds. In tandem with this growth and transformation of the sector, annual milk production has increased from a mere 50,000 MT in year 2000 to about 731,000 MT in 2015 and per capita milk consumption has also steadily increased from below 20 litres/year in the 1990s to 64 litres/year in 2015.

9. While the growth of the dairy sector in Rwanda has been impressive and has elevated the country to a level where it can now be considered a significant player in the regional dairy industry, sector performance is still much lower than those of competing countries in the region and there are still many challenges to be addressed. The government's National Dairy Strategy seeks to build on the gains so far made to address the remaining factors constraining the sector from achieving its potential. A key thrust of the strategy is to formalize the dairy value chain and, considering health benefits, increase national consumption of processed milk instead of the raw milk currently being

² The most important time to address stunting are the first 1000 days – from conception to 23 months. After this period impaired physical and mental development is irreversible.

³ Computed at average farm-gate milk prices of RwF 160/lt and official average USD exchange rate of RwF 720. For 2015

consumed. It also seeks to improve value addition, based on the use of the anticipated increases in milk production. The NDS aims at both increasing the number of improved breed cows and further improving their productivity. The latter is important in ensuring consistent milk supply, particularly during the dry season when milk supply has consistently been below demand. The Government further seeks to expand milk collection infrastructure including establishment of more milk collection centres (MCCs) and commercialization of their operations. The improved productivity and efficiency along the dairy value chain is expected to reduce costs, and hence make Rwandan dairy products cheaper and more competitive in regional markets.

10. The NDS emphasizes the importance of public-private-producer partnerships in the achievement of its objectives. The Government has spearheaded the development of the dairy industry through a number of projects such as the AfDB-funded Development of Dairy Cattle and Livestock Infrastructure Projects and the USAID-funded Rwanda Dairy Competitiveness Program (RDCP (phases 1 and 2)). In addition, SNV Rwanda, Heifer International, 'Send a Cow' and the recently-completed Bill and Melinda Gates Foundation-funded East African Dairy Development Project, have supported dairy development in Rwanda. The projects are being implemented in prescribed districts with RDCP II working in 17 districts across the five milksheds in Rwanda. Since the NDS was developed after wide consultation of stakeholders, most of the projects supported by development partners fit under the NDS framework.

11. **Climate change and adaptation.** The dairy sector is susceptible to climate change both on the production and marketing sides, as water and land become more limited for fodder production and as temperatures increase requiring changes to forage feeding systems. This makes the transport and safe storage of milk in the supply chain to consumers more complex and with requirements for more energy use. On the other hand, dairy farming is also a contributor to climate change as increases in dairy production may contribute to anthropogenic greenhouse gas (GHG) emissions, biophysical degradation and potential loss of biodiversity if extensification occurs and green strategies are not promoted along with good dairy management practices. For these reasons, increases in dairy production need to be achieved through a well-managed intensification, rather than extensification approach, and must incorporate climate-smart measures and technologies to mitigate against adverse environmental impact.

12. **Project rationale.** Despite the remarkable progress in development of the dairy sector in the country, significant challenges still remain. Key among them are: (i) low milk productivity attributed to the still low number of improved dairy cattle and compounded by inadequate forage base, animal feeding practices and seasonal fluctuations in water availability; (ii) limited support services (AI, vet, extension, inputs) and an inadequate knowledge to manage dairy cattle; (iii) limited organization of farmers for effective collective action in marketing of milk and access to inputs/services; (iv) inadequate development and management of milk collection, processing and marketing infrastructure for supply of good quality milk to the domestic and regional markets; (v) limited access to finance for dairy value chain actors, especially women and youth; and (vi) a nascent policy and institutional framework, with the need for specific laws, regulations and capacity development of key institutions to encourage the growth of the industry.

13. The proposed Rwanda Dairy Development Project (RDDP) will address these challenges and capitalize on the gains and opportunities created by past investments in the sector. At the current level of productivity, milk supply projections show that the country will not be able to meet the rapidly growing domestic demand for milk and sustain the upward trend in cross-border exports to the DRC and Burundi markets. RDDP is expected to contribute towards closing this gap. The design of the project builds on the strengths and lessons learned in the dairy sector by focusing on developing the dairy value chain through improving cattle productivity, milk quality and processing capacity of the dairy industry, and strengthening the policy and institutional framework for the sector. The focus will be on improving food security and nutrition, empowering women and youth, increasing smallholder dairy farmer incomes and sustaining climate-resilient dairy value chain development.

14. **Project area.** The project area comprises 12 districts in four Provinces of Rwanda: East (Nyagatare, Rwamagana, and Kayanza), North (Gicumbi, Burera, and Musanze), West (Nyabihu, Rubavu and Rutsiro) and South (Nyanza, Huye, and Ruhango). Selection of the targeted districts was based on: (i) current level of cattle population and milk production; (ii) current and projected market

development potential, including investments in milk collection centres, dairy processing plants, animal feed factories, and evolving domestic and export market linkages; and (iii) level of poverty, food insecurity and malnutrition. The project area has an estimated population of 4.6 million people and hosts 45% of the national cattle herd (601,479) of which 33% are crossbreeds, 22% purebreds and the remaining 45% are local breeds, mainly *Ankole*. Total milk production in the covered area in 2015 stood at 326,000 MT, accounting for 45% of national production. The area has 65 of the 100 milk collection centres (MCCs) in the country. Poverty levels in the project area are higher than the national average estimated at 43% in 2014 with targeted districts in the North and West having the highest poverty incidence levels of 52% and 47%, respectively.

15. **Target groups.** The primary target group of the project comprises slightly over 100,00 resource-poor rural households, of whom 80,000 will be involved in dairy farming (mostly zero-grazing) and 20,000 in off-farm activities along the dairy value chain. Taking into account revisions made in the national wealth ranking system (*Ubudehe*), and consistent with the targeting strategy laid out in the RB-COSOP, the target groups of the project will comprise the following:

- **51,800 smallholder dairy farmers** in the **zero-grazing system** who typically own up to three cows. This is the predominant livestock system in Rwanda, accounting for 92% of all livestock keepers, producing mainly for home consumption and sell a small surplus locally.
- **22,200 smallholder dairy farmers** in the **semi-extensive grazing systems** with up to 10 cows. They are principally located in the Northern and Eastern provinces and typically have 5-10 ha which form a good base for sufficient supply of forage for their cattle, but face challenges associated with shortages of water and pastures during dry months.
- **6,000 *Girinka* beneficiaries**, who will receive a cow in-calf, and pass on the first heifer to a qualifying neighbour. These households will be drawn from *Ubudehe* Category I who meet the criteria set by the government programme, with some land for forage production and ability to construct a cow shed.
- **15,400 young farm assistants** aged 15 to 24⁴ working as wage labourers (mainly male) in many dairy farms, especially in female-headed households with no male adults. They are typically from very poor families (*Ubudehe* Categories I and II), with little or no education and a very limited skills base.
- **5,400 rural women**, aged 15-35 (child-bearing age), will benefit from new economic opportunities and creation of small off-farm business opportunities.
- **Other beneficiaries** will include: 640 Livestock Farmer Field School (L-FFS) facilitators; 450 producers of forage seeds and vegetative planting materials; 175 vets, 72 community animal health workers and AI technicians; members of dairy cooperatives; milk collectors and traders; and dairy processors.

16. **The gender strategy for RDDP** aims to provide equal opportunities for women and men to participate in and benefit from development of the dairy value chain through RDDP activities. Women are specifically targeted to account for at least 50% of the L-FFS facilitators; women-headed households to account for 30% of members of L-FFS; and one target group comprises young women. Women heading households and women in male-headed households will be empowered to build small businesses or effectively engage in dairy farming related activities. Overall, it is expected that women will account for at least 45% of total beneficiaries⁵.

17. **Goal and development objective.** The overall goal of RDDP is to contribute to pro-poor national economic growth and improve the livelihood of resource-poor rural households. This will be achieved by focusing on food security, nutrition and empowerment of women and youth in a

⁴ UN definition of youth: 15-24 years old.

⁵ Women-headed households will account for 30% of 74,000 smallholders (22,200) and women in male-headed households an estimated further 30% of the balance (15,540); plus an estimated 50% of *Girinka* beneficiaries (3,000) and 5,400 rural women's empowerment. Overall, it is expected that women will account for at least 45% of total beneficiaries (46,140).

sustainable and climate-resilient dairy value chain development. Specifically, the project seeks to increase competitiveness and profitability of the dairy sector for the provision of quality products from small-scale producers to domestic and regional consumers, thus improving their livelihoods, food security and nutrition whilst building overall resilience.

18. The specific objectives will aim at the following:

- Sustainably intensify dairy production and productivity among participating smallholder farmers. This shall be achieved through the promotion of improved climate-smart dairy farming practices and access to quality dairy inputs, extension services including veterinary and Artificial Insemination (AI) services; appropriate green technologies, as well as business and financial services, following a hub model approach.
- Increase incomes by at least 80% among participating smallholder farmers from dairy farming through a combined effect of the increased milk production and improved market access. This shall be achieved through the development of 30 dairy hubs; establishment and strengthening of dairy farmer organizations; and facilitation of linkages to markets and dairy value chain actors, such as milk collectors, processors, transporters, traders, and investors in milk quality through public-private-producer partnerships (4Ps).

19. Four **development outcomes** are expected:

- Smallholder dairy farming productivity and supply of quality milk to domestic and regional markets enhanced and milk consumption at household level increased;
- Organizational capacity, and enterprise skills of smallholder dairy farmers and their cooperatives enhanced;
- Infrastructure for collection, handling, processing and marketing of milk and other dairy products expanded and its utilization improved and tailored to adverse climate risks; and
- A conducive policy and institutional environment for the development of smallholder dairy industry fostered and strengthened.

20. **Approach for scaling-up results.** In broad terms, scaling up of results under the RDDP will be achieved through linking focused project investment resources to leverage private co-investment and borrowing from the commercial banking system through 4Ps; and in so doing, developing commercial value chain relationships and services that are market-driven and sustainable. RDDP will strengthen the dairy value chain and, in particular, the linkages between smallholder dairy producers and their organizations on one hand, and processors or traders on the other. It will promote the development of a scalable model for integrating financial and non-financial services to smallholder dairy farmers into the commercial relationship between them and processors; and it will support efforts to reduce the cost of doing business in the dairy processing industry, thus creating incentives for further investment in the sector as a whole.

21. **Project components:** RDDP is structured around three technical components:

- *Component 1: **Climate-smart dairy production intensification*** aimed at increasing smallholder dairy farmers and farm assistants capacity to sustainably produce and supply higher volumes of quality milk to the dairy market with a focus on three broad areas: (i) enhance the capacity of male and female smallholder dairy farmers and farm assistants to improve their knowledge, attitude, and behaviour for increased milk productivity and quality; (ii) enhance sustainable access of smallholder dairy farmers to public and private livestock services and inputs; and (iii) support to resource-poor households who have no cattle to acquire dairy assets so that they can enter into dairy farming under the *Girinka* program and increase their capacity to implement climate-smart and strategic investments aiming at sustainable increase in milk productivity and improved milk quality, as well as increased milk consumption at household level.

- **Component 2: *Producer organization and value chain development*** designed to enable farmers to capitalize on productivity gains expected to be realized through investments made under component 1 to increase earnings through support in: (i) organization and capacity building of dairy farmer cooperatives for improved service delivery to farmers in milk collection and marketing, input supply, proximate animal health services, and financial services under the "hub" model; (ii) investment in climate resilient milk collection, processing and marketing infrastructure⁶ aimed at reducing post-production losses and enhancing the supply of quality milk in the domestic and regional markets; and (iii) leveraging financing for climate resilient dairy enterprise development aimed at catalysing growth in all segments of the dairy value chain.
- **Component 3: *Institutional and policy development*** aimed at facilitating the consolidation of an evidence-based, inclusive policy framework and institutional structure for the Rwandan dairy sector by supporting: (i) the formulation of a national dairy policy and necessary legislation for improving the regulatory environment of the sector (ii) policy implementation and strengthening of key institutions; and (iii) policy related analysis and technical assistance.

22. **Project implementation arrangements.** The lead agency for RDDP implementation will be the Ministry of Agriculture and Animal Resources (MINAGRI). Within the ministry, the project will be implemented through the already established Single Project Implementation Unit (SPIU) mainstreamed in MINAGRI. In line with SWAp principles and to mainstream project implementation within the government agencies responsible for dairy development, the main implementing body for the project will be the Rwanda Agricultural Board (RAB) which will work closely with Heifer International (HI) in development of the dairy hub model. Other key implementing partners will be the Rwanda Council of Veterinary Doctors (RCVD), the Rwanda Cooperative Agency (RCA), the Business Development Foundation (BDF) and the Rwanda National Dairy Platform (RNDP). These agencies will deliver specialised facilitation and technical services within their mandated roles to support successful project implementation and incorporate assessment and mitigation of short- and long-term climate risks in their services. Collaboration will also be forged with FAO for technical support where required. The SPIU will draw performance based MoUs and partnership agreements with all implementing partners to form a basis for close follow-up and monitoring of implementation progress towards achievement of results.

23. **Project costs and financing.** The total cost of RDDP including physical and price contingencies is estimated at USD 65.1 million (RwF 51.2 billion) of which USD 62.7 million are baseline costs and USD 2.4 million are allowances for physical and price contingencies. The baseline cost broken down by project components is as follows: (i) Climate-smart dairy production intensification: USD 26.5 million (42%); (ii) Producer organization and value chain development: USD 28.8 million (46%); (iii) Policy and institutional strengthening: USD 1.8 million (3%), and (iv) Project coordination and management: USD 5.6 million (9%). The project will be financed by: (i) IFAD up to USD 44.7 million (68%), through a USD 43.6 million highly concessional loan and a USD 1.1 million grant; (ii) Heifer International for USD 4.0 million (6%); (iii) Private sector/banks for USD 6.6 million (10%), (iv) Government of Rwanda for a total of USD 3.9 million (6%) in the form of tax exemptions; and (v) Beneficiaries for USD 5.9 million (9%).

24. **Economic and financial analysis** of RDDP shows that the project would be profitable with an Economic Internal Rate of Return (EIRR) of 26.2% and a Net Present Value of USD 44.1 million at a 12% economic discount rate. Sensitivity analysis carried out shows that the economic profitability of RDDP would remain satisfactory even if the project costs increase by 50%, the project benefits decrease by 50% or if the benefits lag behind by 2 years. The project is also financially profitable at production, processing and marketing segments of the value chain with financial internal rate of return (FIRR) for farmers ranging from 22 to 43% depending on the production system, for small scale processors estimated at 43% and for milk collection and marketing enterprises ranging from 25 to 36%.

⁶ Climate resilient milk collection, processing and marketing infrastructure will include investments in improved rain water management systems from rural roads and buildings, improved access to and provision of green energy technologies such as solar power and biogas to replace the use of fossil fuels where feasible.

25. **Environmental and social category** is B, considering that the project approach will promote enhanced natural resources management and better integration of livestock and crop production. RDDP will ensure that climate-smart technologies (e.g. solar energy and biogas technologies) are widely promoted along with capacity building, improved management of natural resources and dairy cattle herds, which in return, will contribute to mitigation of environmental risks. Under the project, a “climate smart dairy production intensification system” is defined as a system in which households have access to sustainable forage production (e.g. improved forage varieties tolerant to drought or/and flood or agroforestry fodder species for improving and diversifying livestock diet), water accessibility and availability, with an emphasis on the substitution of fossil fuel and firewood with green energy sources such as biogas and solar energy sources to power dairy machinery, chillers/coolers, water heaters and small scale grass choppers. The project will also contribute in the reduction of other externalities concomitant to dairy production and processing (e.g. manure management, recycling of solid waste and wastewater, etc.) by adopting measures to tackle environmental pollution, soil erosion, loss of biodiversity and greenhouse gas emissions.

Logical framework

	Indicators			Means of Verification			Assumptions
	Name	Baseline	End target	Source	Frequency	Responsibility	
Goal: Contribute to pro-poor national economic growth and improve the livelihoods of poor rural households	<ul style="list-style-type: none"> Number of female- and male-headed households that experience an increase in household assets 	-	80% of project beneficiaries	National statistics, household surveys incl. poverty & gender studies	Baseline and completion	SPIU	Income from milk sales will be used on household improvements
	<ul style="list-style-type: none"> Number of children 0-5 years suffering from chronic malnutrition in project area (stunting) 	TBD	5% reduction compared to baseline data				Income from increased sales accompanied by nutrition education and behaviour change will lead to greater availability of and access to a diversified diet and nutrient-rich crops/ food items.
Development Objective: To increase competitiveness and profitability of the dairy sector for the provision of quality products from small-scale producers to domestic and regional consumers, thus improving their livelihoods, food security and nutrition whilst building overall resilience	<ul style="list-style-type: none"> Volume and value of milk sold from targeted small-holder dairy farmers annually⁴¹ 	Volume: 43 560 MT; Value: USD 9.3m	Volume: 95 040 MT; Value: USD 22.8 m	National Statistics	Baseline, mid-term, completion	SPIU	Increased production will lead to sales and domestic consumption
	<ul style="list-style-type: none"> Volume of milk exported and penetration in the East Africa Community dairy market 	15,038,406 litres/year (2014-2015)	30-35 million litres by 2022 (4-5% penetration in the East Africa Community dairy market for Rwanda from the current 1%)	National Statistics (NISR, Statistical Year Book)	Baseline, mid-term, completion	SPIU	Export data for dairy products are more reliable (considering that most of the milk currently exported to Congo DRC and Burundi is not recorded)
	<ul style="list-style-type: none"> Increased income among participating smallholder farmers from dairy farming 	-	80% of project beneficiaries	National statistics, household surveys incl. poverty & gender studies	Baseline and completion	SPIU	Incomes increase through a combined effect of increased milk production and improved market access
Outcomes: Smallholder dairy farming productivity and supply of quality milk enhanced and milk consumption at household level increased	<ul style="list-style-type: none"> Average kg of milk produced per cow per day during one lactation period 	Cross-breeds: 5.5 kg/day Local breed: 2.1 kg/day	Cross-breeds: 9 kg/day; Local breed: 2.4 kg/day; Pure breeds: 15 kg/day	MCC records	Continuous	SPIU / RAB / MINAGRI	Improved dairy practices will improve milk productivity regardless of breed purity
	<ul style="list-style-type: none"> Average consumption of milk at household level increased 	64 litres/person / Year	100 litres/person/ year	National Statistics	Baseline, mid-term, completion	SPIU / RAB / MINAGRI	Increased and safer dairy production, consumption and education campaigns will lead to domestic consumption
Enhanced organizational capacity and enterprise skills of dairy cooperatives	<ul style="list-style-type: none"> Number (and %) of MCCs serving targeted farmers in milk collection and marketing, dairy input supply, animal health and extension services and financial services 	38% (25 out of 65 category 1 MCCs)	90%	MCC records Thematic study	Continuous Quarterly and completion	Service provider SPIU / Rwanda cooperatives agency	Well-functioning MCCs intend to provide multiple services to farmers beyond mere milk collection and marketing

Republic of Rwanda
RWANDA DAIRY DEVELOPMENT PROJECT
Detailed Design Report

	Indicators			Means of Verification			Assumptions
	Name	Baseline	End target	Source	Frequency	Responsibility	
Expansion and improved utilization of milk collection and processing infrastructure	▪ Number of dairy farmers using a formal milk collection system (by gender)	30%	80%	Thematic study	Mid-term and completion	Service provider SPIU / Rwanda cooperatives agency	Farmers have adequate incentive to supply to formal sector
	▪ % of installed capacity of milk collection and processing facilities functional and utilized	45%	80%	MCC reports	Quarterly	Service provider	Sufficient access to services is available, e.g. to technicians, facilities, etc.
Enhanced policy and institutional environment for development of the smallholder dairy industry	▪ Stakeholder satisfaction with policy and regulatory framework	n/a	90%	Thematic study	Baseline, mid-term and completion	SPIU	All relevant stakeholders are consulted and heard
Enhanced climate-smart dairy value chain and strengthened community resilience	▪ GHG emissions (CO ₂ e/kg milk) avoided or sequestered by the climate smart dairy production intensification approach (RIMS)	TBD	TBD	Thematic study using ExAct methodology at baseline and completion	Baseline and completion	SPIU / RAB / RVC / MINAGRI	Climate-smart technologies will offset the carbon footprint of the dairy sector despite eventual increase in livestock population
Outputs: Developing farmer capacity in good dairy production practices	▪ Number of households adopting technologies that reduce or sequester greenhouse gas emissions (RIMS)	n/a	60 000	Service provider report	Quarterly	Service providers	L-FFS will lead to improved animal husbandry practices, leading to improved animal health, improved feeding and improved hygiene generally as well as natural resource base
Strengthening animal health services	▪ Number of households receiving facilitated animal health services, incl. AI and % of success (RIMS)		80% of project beneficiaries, incl. 60% AI conception rate	Service provider report	Quarterly	Service provider	Strengthening animal health services will result in more people accessing services. Private vet and insemination services will improve animal genetic resources and sustainability of services
Supporting informal sector to comply with milk quality standards	▪ Number of milk zones, kiosks and bars that have been established or upgraded and certified for milk handling	n/a	2 000	Authority in charge of animal product inspection	Quarterly	Implementing partner	The ministerial order on milk standards will be effectively implemented and informal sector allowed to upgrade to the level of required standards
Strengthening of value chain	▪ Number of processors supported by project in improved processing, product diversification, packaging, certification and marketing	-	30	Service provider report	Quarterly	Service provider	Dairy cooperatives and unions with category 1 MCCs will want to invest in processing. Existing processors are willing to engage with project.
Supporting organizational development of cooperatives	▪ Number of cooperatives with new bankable enterprise development plans	-	60	Service provider report	Quarterly	Service provider	Cooperatives are interested in operational and business development
Improving access to financial services	▪ % financing gap of enterprise development plan	-	10%	Service provider report	Quarterly	Service provider	Financial institutions are ready to invest in dairy cooperatives
Strengthening policy development	▪ Number of national policies (laws and regulations) developed to strengthen dairy industry.	n/a	5 enabling laws and regulation developed 1 national policy developed	Rwanda Standards Board records (tbd)	Bi-annually	SPIU	Budget for policy implementation is availed by government and capacity for operationalization exists at local level

*Volume of milk sold to market annually = (kg per lactation period excl. milk intake of calves and own household consumption)

I. Strategic context and rationale

A. Country and rural development context

1. **Geography.** Rwanda is a small, land-locked country in east-central Africa with a land area of 26,338 km². It is bordered by the Democratic Republic of Congo to the west, Tanzania to the east, Uganda to the north and Burundi to the south. Its estimated population in 2016 is 11.55 million people with an annual growth rate of 2.36% (NISR). Population density has increased from 321 persons per sq.km in 2002 to 445 persons per sq.km in 2015, the highest in Africa. Rwanda is one of the 5-member countries of the common market of the East African Community (EAC) which has a combined population of 160 million people and annual GDP of USD 110 billion. Access to the sea for international trade is through the port of Mombasa in Kenya, a distance of 1,800 kilometres through Uganda; or through the port of Dar es Salaam, Tanzania, a distance of 1,600 kilometres.

2. The country's topography is dominated by mountainous plateau that falls from the west to east, ranging from 4,500 metres above sea level at the highest point in the west to around 1,000 metres in the east. Although many parts of the country receive some rain all the months of the year, there are two main rain seasons: long rains in February – May and shorter rains from mid-September to mid-December separated by a dry period in June to mid-September and a shorter one in January to mid-February. In general however, the north and north-west are wet throughout the year with average rainfall of 1,300mm to over 2,000mm while the east is characterized as semi-arid with annual rainfall of 750mm to 1,000mm and distinct dry periods. Temperatures range from 24°C to 28°C.

3. **Economy.** The Rwandan economy has remained resilient and continues to grow at a sustained pace, while recording moderate inflation. Between 2001 and 2014, real GDP growth rate averaged about 8% and despite a slowdown to 5.1% in 2012/13, following aid shortfall in 2012, the economy grew at 7.2% in 2014 and 6.9% in 2015 (NISR). Buoyed by this remarkable economic performance, the country has recorded rapid poverty reduction from 59% in 2001 to 39% in 2014, with a corresponding increase in annual per capita income from USD191 in 2001 to USD 720 in 2015. This successful performance has been driven by stable macro-economic and market-oriented policies, improved regulatory frameworks, and relatively transparent interactions between government and the private sector. A strong anti-corruption policy increased business confidence with the country now ranked by the World Bank at 45th position worldwide, and 3rd in Africa in ease of doing business.

4. **Rural poverty.** While Rwanda has had an impressive record in translating its sustained growth into poverty reduction across the country, poverty remains a key challenge in the country and slightly over 4.4 million people are estimated to be living in poverty. The country is ranked at the 163rd place out of 188 countries in the 2014 Human Development Index (HDI), classifying Rwanda as a low human development country. The latest national poverty survey¹ identified 39.1% of the population to be poor and 16.3% as extremely poor, unable to afford the basic basket of goods and services estimated at RwF 159,375 per household per year in 2014. Poverty is mostly a rural phenomenon: the incidence of poverty in rural areas is estimated at 43% compared to 22% in urban areas. Poverty is highest (76.6%) among households (often landless) who obtain more than half of their income working on other people's farms. The land distribution is skewed – 36% of households own 6% of the farm land, with an average of 0.1 ha per household (compared to the national average of 0.33 ha per household). The HIV prevalence rate has fallen below 3% as a result of concerted efforts to promote awareness and behaviour change, coupled with ensuring pregnant women living with HIV have access to antiretroviral medicines to prevent the transmission of HIV from mother to child.

5. **Women.** Rwanda has a good record on gender and affirmative action. The national government comprises 50% of women ministers and more than 64% seats in the National Parliament are occupied by women. While this trend generally transcends all other key positions in the national government, it is not exactly matched at district and local government levels where 40% of local governors and 10% of mayors are women. When the HDI is disaggregated by sex, the Gender Development Index (GDI) for Rwanda shows that although women live longer than men, their mean

¹ National Institute of Statistics of Rwanda (NISR), Rwanda Poverty Profile Report 2013/2014, 2015

years of schooling and incomes are lower². In the economy, although female participation in the labour market is slightly higher (86.4%) than for men (85.3%), only 27.2% of women are engaged in wage employment in the non-agricultural sector and the vast majority are employed in the agricultural sector. Indeed, women provide the bulk of labour in the agricultural sector, but function mainly at subsistence level with insufficient skills, weak control over land and limited access to markets and other agricultural services. They typically work twice as much as rural men mainly due to additional responsibilities around the home including care for other family members. In male-headed households, labour intensive technologies increase the burden of women and girl children. Women-headed households - who constitute 26% of households in the country - are generally more vulnerable to shocks and more food insecure and poorer than male-headed households.

6. **Youth.** Rwanda has a very young population with more than half aged under 20 and about 82% aged under 40. Literacy levels among Rwandan youth (defined to be between 14 to 35 years old³) are high with 80% being able to read and write. Net school attendance however drops dramatically from 88% in primary to 23% in secondary education (for boys and girls between 13–18 years old)⁴. In rural areas, girls aged 15-19 are affected more by early childbearing than those in urban areas, especially when they have no education. Girls spend about 12 hours a week fetching water and firewood in addition to their schoolwork.

7. **Food and nutrition security.** Rwanda has recently subscribed to the Global Compact to end hunger and malnutrition by 2025. Official estimates show that 19% of households are food insecure. Food insecurity follows a similar distribution across districts as poverty is highest in the Northern (46.2%) and Western (45.3%) provinces, and in many cases it relates to the stability of rural incomes as well as the ownership of animals, and events such as crop failures and seasonal scarcities which reduce access to food. Poor rural households which farm small plots of land are the most food insecure. While there have been marked reductions in the prevalence of chronic malnutrition (as measured by stunting) over the last decade, the prevalence of stunting in the country continues to be above WHO's high severity threshold and constitutes a major public health concern⁵.

8. Almost 38% of children under 5 are chronically malnourished, with very high stunting rates (>40 percent) in slightly over 30% of districts in the country, with only three districts having moderate stunting rates of below 30%. Besides stunting, 37% of children in the country are reported to suffer from some degree of anaemia, with the prevalence decreasing with age - from a high of 66% among children aged 6-11 months, to a low of 21% among children aged 48-59 months (CFSVA 2015). Improving nutrition faces multiple challenges both at policy and household levels, including limited knowledge of basic nutritional requirements and inadequate food consumption patterns, with insufficiently diverse diets, inappropriate infant and young child feeding practices, and inadequate maternal nutrition. Agriculture has an essential role to play in overcoming the remaining barriers in chronic malnutrition by enabling rural households to improve their food system, as well as the quality and quantity of their diets.

9. **Agriculture and smallholder farming.** Agriculture is a key sector in Rwanda contributing to 33% of the total GDP in 2014 (NISR, 2015). The sector also provides employment to over 80% of the labour force, 90% of the country's food requirements and over 95% of the country's exports. Out of the five sub-sectors constituting agriculture, food crops dominate the sector accounting for 68.8% of total agricultural GDP. Overall, agriculture growth was 5.5% per annum (p.a.) between 2000 and 2012 and recorded a slowdown in 2013 to 3% before rebounding to 5% in 2014 and 2015. Continued food and high-value commodity production and productivity increases are essential to secure further reductions in rural poverty and to convert the largely subsistence sector to a more knowledge-intensive, competitive, and market-oriented sector.

10. Rwandan agriculture is characterized by small production units – the average landholding size is 0.33 hectare, reflecting the high population pressure on the country's natural resource base. About

² UNDP, Human Development Report 2015

³ For the purposes of the RDDP, the UN definition of youth will be used (15-24 years) in relation to the activities to develop and strengthen the livelihoods of young farm assistants.

⁴ The Fourth Integrated Household Living Conditions Survey – 2013/14 (EICV4)

⁵ RDHS 2014/2015 and CFSVA 2012

80% of the rural population consists of subsistence farmers who use mostly rain-fed production systems; less than 6% of all cultivated land is irrigated. The total agricultural land stands at 1.8 million ha and can be broadly categorized into intensive agricultural land (1.47 million ha – 82%), marshlands (0.16 million ha – 9.1%), rangelands (0.13 million ha – 7.4%), and tea plantations (0.03 million ha – 1.6%). Land remains a binding constraint and generally rules out expansion of land under production and calls for production intensification as the only environmentally sustainable pathway for a continued growth of the agricultural sector.

11. The crop and livestock intensification agenda for Rwandan agriculture has been and continues to be critical. Given limited arable land, yield increases of staple crops and livestock are vital for increasing rural incomes and agricultural growth. Expanding high-value agricultural commodities and reducing post-production losses are also important for increasing exports and foreign exchange, reducing imports, and sustaining higher incomes over the long term. In the last five years, significant interventions have driven productivity gains, including: implementation of the Land-Use Consolidation Policy (LUCP) and the Crop Intensification Program (CIP); greater protection against soil erosion; and increased area under irrigation, including more productive utilization of extensive fertile marshlands areas.

The dairy sector⁶

12. **Cattle population.** Livestock, particularly dairy cattle, has historically been an integral part of the production systems in Rwanda. The country has made tremendous strides in rebuilding its livestock sector in the last two decades since the 1994 genocide during which an estimated 80% of cattle and 90% of small ruminants were decimated. Total cattle population has increased more than twice from the pre-1994 level of 600,000 heads and now stands at 1,349,792, comprising 615,631 (45%) local breeds (mainly *Ankole*), 439,414 (33%) dairy cross-breeds, and 294,747 (22%) dairy pure breeds. Currently, the dairy sub-sector contributes to regional milk supply largely through informal exports to Burundi and the Democratic Republic of Congo (DRC). The informal milk exports are estimated to be approximately 15 million litres of fresh and fermented milk per year. However, opportunities for export of value added products, particularly cheese, to East African countries exist because of their high quality at lower product prices.

13. **Milk production.** In tandem with the growth in cattle population, milk production has increased from 50,000 MT in 2000 to about 731,000 MT in 2015; and increased milk availability and per capita milk consumption from below 20 litres/year in the 1990s to 64 litres/year in 2015. This impressive performance has been achieved through strong commitment of the government in implementing a dynamic livestock intensification program as outlined in the National Dairy Strategy 2013-2017. Large investments have been made in improving milk production and milk productivity including through the importation of improved dairy cattle and distribution to resource-poor families under the *Girinka* and *Igikumba cy'umudugudu* programmes⁷; in improved accessibility of artificial insemination (AI), animal health and animal husbandry services to farmers; and establishment of milk collection centres (MCCs) and dairy cooperatives to improve market access and enhance food safety in the milk supply chain. Investments have also been made in improving rural access roads, rural electrification and improved water supply, as well as promoting public and private sector investments in animal feed production and processing of milk and other dairy products, and expansion of the domestic market through campaigns aimed at increasing milk consumption per capita from 40 litres in 2010 to 80 litres by 2020⁸.

14. **Advisory and extension services and knowledge generation.** Despite promising progress thanks to the adoption of the "Farmers Field School (FFS)" approach through the "*Twigire Muhinzi*" programme, farmer's knowledge and capacities are yet limited to ensure a good understanding of the

⁶ See Appendix 1 for a detailed discussion of the dairy sector, including status of production and challenges, producer organization and market linkages, access to financial services, and dairy policies and institutions.

⁷ Among other initiatives for restocking, the "one-cow per resource-poor household" (*Girinka*) programme has been instrumental in the increased growth of cattle population with a deliberate effort to target the poorest households. From 2006, the programme has distributed a total of 226,240 cattle to resource-poor households and plans to reach a target of 350,000 households by the end of 2017.

⁸ The estimated milk consumption per capita in 2014 was 59 litres per person per year.

advantage of new improved techniques and technologies. Hence, milk productivity and milk quality are progressing at a too low pace. Over the past decades, Advisory and Extension Services (AES) have been limited by a low extension agent to dairy farmer ratio⁹ and inadequate extension agent capacity including lack of transport, lack of equipment and training material and the lack of methodological support. Regarding research, the situation is less clear. The transfer of the “*Institut de Sciences Agronomiques et de Recherche*” (ISAR) to a mixed animal research and extension programmes within the Rwanda Agricultural Board (RAB) led to the transfer of a number of researchers to extension without being appropriately prepared to their new function. In addition to reduced research capacity, transferring highly specialized researchers into broad specialization areas in a large range of fields including animal health, breed improvement, animal feeding, animal husbandry, milk hygiene, etc. is a long and often unsuccessful process.

15. **Animal genetic resources (AnGR).** Over a period of just about one decade, Rwanda has succeeded in transforming the genetic structure of its national cattle herd from one dominated by local breeds to the current structure where local breeds account for less than half (46%) of the cattle population and the rest are cross-breeds (33%) or pure dairy breeds (22%). This transformation can largely be credited to importation of improved breeds under programs such as *Girinka* ("One cow per poor family") which has resulted in the distribution to poor families of more than 230,000 cows with improved genetics and cross-breeding of local breeds through AI. However, these progressive developments in the genetic composition of the national herd are also accompanied by new challenges and risks which in the medium and long term could significantly compromise the efforts and progress accomplished. These challenges include: increased feed requirements and pressure on land; the progressive disappearance of the local breeds; and the higher sensitivity to diseases of exotic and crossbreed cattle all of which require attention¹⁰. MINAGRI has drafted an animal genetic improvement strategy (2012) and a breeding policy (2015)¹¹. However, the country now needs a rationale and well thought breeding programme and tools such as an Animal Identification and Performance Recording system to support their implementation.

16. **Artificial insemination (AI) services.** Since early 2000, the GoR has taken a number of steps to improve the national capacities for AI. A local production unit of semen and a liquid nitrogen production equipment have been purchased and established at the Masaka bull station. A number of AI inseminators have been trained and equipped and a cold chain developed. However, in spite of the investment, the success rate remains low (between 40% to 45% according to RAB¹²). According to studies of the EADD¹³, the lowest rate of adoption of AI among the EADD countries was found in Rwanda. The limited farmer's skills in heat detection is one of the main reasons provided to explain the low results. The problem is also largely due to the organization and the logistic of the AI chain, and the capacities and motivation of the inseminators. In the future, the Government would like to see the private sector take over the delivery of AI services under a commercial mode. However, as an isolated activity, the AI service cannot generate enough revenue to survive. The activity has to be seen in the larger context of the privatization of the veterinary services which is a complex operation requiring strong policy measures and commitment from the government.

17. **Animal feeds.** Inadequate quantity and quality of animal feed in Rwanda, compounded by seasonal fluctuations in water availability, is a key factor preventing dairy cows from reaching the potential milk productivity that could be expected. The progressive substitution of the local breed by crossbreeds has placed animal nutrition among the highest priority issues that need to be addressed in the country's dairy sector. A well balanced mixed forages of grass and legumes could cover the needs of non-productive animals and of a dairy cow producing 5 to 6 litres of milk per day. However, improved dairy cows, cannot reach their potential productivity if they are exclusively fed on Napier grass without additional intake of proteins. The current situation is that there is limited forage

⁹ The Bill and Melinda Gates Foundation-funded East Africa Dairy Development (EADD) programme has estimated that, on average over a year, a dairy farmer is reached 2.5 times by a public or private (NGOs, MCC) extension agent.

¹⁰ Increased sensitivity to disease induces a higher utilization of drugs which results in increasing resistance of diseases to drugs (anti-microbio resistance) and, in turn, increased occurrences of diseases and higher requirement for use of drugs.

¹¹ These documents provide the guidelines for the introduction of new exotic breeds and the conservation of the indigenous species.

¹² This figure does not take into account the number of repetition needed to reach a positive insemination and the real success rate remains unknown.

¹³ EADD baseline survey.

production and lack of diversity in the type of forage available. Furthermore, very few farmers are providing complementary feeding of concentrates to their animals due to many factors such as limited number of animal feed processing plants, limited knowledge of farmers on the importance of improved feed supplements and the high cost of imported raw materials for feed manufacturing. The quality of concentrate available in the market is generally poor due to lack of quality control regulation of the feed industry. The profitability of supplementation with concentrates also depends on the ratio of milk price to feed cost per kilogram which has been estimated to be at least a ratio of 1.2:1 milk price per litre to cost of concentrate per kilogram. Current milk prices are therefore generally too low to provide the required market incentive to farmers to use supplementary feeding.

18. Within the Eastern milkshed, farmers are experiencing severe animal feed shortages during the dry season (June–September) that reduces milk production and increases cattle mortalities. In this cluster, cattle are raised under open and deteriorated range areas due to lack of appropriate grazing management and observance of the proper land carrying capacity leading to overgrazing and inadequate dry matter intake. Lack of conservation technologies, low availability of dry season feed, and insufficient quality commercial feeds also contribute to poor nutrition. In the Northern and Western milksheds, the high altitude and rugged topography favours kikuyu grass planted pastures fortified with clover legumes which is a sustainable farming system. This however requires rotational grazing systems and pasture management which is currently not adequately practiced by farmers. This lack of grazing management and degradation of the natural resource based is one of the major contributors to green-house gas production in Rwanda (INDC).

19. **Animal diseases and health services.** The situation in Rwanda is more favourable than in most neighbouring countries in the area of animal diseases. Tick-Borne Diseases (TBDs) such as East Coast Fever, usually considered the most critical disease category in dairy production systems due to its associated high morbidity and mortality rates especially among improved dairy breeds, are relatively low in Rwanda compared to other neighbouring countries (EADD)¹⁴. As a landlocked country sharing borders with four countries, Rwanda is exposed to TADs mainly Foot and Mouth Disease, Contagious Bovine Pleuropneumonia, and Lumpy Skin Disease. Control measures such as import certificates and quarantines are applied although there are concerns that the quarantine periods currently followed are inadequate. Other frequently reported diseases are brucellosis (10% incidence) and Mastitis (60%) which can be largely attributed to both lack of good practices in milking hygiene and handling, and limited capacity of public services to control milk quality and ensure food safety. The diagnostic capacity is however relatively good and the country has a number of well-equipped veterinary diagnostic laboratories. High turn-over of technicians, lack of regular refresher training and lack of access to advanced diagnostic technologies are however key aspects that undermine the utilization of the established capacity.

20. **Animal health services.** Rwanda has a well-developed animal health services delivery system. Veterinary services are provided by the Government through district and sector veterinary officers. Dairy farmers access veterinary drugs freely and most drugs are abundant in veterinary pharmacies. Veterinary equipment is also available and drugs can be imported duty and tax free. However, in absence of a private sector, public sector delivery system is overstretched. A veterinary officer is responsible, on average to about 3,200 cattle in addition to all other animal species in that service area. As a result, services delivery to dairy farmers are inadequate and insufficient. Veterinary officers also lack capacity as they are inadequately trained in dairy management and do not have adequate transportation means to visit the large number of farmers in their service area. To address this shortfall, the government has adopted a strategy for promotion of private sector participation in the provision of animal health services. Some dairy cooperatives have also put in place private veterinary services and livestock insurance schemes. This has however not fully taken root and more has to be done to develop a national network of privately-owned animal health services.

21. **Dairy sector and rural livelihoods.** About 50%¹⁵ of livestock-keeping households in Rwanda are estimated to rear cattle which is commonly considered to be of a high economic, social and

¹⁴ The most frequently reported diseases are: diarrhoea (43% of dairy households), anaplasmosis (31%) and TBDs (21%).

¹⁵ Results from EICV4 show that the number of livestock-keeping households with cattle has increased from 47.3% in 2010 to 50.4% in 2014. For the same period, the proportion of households in the country with livestock declined from 68.2% in 2010 to 64.5%.

cultural value. The most common system of dairy keeping is zero-grazing, with an average holding per household of 2 to 5 cattle (1 to 3 cows). Smallholder dairy production provides a pathway out of poverty: with *Girinka* households having the possibility to progress from one cow and calf and home consumption of milk and informal sales, to gradually increasing herd size and more formal engagement in the milk marketing chain. Women contribute to the production but have no control over large livestock such as cattle. Traditionally, women were not allowed to milk even though they were engaged in many other activities regarding the care of dairy cows at the household level. This poses specific challenges in female-headed households who are frequently short of male labour. They pay a higher price for wage labour for feeding and taking care of the cow and end up incurring higher production costs compared to dairy keeping male-headed households. Women account for 34% of members of dairy cooperatives. In line with initiatives for fostering modernization and transformation of agriculture, MINAGRI is actively involved in addressing gender disparities through annual assessments and annual action plans within the framework of its Agriculture Gender Strategy. The dairy sector creates a large number of on-farm wage jobs for family labour and for farm assistants, who are mainly young men. Rural off-farm jobs are generated by the collecting, marketing and processing of milk mainly in the small-scale informal sector. While involvement of young men is visible (in wage labour and transportation), young women are more likely to work in family farms than young men (74% compared to 55%, respectively) and pro-active measures for increasing their remunerative participation are required.

Producer organization and market linkages

22. **Farmer organization.** Information on the number of farmers involved in cattle farming in Rwanda is not readily available. Estimates by EICV IIV showing that 50.4%¹⁶ of livestock-keeping households have at least one cow suggest that Rwanda has around 850,000 cattle farmers. While there are no official figures on the number of dairy farmers, the National Dairy Farmers' Federation of Rwanda (NDDFR) puts an estimate of 400,000 (NDDFR Strategy, 2016). This would imply that about 52% of cattle farmers (450,000) have only the indigenous breeds and the remaining 48% have at least one improved dairy breeds. If this is the case, then it is very likely that the number of dairy farmers in the country will continue to grow as many of the farmers having only local breeds upgrade into improved dairy breeds either through crossing their local breeds or purchasing improved breeds from the market. Overall, however, information on the number of farmers involved in cattle farming and their characterization across the various milksheds and production system is something that needs to be updated for better planning and targeting of interventions in the dairy sector.

23. Information from the Rwanda Cooperative Agency (RCA) shows that Rwanda has 314 registered dairy cooperatives with a total membership of 16,697 (39% women). Discussion with MINAGRI, RCA, NDDFR and other stakeholders show a convergence of views that out of the registered cooperatives, less than half are functional and efforts are required in re-establishment and strengthening their capacity to serve members. This notwithstanding, comparing the total registered membership to the total population of dairy farmers shows that only about 4% of dairy farmers are in any registered cooperative. This means that most of the dairy farmers end up dealing with the various input, service and output markets on their own as individuals. Given the small scale operations of the majority of dairy farmers (average of 3 cows), dealing with these markets individually puts the farmers at a significant disadvantage – and make them unable to command the economies of scale necessary to attract profitable business relationships in these markets¹⁷, which in turn acts as a disincentive to farmers to invest in improved farming practices and increased productivity.

24. Discussions with the RCA indicate that while Rwanda has a long history of farmer institutions, dairy cooperatives in the country are a relatively new phenomenon most of them emerging only over the last 10 years¹⁸. Most of the existing dairy cooperatives can therefore be characterized as generally new, low in membership, and weak in organizational structures for effective leadership, governance

¹⁶ The EICV series of studies (I – 4) done every three years shows that the number of livestock keeping households in Rwanda has declined 72.8% in 2005, 68.2% in 2010 to 64.5% in 2014. Over the same period however the proportion of cattle keepers among households with livestock has steadily increased from 34.4% in 2005, 47.3% in 2010 to 50.4% in 2014.

¹⁷ This is partly responsible for the low milk prices paid to farmers (RwF 120 – 180/litre) which are the lowest farm gate prices in the region.

¹⁸ The Policy on Cooperatives was formulated in 2003 and enacted into Law in 2006.

and day-to-day management of operations. This in turn becomes a self-reinforcing feature that makes cooperatives not attractive to existing and new members. Within this overall general characterization, however, there is a number of cooperatives which have emerged with strong leadership and effective management structures such as IAKIB¹⁹ in Gicumbi. IAKIB has started demonstrating its influence as a strong farmer organization not only to its members but also to the growth of the entire value chain. IAKIB in Rwanda and others in the region²⁰ present a strong case for deliberate efforts to build stronger farmer organizations if smallholder dairy farmers are to effectively participate in the growing dairy value chain in the country. Key areas requiring support include membership mobilization (including emphasis on women, youth and poorer smallholders) for grassroots ownership and direction; registration (as many are at formation stage and not yet formally registered); support for establishment of key governance, management and operational structures; and capacity building in business and technical areas for effective service delivery to members.

25. **Milk marketing.** Estimates on the dairy sector in Rwanda suggest that about 45% of the milk produced in the country is consumed by milk producing households and the balance (55%) is marketed in the rural and urban markets, with a small part exported to neighbouring countries, mainly Burundi and DRC as fermented milk. Out of the total marketed milk, a small proportion (about 10–15%) is sold directly by dairy farmers to end consumers – other households in the neighbourhood who do not have cattle or are facing milk deficits, local markets, kiosks and rural restaurants. The rest of the milk (85–90%) is sold through either informal milk traders (alternative market system) or through dairy farmer cooperatives who have since 2006 been supported by the government and various development partners to establish a cold chain of MCCs with linkages to processors and large milk traders. The cooperatives channel is however currently handling 15-20% of total marketed milk. Milk marketing is therefore currently dominated by informal milk traders who handle upwards of 70-75% of all milk sold by farmers. On the whole, it is estimated that the rural market currently consumes around 70% of marketed milk while the rest is sold in Kigali and other urban markets, with some going to urban markets in neighbouring Burundi and Eastern DRC, annually estimated at up to 12m MT.

26. **Milk collection infrastructure.** To ensure that food safety standards are maintained in traded milk, Rwanda has recently (December 2015) passed a Ministerial Order (MO) regulating the collection, transportation and selling of milk. Under this new regulation, all milk sold in the country must first be collected at a place where its quality testing is possible before being marketed. This law recognizes two types of milk collection points: simple sheltered milk collection sites and modern milk collection centres.

27. *Simple milk collection points/sites:* This is the simplest milk collection infrastructure and involves a structure that provides shade, is close to a road, sheltered from dust, and is equipped with clean containers (aluminium milk cans) and milk testing equipment (at least an alcohol-gun; lactodensimeter and thermometer). Available information shows that no milk collection site in the country currently meets the expected specifications under the new regulations. Milk is either collected directly from farmer's homesteads or at designated roadside points mostly without any shade. Rough estimates suggest that the country requires at least 2,000 milk collection sites to handle the current level of milk production sold by farmers.

28. *Milk collection centres:* A modern milk collection centre is defined as one that meets a number of specifications related to construction, and utilities (availability of water and electricity) as well as milk testing facilities. Currently, there are 100 MCCs²¹ established along the lines of a modern milk collection centre. A recent assessment of the operational status of the current MCCs conducted by MINAGRI on the basis of service delivery to farmers, connection to essential utilities (electricity and water) and operating capacity, puts the 100 MCCs into three categories: 28 in category 1 where most

¹⁹ Started in 2003 from the merger of 12 dairy farmers associations, IAKIB has grown to be the leading dairy cooperative union in Rwanda today with a membership of 684 members, 38 permanent staff (including a professional Managing Director) and collects milk from approximately 7,000 farmers across Gicumbi district (and even surrounding parts of neighbouring Rulindo and Burera districts). It is currently managing 6 MCCs and plans to construct 7 more and 20 collection points in the next 5 years to effectively cater for current and projected increase in daily milk collections from current 28,000 – 35,000 litres to 50,000 – 60,000 litres within its catchment area.

²⁰ Such as Githunguri Dairy Farmers Cooperative which has the third largest dairy processing plant in Kenya today.

²¹ 65 MCCs are located in the 12 districts targeted under RDDP.

of the services are offered and milk collection, cooling and selling is done well; 58 in category 2 where not all services are offered due to various capacity limitations; and 14 which are not operational either because they are newly constructed or have closed down for various reasons. Overall, however all the 100 MCCs have buildings which meet the statutory requirements for a modern MCC, all have at least a 3-phase generator and 86 of them have electricity connection (34 on 3-phase and 52 on single phase). The biggest shortfall is in functional capacity of cooling facilities and reliable water connection. While all the MCCs have cooling facilities (most with at least 2 tanks of up to 7 MT combined capacity), for many of the MCCs, part of this installed capacity is not functional largely due to disrepair or because of electricity connection (single phase, when the coolers require 3-phase electricity). Most of the MCCs complain about access to clean and reliable water supply. All these factors combine to lower the functional capacity of most MCCs to 50 – 60% of installed capacity and stands out as an issue that needs to be addressed.

29. Beyond functional capacity of established structures and facilities, a major challenge facing MCCs is the overall level of utilization of the facilities by farmers. Available information shows that more than 60% of the MCCs have daily milk collections below the 2,000 litres minimum threshold used in the business model for establishment of MCCs. Overall, estimates by MINAGRI suggest that only about 25–30% of the total installed capacity of existing MCCs is being utilized. While there are many interrelated factors behind this low utilization, the main ones relate to farmer organization and ownership of MCCs; management capacity; and market linkages. Underutilization is also an indicator of underdeveloped supply chains, inefficient collection including milk spillage and spoilage, side marketing or existence of a large informal sector, and probably lack of shared value along the value chain (see Appendix 1 for a discussion and Appendix 3).

30. To support the establishment of a milk collection infrastructure that meets Rwanda's need for adherence to milk quality standards of traded milk, it is important that measures are taken to increase the functional capacity of existing facilities and its utilization. Beyond this however, analysis of the distribution of the existing MCCs vis a vis current levels of milk production shows that there is still a need for expansion of the second tier milk collection aggregation centres. Estimates show that at least 177 MCCs are required in the country to handle current levels of milk sold by farmers at 85–100% capacity utilization levels²².

31. **Road access infrastructure.** As a highly perishable commodity, milk quality and market access are highly dependent on the condition of feeder roads from the production areas to MCCs which have cooling facilities. Although Rwanda has one of the highest road densities in the region, the general characterization of road infrastructure in rural areas is that roads connecting villages and farming areas to one another and to markets are inadequate and poorly maintained. Official estimates by the Rwanda Transport Development Agency (RTDA) show that 85% of feeder roads (District Class II roads) are in unacceptable conditions²³. The highest benefits to the agricultural sector and rural livelihoods come from improvements in feeder roads linking farms to markets (1-5 Kms) and to Sector centres (5-10 Kms). Within the 5 milksheds in Rwanda, the Western milkshed (Gishwati rangelands) is recognized to have the poorest feeder roads which significantly curtails accessibility to milk collection points and centres. Within this area alone a total of 116 Kms of feeder roads are identified as critical to linking areas of high milk production to MCCs and market centres.

32. **Value addition and processing.** Perhaps owing to the fact that Rwanda's dairy industry is relatively young, the country's processing base for milk and dairy products is still fairly underdeveloped. The country has five main milk processing plants²⁴ and about 25-30 small and medium scale processors of cheese and other dairy products. The largest milk processor is Inyange Industries with a processing capacity of 80 MT/day and currently the market leader controlling over 75% of the market share of processed milk and milk products in the country. To this list, two new additions in the coming months will be the newly-constructed Mukamira Dairy Processing Plant in Western Province

²² Within the project area, a total of 97 MCCs would be required compared to the current of 65 (assuming a 6,000 litres/day capacity utilization). An analysis of existing MCCs however shows that 6 of the current 65 MCCs are located in areas currently without sufficient milk production (see Appendix 1). On the whole therefore the shortfall of MCC facilities in the 12 districts is 38.

²³ MINAGRI – Rwanda Feeder Roads Development Project, 2015.

²⁴ These include Inyange Industries, Crystal Industries (only 7 months old with a production capacity of 100 MT per day but currently operating at 10% capacity but rapidly expanding) Nyanza Dairy, Savanah Dairy, Haji Dairy and Blessed Dairies.

with a processing capacity of 80 MT/day which is expected to start operations in 2016 through 4P arrangement²⁵; and Burera Dairies in the North funded by the UNDP under a Community Processing Centre (CPC) initiative. In total, Rwanda is currently estimated to have about 280 MT/day milk processing capacity. Estimates by MINAGRI show that although capacity utilization has been improving over the last 3 years, it still stands at around 35-40% of the total installed capacity.

33. Key challenges facing the processing industry include: low and inconsistent supply of good quality milk partly due to seasonality of milk production, poor organization of farmers for supply to MCC infrastructure and competition from the informal market who pay better prices; high cost of processing and packaging largely attributed to capacity under-utilization, cost of imported packaging materials, cost of power and inefficient processing technologies; and low product diversification and market penetration in the local and regional markets. The result is that although Rwanda now has large volumes of milk produced in the country, a very small proportion is processed to acceptable quality standards and marketed to consumers in the country at a price affordable by a wide cross-section of consumers. Although farm-gate prices paid to farmers are the lowest in the region, consumers on the contrary pay the highest prices for processed milk and other dairy products due to inefficiencies in the processing channel of the value chain. This is a critical channel for the growth of the dairy sector in the country and efforts must be put towards unlocking the constraints that hinder capacity utilization and efficient operations for delivery of high quality and affordable products to consumers in the domestic and regional markets.

34. **Milk trade.** The marketing of milk in Rwanda is dominated by informal traders who are estimated to handle 75-80% of the milk sold in the country. These traders generally fall into two categories: those who buy milk from the farmers, transport it, and sell it to other intermediate buyers (traders or processors) generally called milk collectors; and those who retail milk to the final consumers either through door-to-door deliveries (hawkers) or through designated milk structures interchangeably called milk kiosks, bars or zones. The volume of milk traded per trader per day varies from a few 20 litres containers to upwards of 10 MT by a few large-scale traders. The majority of traders are however small-scale handling, on average, 100 litres per day. While the exact number of milk traders is not known, rough estimates by the Milk Collectors and Traders cluster of the Rwanda National Dairy Platform (RNDP) place the figure at 5,000 - 8,000. The milk Collectors and Traders cluster of the RNDP currently has 400 members. These figures however exclude the thousands of general retail outlets who sell milk as part of the general merchandise they trade in (general shops, supermarkets and kiosks).

35. A general characterization of milk trade in the informal sector is that milk handling and trading is done through a system that does not ensure quality and food safety. Milk is generally collected from farmers without any testing, is transported in plastic containers which are not easy to maintain required hygiene standards, and the entire handling and trading environment is open to deliberate or opportunistic adulteration/contamination of the milk. Yet, this is the only main channel through which the majority of consumers in the domestic and regional markets are able to get milk produced in Rwanda at an affordable rate (of less than half the price of processed milk).

36. The new Ministerial Order on milk collection, transportation and marketing (2015) seeks to improve the quality of traded milk and ensure that minimum food safety standards are maintained in the sector. Under this new regulation, all milk traders must be licensed to undertake milk business and must adhere to food safety standards in milk handling and trading. Traders can only sell milk that has been tested at the point of delivery by the farmer and certified that it is safe for human consumption; the milk must be transported in well closed stainless steel containers; and traded in premises (milk kiosks/bars) meeting specified standards of hygiene and public health. The regulation also specifies standards for the quality of traded milk in terms of density (at 20 °C) and acidity.

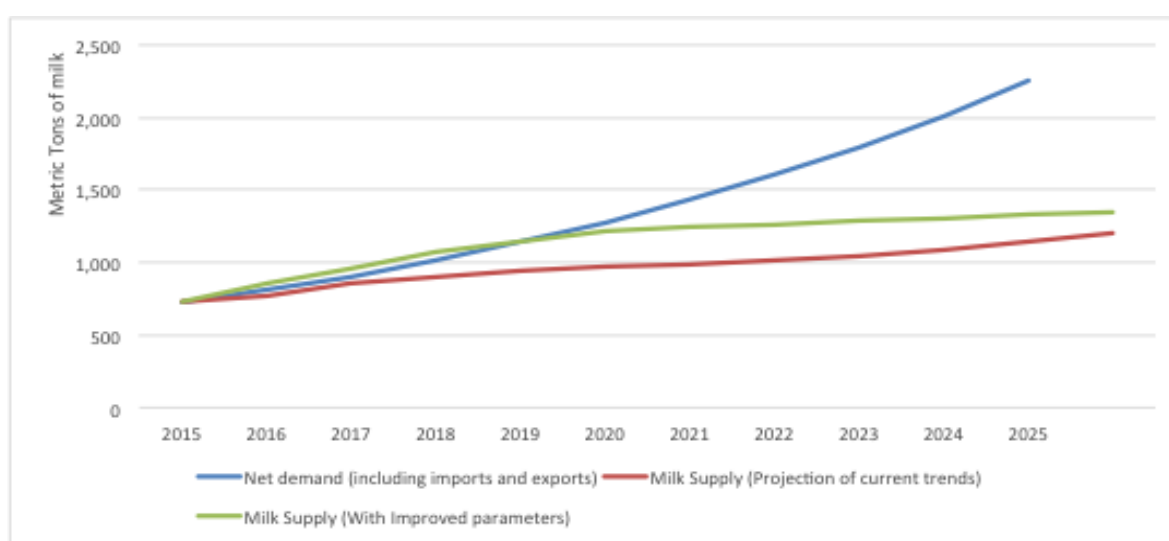
37. Discussions with the RNDP show that while stakeholders view this law as necessary for the long-term growth and sustainability of the dairy industry, significant investments are required to support the transformation process towards compliance. Currently, only about 10–15% of traders meet the conditions in the new regulation. Critical areas of support include: mobilization, sensitization and

²⁵ Constructed by MINAGRI with 12% contribution from 12 dairy cooperatives. Discussions on possible management contract with Inyange for day-to-day operations are ongoing.

training of traders on milk handling and trading practices that meet standards laid out in the new regulation; access to financial and technical services for upgrading to required milk handling and trading standards; and support to milk certification and quality control system to ensure effective delivery of services. Support is also required in public awareness among consumers for demand-driven enforcement of the standards.

38. **Growing milk demand – supply gap.** Projections of the supply and demand in milk over the next 15 years carried out during project design jointly with a group of senior livestock officers of MINAGRI show a widening gap between the supply of milk and growing demand unless efforts are made to increase productivity of the country dairy herd. The projections used the Livestock Sector Investment and Policy Toolkit (LSIPT²⁶) and the DynMod herd modelling tools²⁷ for the supply side and a simple standard model capturing population growth, inflation, revenues and elasticities of demand to price and income.

Figure 1: Projected milk supply and demand over the next 10 years



39. As highlighted in Figure 1, the projections show that a deficit of supply over demand is expected to continue increasing over the coming 10 years. If the dairy cattle herd will grow at the same pace as current trends, the country will end up with an unsustainable situation. The most important threats are related to the increased reduction in land access and the subsequent consequences on animal nutrition, the loss of genetic diversity with consequences on increased sensitivity to diseases, and the still insufficient consideration to the impacts of herd growth on GHG emission. However in an improved situation, the occurrence and the importance of the deficit between milk demand and supply will be delayed if effective interventions are implemented to improve yield per animal rather than increasing the number of animals producing milk. These interventions include: (i) strengthening capacity building of farmers in support of intensification with a special focus on animal nutrition; (ii) improving access to livestock services including access to animal health services, access to appropriate animal genetic resources and access to inputs; and (iii) identifying and enforcing policy measures to support the intensification pathway. Another important finding from the analysis is the very likely trend towards the disappearance of the local breed which justifies supporting national efforts to maintain a population of purebred *Ankole* cattle as a mean to ensure biodiversity and access to a gene pool of livestock highly adapted to the Rwandese environment.

40. **Increasing milk consumption at household level.** In the context of widespread poverty, milk can play an essential role as an affordable animal source protein. Consumption at household level depends mainly on milk production. Only in case of a felt surplus, milk consumption at household level will increase. Higher production accompanied by nutrition education promoted as part of general

²⁶ Developed in partnership with the CIRAD, the World Bank and the FAO.

²⁷ Developed by CIRAD and ILRI.

dietary diversity will have a positive effect at smallholder farm level.

Financial services²⁸

41. Within the dairy sector, most farmers who are members of a dairy cooperative have access to finance through various financial service windows offered by the cooperatives. These include savings and loans through SACCO wings of the dairy cooperatives²⁹, direct advances by the cooperative from milk sales (deducted at the end of the month), or linkages (through written guarantees) to commercial banks where the cooperative operates its accounts. Other mechanisms through which dairy farmers have access to financial services is through self-help mechanisms of Accumulated Savings and Credit Associations and Table Banking initiatives. On the whole, however, only a small proportion of dairy farmers are members of dairy cooperatives (2–7%) and therefore the majority of smallholder dairy farmers remain in the unbanked category with limited access to finance. At the production level, the need for finance in the sector includes for acquisition of improved breeds; construction of zero-grazing units; pasture development; and other dairy farming inputs and equipment. All other segments of the value chain also require financial services: milk collectors (containers, transportation); milk collection centres; processors and milk traders. Outreach among women and the poor is constrained both by limited financial services and low levels of financial literacy.

Environment and vulnerability to climate change

42. Rwanda is highly vulnerable to climate change as it is reliant on rainfed agriculture both in crop and livestock production. Climate change impacts vary depending on agro-ecological zones. The Northern and Western provinces are more affected by floods, while the Eastern and Southern provinces are more vulnerable to drought events. The impact of floods and droughts associated with El Nino and La Nina events of recent years are thought to have been exacerbated by climate change and the environmental degradation observed throughout the country (NAPA). The mean annual temperature is expected to increase up to 3.25°C for the region by the end of the century resulting in proliferation of diseases, crop decline and reduced land availability that affects food security and livestock production. Rainfall variability is more uncertain, though models predict more extreme events with higher rainfall intensities leading to landslides, crop losses, health risks and damages to infrastructure. The degradation of Rwanda's resource base is closely tied to relentless pressure exerted by a large and rapidly growing population on a limited arable land area for farming, raising livestock, and other agricultural production.

43. The dairy sector is susceptible to climate change both on the production and marketing sides, as water and land become more limited for fodder production and as temperatures increase requiring changes to forage feeding systems. This makes the transport and safe storage of milk in the supply chain to consumers more complex with and requirements for more energy use. Without major unit cost-reducing developments in feed/forage production, milk supply and marketing chain, many of the short term gains and improvements made in the livelihoods of smallholder farmers from investments in the dairy sector will be reduced due to increasing climatic risks and higher energy costs. On the other hand, dairy farming is also a contributor to climate change as increases in dairy production may contribute to anthropogenic greenhouse gas (GHG) emissions, biophysical degradation and potential loss of biodiversity if extensification occurs and green strategies are not promoted along with good dairy management practices. For these reasons, increases in dairy production need to be realized through a well-managed intensification, rather than extensification approach, and must incorporate climate-smart measures and technologies to mitigate against adverse environmental impact.

Policy, governance and institutional issues

44. **Institutional framework.** After the 1994 genocide, the Government of Rwanda has deliberately sought to create a more inclusive form of governance based on one national identity and increased decentralization. The National Decentralization Policy adopted in 2000 was implemented in phases which included administrative reorganization and fiscal decentralization. The third phase (2011-2015) has intended to build capacities to enable communities and decentralized structures to take full responsibility for implementing national policies and strategies. A special feature in Rwanda is

²⁸ See Appendix 13 for a discussion of rural financial services in the dairy value chain.

²⁹ IAKIB has a successful SACCO which is now in the process of transformation into a commercial bank.

the adoption of “annual performance contracts” (*Imihigo*) at all levels of government to ensure service delivery and for public sector accountability to achieve verifiable development results and targets. This has had a positive impact on the delivery of services since its adoption.

45. The Ministry of Agriculture and Animal Resources (MINAGRI) is responsible for agricultural policy formulation, coordination and monitoring. The government has restructured the agricultural sector agencies to create the Rwanda Agriculture Board (RAB), responsible for research and extension related to food crops and livestock and the National Agricultural Export Development Board (NAEB), responsible for tea, coffee and new potential export crops such as horticulture. Other important institutions include the Ministry of Local Government (MINALOC); the Ministry of Trade and Industry (MINICOM); and the Ministry of Lands, Environment, Forestry, Water and Mines (MINIRENA). IFAD has collaborated and established dialogue with all these institutions and also works with decentralized authorities to empower local government and sector-level community development committees to implement project activities.

46. Rwanda has already achieved much in shaping an enabling policy framework for dairy development. This has resulted from many interventions and support programs from the government and various development partners over the past decade. The current policy framework governing operations of the dairy sector was formulated in 2004 as part of MINAGRI's Animal Resources Policy (2004). The sections of the 2004 policy addressing dairy issues focussed chiefly on raising milk production to address low per capita milk availability. Following a land reform policy (2004) and Act (2005), the dairy farming approach shifted from extensive communal grazing systems to more intensive smallholder systems. Thus the core elements of the policy are focused on increasing production through changes to grazing systems, improved breeds and genetic profile of dairy cows, incentives for creation of farmer associations, integrated livestock/farming systems, improved animal feed and performance, decentralized service delivery, increased linkages between training, research and extension, and overall creation of an enabling environment for the dairy industry.

47. Since 2004, a number of other policies, laws, strategies and plans aimed directly at increasing the production and consumption of safe milk and dairy products have been enacted. These include: Animal Health Law (2008); Animal Nutrition Strategy (2009); the Milk Value Chain Master Plan (2009); National Dairy Strategy (2013-2018); Charter for ‘One Cup of Milk per Child’ Programme (2014); Strategic Plan for Mastitis Prevention and Control in Rwanda (2015), Rwanda Breeding Policy and National Herd Book (2015), among others. These actions have been complemented by dedicated public sector investment in the dairy sector which explains the significant achievements in implementation of the various policies and strategies. However, the developments that have taken place in the dairy sector over the last decade now require an updated policy framework. The 2012-2017 National Dairy Strategy was the first step taken by the government towards this update.

48. The primary responsibility for the animal production and farming aspects of the dairy industry fall under MINAGRI. Within MINAGRI, RAB provides animal support services, and the Rwanda Agriculture and Livestock Inspection Certification Services (RALIS) and NAEB also have relevant roles. MINAGRI also runs three important programs that are relevant to the design of the project: the One cow (*Girika*) programme, communal kraal system (where cows are zero grazed in communal cow sheds) and the “One-cup per child per day” programme. Other important ministries and agencies include: MINICOM, which runs the private sector federation; Rwanda Cooperative Agency (RCA); National Industrial Research and Development Agency; and the Business Development Foundation (BDF); the Ministries of Education (MINEDUC) and Health (MINISANTE), which are responsible for implementing the One-cup initiative; MINALOC, which acts as local district and sector authorities for agriculture/food planning, investment and implementation; Rwanda Standards Board (RSB); Rwanda Environmental Management Authority (REMA), which regulates the use of plastic packaging relevant to the dairy industry; Rwanda National Dairy Platform (RNDP); and Rwanda Veterinary Doctors Council (RVDC).

49. **Strategic policy context.** The achieved good governance, political stability and economic performance offer a unique opportunity for inclusive growth and rural transformation in the country. Rwanda's Vision 2020 is the overall long-term strategic framework within which all other national strategies operate. It is a key document having originally been formulated in 2000, with targets set for

2010 and 2020. Many of the targets, notably on GDP growth and GDP per capita, had been met by 2010 and so the mid-term review revised these targets upwards. The overall goal of Vision 2020 is for Rwanda to achieve middle-income country status by 2020, transforming the country from an agrarian to a knowledge-based economy. Agriculture is one of the six pillars of Vision 2020 and the thrust of the strategy in this area is to transform agriculture into productive, high value, market oriented sector with strong forward and backward linkages. To achieve this, the sector is expected to grow at an annual rate of 8.5%³⁰. The following are the key medium-term government strategies with a strong bearing on agriculture transformation and rural growth within the framework of Vision 2020:

50. ***Economic Development and Poverty Reduction Strategy (EDPRS II: 2013 -2018):*** EDPRS II is structured around five thematic priorities: (i) economic transformation for rapid growth, including diversifying the economic base for exports; (ii) private sector development, competitiveness and service delivery; (iii) rural development, including agriculture modernization, environment and climate change; (iv) productivity and youth employment creation, including education and skills development and job creation; and (v) accountable governance.

51. ***Strategic Plan for the Transformation of Agriculture (PSTA III: 2013 - 2017):*** PSTA III constitutes the country's National Agriculture Investment Plan following the CAADP process which seeks to transform Rwanda's agriculture from subsistence to a knowledge-based, value creating sector. New thrusts of PSTA III include the greater emphasis placed on value chains and markets, product quality and premium prices which can be obtained; arrangements for bulking up production in order to facilitate access to inputs, services and markets; increasing exports mainly of tea, coffee and horticultural products; and increased role of private sector including in dairy production.

52. ***National Strategy on Climate Change and Low Carbon Development (NSCCLCD, 2011):*** NSCCLCD was prepared in line with the UN Framework Convention on Climate Change (UNFCCC) to steer Rwanda towards a low carbon and sustainable development, effectively managing the implications of climate variability for social, environmental and economic development of the country. The strategy focuses on climate resilient and low carbon development, which addresses both mitigation and adaptation approaches to sustainable economic growth and poverty reduction. It advocates for an integrated development pathway that considers cross cutting issues linked to resource management and articulates a Green Growth and Climate Resilient Strategic framework for sustainable intensification of the agricultural sector based on several approaches such as: reduced dependency on fossil fuels, mainstreaming of agro-ecology techniques, better soil and water resource management, improving meteorological services, sustainable small-scale energy installations in rural areas, and green industry and private sector investment.

B. Project Rationale

53. Dairy is a strategic commodity and the dairy subsector is crucial for rural development, poverty reduction and food and nutrition security for Rwanda. It offers a pathway out of poverty for the large number of households keeping livestock, and for those who provide services and value addition throughout the supply chain. The current "farm gate" value of annual milk production is approximately RwF 131.6 billion (USD 153.90 million). The dairy subsector is the largest segment of the livestock sector in Rwanda which accounts for 10.5% of agricultural GDP and is the fastest growing sub-sector within agriculture.

54. In recognition of the strategic importance of the sector, the Government has over the past decade made significant investments in the industry aimed at transforming it from subsistence orientation to a business-oriented, modern sector capable of meeting the country's demand for dairy products and producing surpluses for the regional market. The results of these investments are clearly visible today and include the growth and transformation of the national cattle herd from a small size of 600,000 cattle dominated by local breeds with little milk production potential in the 1990s to the 1.35 million national herd today where more than half (54%) are improved dairy breeds. In tandem with this growth and transformation of the sector, annual milk production has increased from a mere 50,000 MT in year 2000 to about 731,000 MT in 2015, and per capita milk consumption has also steadily increased from below 20 litres/year in the 1990s to 64 litres/year in 2015.

³⁰ Revised target.

55. While the growth of the dairy sector in Rwanda has been impressive and has elevated the country to a level where it can now be considered a significant player in the regional dairy industry, the performance of the sector is still much lower than those of competing countries in the region and there are still many challenges to be addressed. The government's National Dairy Strategy seeks to build on the gains so far made to address the remaining factors constraining the sector from achieving its potential. A key thrust of the strategy is to formalize the dairy value chain and, considering health benefits, increase national consumption of processed milk instead of the raw milk currently being consumed. It also seeks to improve value addition (e.g., through product diversification) based on the use of the anticipated milk surplus. The NDS aims at not only increasing the number of improved breed cows but further improving their productivity through improved feeding across seasons. The latter is important in ensuring consistent milk supply, particularly during the dry season when milk supply has consistently been too far below demand. The Government further seeks to expand milk collection infrastructure including establishment of more MCCs and commercialization of their operations. The improved productivity and efficiency along the dairy value chain is expected to reduce costs, and hence make Rwanda dairy products cheaper and more competitive in regional markets.

56. The NDS emphasizes the importance of public-private-producer partnerships in the achievement of its objectives. The Government has spearheaded the development of the dairy industry through a number of projects such as the AfDB-funded Development of Dairy Cattle and Livestock Infrastructure Projects and the USAID-funded Rwanda Dairy Competitiveness Program (RDCP I & II). In addition, SNV Rwanda, Heifer International, 'Send a Cow' and the just-completed BMGF-funded East African Dairy Development Program, have supported dairy development in Rwanda. The projects are being implemented in prescribed districts with RDCP II working in 17 districts across the five milksheds in the country. Since the NDS was developed after wide consultation of stakeholders, most of the projects supported by development partners fit under the NDS framework.

57. Despite the remarkable progress in development of the dairy sector in Rwanda, significant challenges remain. Key among them are: (i) low milk productivity due to weak farmers capacity in the intensification pathway with a special focus on animal nutrition and access to livestock services including access to animal health services and AI, access to appropriate animal genetic resources, and access to inputs; (ii) limited organization of farmers for effective collective action in marketing of milk and access to inputs/services; (iii) inadequate development and management of milk collection, processing and marketing infrastructure for supply of good quality milk to the domestic and regional markets³¹; (iv) limited access to finance for smallholder dairy farmers and other dairy value chain actors, especially women and youth; and (v) a nascent policy and institutional framework, with the need for specific laws, regulations and capacity development of key institutions to encourage the growth of the industry.

58. The proposed Rwanda Dairy Development Project (RDDP) will address these challenges and capitalize on the gains and opportunities created by past investments in the sector. The design of the project builds on the strengths and lessons learned in the dairy sector by focusing on developing the dairy value chain through improving cattle productivity, milk quality and processing capacity of the dairy industry, and strengthening the policy and institutional framework for the sector. It will promote the development of a scalable model for integrating financial and non-financial services to small dairy farmers into the commercial relationship between them and processors; and it will support efforts to reduce the cost of doing business in the dairy processing industry, thus creating incentives for further investment in the sector as a whole.

II. Project description

A. Project area and target group

59. **Project area.** The project area comprises 12 districts in four provinces of Rwanda: East (Nyagatare, Rwamagana and Kayanza), North (Gicumbi, Burera and Musanze), West (Nyabihu, Rubavu and Rutsiro) and South (Nyanza, Huye and Ruhango). Selection was based on: (i) current

³¹ Low milk quality (at times reaching 52% rejection rates at a number of MCCs) in the informal sector limits export and production of value added products.

level of cattle population and milk production; (ii) current and projected market development potential, including investments in MCCs, dairy processing plants, animal feed factories, and evolving domestic and export market linkages; and (iii) level of poverty, food insecurity and malnutrition. The project area has an estimated population 4.6 million people³² and hosts 45% of the national cattle herd (601,479) of which 33% are crossbreeds, 22% purebreds and the remaining 45% are local breeds, mainly *Ankole*. Total milk production in 2015 stood at 326,000 MT accounting for 45% of national production. The area also has 65 of the 100 MCCs in the country. Poverty levels in the project area are higher than the national average estimated at 43% in 2014 with targeted districts in the North and West having the highest poverty incidence levels of 52% and 47%, respectively.

Table 1: Targeted districts

District	Population (2012)	# of households (2012)	Poverty incidence (%) 2014	Cattle population (2015)				Milk production (MT) 2015
				Local breeds	Cross-breeds	Pure breeds	Total	
SOUTH	984,105	234,958	33.7	61,821	44,126	29,598	79,505	73,408
Nyanza	323,719	77,522	38.0	20,705	14,779	9,913	45,397	24,586
Ruhango	319,885	76,968	37.8	25,585	18,262	12,249	56,096	30,380
Huye	328,398	77,915	32.5	15,531	11,085	7,436	34,052	18,442
WEST	953,107	216,085	47.1	39,424	28,139	18,875	86,440	46,814
Rutsiro	324,654	71,267	51.4	16,933	12,086	8,107	37,126	20,107
Nyabihu	294,740	65,855	39.6	14,184	10,124	6,791	31,100	16,843
Rubavu	403,662	88,849	35.5	8,307	5,929	3,977	18,214	9,864
NORTH	1,019,869	227,152	51.7	66,574	47,517	31,873	145,963	79,050
Gicumbi	395,606	86,075	55.3	30,481	21,756	14,593	66,830	36,193
Burera	336,582	73,624	50.4	19,358	13,817	9,268	42,442	22,986
Musanze	368,267	84,756	34.9	16,735	11,944	8,012	36,691	19,871
EAST	1,243,032	282,202	39.1	106,512	76,025	50,995	233,532	126,475
Nyagatare	465,855	105,365	44.1	57,673	41,165	27,612	126,450	68,482
Kayanza	344,157	80,517	26.4	31,489	22,476	15,076	69,041	37,391
Rwamagana	313,461	74,175	25.4	17,350	12,384	8,307	38,041	20,602
Total, RDDP	4,218,986	962,888	42.7	274,331	195,807	131,341	545,440	325,747
Total, Rwanda	10,515,973	2,424,898	39.1	615,631	439,414	294,747	1,349,792	731,014

Source: MINAGRI, 2016; NIRS, 2015

60. **Target groups.** The primary target group of the project comprises slightly over 100,00 resource-poor rural households, of whom 80,000 will be involved in smallholder dairy farming (mostly zero-grazing) and 20,000 in off-farm activities along the dairy value chain. Overall, it is expected that women will account for at least 45% of total beneficiaries. Taking into account revisions made in the national wealth ranking system (*Ubudehe*), and consistent with the targeting strategy laid out in the RB-COSOP, the target groups of the project will comprise the following:

- **51,800 smallholder dairy farmers** in the **zero-grazing system** who typically own up to three cows. This is the predominant livestock system in Rwanda, accounting for 92% of all livestock keepers, producing mainly for home consumption and sell a small surplus locally.
- **22,200 smallholder dairy farmers** (30% of total smallholder target group) in the **semi-extensive grazing systems** with up to 10 cows. They are principally located in the Northern and Eastern provinces. They typically have 5-10 ha which forms a good base for forage production but generally face challenges in accessing markets as well as water and pasture during the dry months of July–September.
- **6,000 Girinka beneficiaries**, who will receive a cow in-calf, and pass on the first heifer to a qualifying neighbour. These households will be drawn from *Ubudehe* Category I who meet the eligibility criteria set by the government programme, with some land for forage and ability to construct a cow shed.
- **15,400 young farm assistants** aged 15 to 24 working as wage labourers. They are the “hands-on” male laborers in many dairy farms, especially in female-headed households with

³² Projected population in 2015, NISR

no male adults. They are typically from very poor families (*Ubudehe* Categories I and II), with little or no education and a very limited skills base.

- **5,400 rural women**, aged 15-35 (child-bearing age), will benefit from new economic opportunities and creation of small off-farm business opportunities.

61. **Other beneficiaries** will include:

- 640 livestock farmer field schools (L-FFS) facilitators (of whom at least 50% are to be women) who will be trained and supported to establish 3,200 L-FFS.
- 450 producers of forage seeds and vegetative planting materials will be supported to produce for the market.
- 175 vets, 72 community animal health workers and AI technicians who will be trained and equipped to strengthen animal health services.
- Members of dairy cooperatives who will benefit from improved governance and infrastructure investments.
- Milk collectors and traders who will benefit from sensitization, training and capacity building, investments, and certification.
- Dairy processors who will benefit from investments in value addition and processing facilities, particularly those which leverage public, private and producer investments.

62. **The targeting strategy for RDDP** will be based on the following targeting mechanisms:

- **Geographical targeting.** Initially based on the presence of milksheds, production and market opportunities, RDDP will increase its poverty focus within the 12 project districts. The selection of sectors, cells and villages will be done in close collaboration with local governments and rural communities using the criteria of poverty, food insecurity and malnutrition.
- **Self-targeting.** The goods and services provided by the project will respond to the priorities, financial/labour capacities and livelihood strategies of the target groups. Smallholders will join L-FFS to develop skills in dairy husbandry, milk quality and hygiene, household nutrition, basic numeracy and literacy, and record keeping. They will be encouraged to join dairy cooperatives and skills in group management could provide a platform for strengthening dairy cooperative governance. L-FFS members will participate in GALS and investments from the household level to first collection point will be hosted in L-FFS for individual or group use. L-FFS will also be supported to prepare enterprise development plans for financing under component 2.
- **Direct targeting.** The *Girinka* households, young farm workers and women-headed households (from Category I) will be targeted directly by the project to receive cows (*Girinka* beneficiaries) and join L-FFS activities. When relevant, the *Umudugudu* committee at village level will be involved to ensure transparent and participative methods of household selection. Young rural women will be targeted to develop individual or group business plans for income generating activities and enterprises directly linked to increased milk production or from increased income in the local economy.
- **Empowering measures.** In addition to developing technical skills in dairy production and off-farm enterprises, the project will support beneficiaries to develop skills in household nutrition, basic literacy and numeracy, business and leadership. Most significantly, the GALS is an innovative approach which deepens project impact by fostering more equitable gender roles and relations at household and group levels. It will also be used to improve the performance of cooperatives, groups, other VC actors and smallholder dairy farmers by identifying common areas of interest, addressing inequalities and strengthening mutually-beneficial linkages for VCD.
- **Enabling policy and institutional environment.** The project benefits from a highly enabling policy and institutional environment fully supportive of the development of the dairy sector,

with a pro-poor and inclusive approach. Identified gaps in terms of policy, laws, regulations and institutional framework will be addressed with RDDP support.

- **Procedural measures.** Attention will be given to costs/beneficiary contributions, timing and administrative procedures required for effective participation of the various target groups, especially regarding access to advisory services of the MCCs and private livestock support services.
- **Operational measures and monitoring.** A Gender, Targeting and Community Mobilisation Officer has been appointed in the MINAGRI Single Project Management Unit (SPIU) to coordinate implementation of the gender and targeting strategies. Training will be given to project staff and implementing partners. At the field level, extension personnel will be trained in the GALS and rolled out to L-FFS, MCCs and dairy cooperatives, among others. Poverty and gender studies, including the use of the Women's Empowerment in Agriculture Index (WEAI), will be conducted at baseline, mid-term and completion to assess the effectiveness and relevance of the strategies/mechanisms. M&E indicators will sex- and age-disaggregated.

63. **The gender strategy for RDDP** aims to provide equal opportunities for women and men to participate in and benefit from development of the dairy value chain through RDDP activities. Women are specifically targeted to account for at least 50% of the L-FFS facilitators; women-headed households to account for 30% of members of L-FFS; and one target group comprises young women. Women heading households and women in male-headed households will be empowered to build small businesses or effectively engage in dairy farming related activities. The use of GALS will ensure that women are fully part of decision-making in the household and regarding dairy activities. Their participation in L-FFS will be used to encourage their membership and leadership in dairy farmers' organizations, apex organizations and policy engagement activities. Climate-smart investments will support the use of labour-saving technologies, such as rainwater harvesting, and the intensification of dairy production provides opportunities for biogas systems which can be used for household energy. GALS will stimulate discussions at the household level regarding workloads which invariably result in an improved allocation of tasks between household members.

B. Development objective and impact indicators

64. The overall goal of RDDP is to contribute to pro-poor national economic growth and improve the livelihood of resource-poor rural households. This will be achieved by focusing on food security, nutrition and empowerment of women and youth in a sustainable and climate-resilient dairy value chain. Specifically, the project seeks to increase competitiveness and profitability of the dairy sector for the provision of quality products from small-scale producers to domestic and regional consumers, thus improving their livelihoods, food security and nutrition whilst building overall resilience.

65. The specific objectives will aim at the following:

- Sustainably intensify dairy production and productivity among participating smallholder farmers and increase their consumption of milk and dairy products at household level. This shall be achieved through strengthening the capacity of male and female smallholder dairy farmers and farm assistants, promotion of improved climate-smart dairy farming practices and access to quality dairy inputs and livestock services including animal health and Artificial Insemination (AI); appropriate green technologies, as well as business and financial services, following a hub model approach.
- Increase incomes by at least 80% among participating smallholder farmers from dairy farming through improved market access. This shall be achieved through the development of 30 dairy hubs; establishment and strengthening of dairy farmers' associations; and facilitation of linkages to markets and dairy value chain actors, such as milk collectors, processors, transporters, and investors in milk quality through public-private-producer partnerships (4Ps).

66. Four **development outcomes** are expected:

- Smallholder dairy farming productivity and supply of quality milk to domestic and regional markets enhanced and milk consumption at household level increased;

- Organizational capacity, and enterprise skills of smallholder dairy farmers and their cooperatives enhanced;
- Infrastructure for collection, handling and processing of milk and other dairy products expanded and its utilization improved and tailored to adverse climate risks; and
- A conducive policy and institutional environment for the development of smallholder dairy industry fostered and strengthened.

67. **Scale up approach.** The development results of the project will be scaled up by linking focused project investment resources to leverage private co-investment and borrowing from the commercial banking system through 4P approaches; and in so doing, developing commercial value chain relationships and services that are market-driven and sustainable. RDDP will strengthen the dairy value chain and, in particular, the linkages between smallholder dairy producers and their organizations on one hand, and processors or traders on the other. It will promote the development of a scalable model for integrating financial and non-financial services to small dairy farmers into the commercial relationship between them and processors; and it will support efforts to reduce the cost of doing business in the dairy processing industry, thus creating incentives for further investment in the sector as a whole.

C. Components

68. RDDP builds on the experience of past and ongoing experiences to improve and enhance the national dairy industry through the dairy hub model. Through the promotion and support of this successfully tested model, project interventions will seek to strengthen dairy farmers' cooperatives and set up basic dairy infrastructures under a business framework that shall graduate into sustainable farmer-managed dairy hubs. These dairy hubs will act as a nexus of private sector-led interventions designed to increase access to productive services such as feed and other inputs, AI and veterinary extension services, as well as output markets and dairy-related business development services such as finance, extension, insurance, and support markets.

69. To achieve its objectives, the project is organized around three technical components: (i) Climate-smart dairy production intensification; (ii) Producer organization and value chain development; and (iii) Institutional and policy development.

Component 1: Climate-smart Dairy Production Intensification (USD 26.46m)

70. The objective of this component is to increase the capacity of male and female smallholder dairy farmers and farm assistants to sustainably produce and supply higher volumes of quality milk to the dairy market and home consumption. At the end of the project, it is expected that participating smallholder dairy farmers will have acquired the skills, knowledge and attitude needed to sustainably improve milk productivity, make climate smart and strategic investments, and provide an increased supply of quality milk to the market and for home consumption without increasing the carbon emission's intensity of their dairy production system.

71. The component is organised around three main interventions: (i) enhancing the capacity of male and female smallholder dairy farmers and farm assistants to improve their knowledge, attitude, and behaviour for increased milk productivity and quality; (ii) enhancing sustainable access of smallholder dairy farmers to public and private livestock services and inputs; and (iii) supporting resource-poor households who have no cattle to acquire dairy assets under the *Girinka* program so that they can enter into dairy farming and increase their capacity to implement climate-smart and strategic investments aiming at sustainably increase milk productivity and improve milk quality. The component, activities and implementation mechanisms are detailed in Appendix 4 (Detailed project description).

Sub-component 1.1 – Training and capacity building of smallholder dairy farmers (USD 9.3m)

72. Under this sub-component, RDDP will improve smallholder dairy farmers' and farm assistants' capacity to sustainably increase milk productivity and quality to subsequently reduce both milk

rejection at first collection point and reduce risks related to food safety. The sub-component will also pay particular attention to increase awareness of gender roles in dairy farmers' households by improving household members' capacity to negotiate their needs and interests and assist in developing gender-equitable solutions in livelihoods planning and value chain development. The main activities of the sub-component will fall under the following three areas:

73. ***Establishment and development of Livestock Farmer Field Schools (L-FFS)*** for 80,000 smallholder's dairy farmers and 15,400 farm assistants. Building on the "*Twigire Muhinzi*" programme, the project will assist dairy farmers and farm assistants to engage in a process of hands-on field-based learning over a production cycle of a cow covering "calf to calf" as the timeframe. Training will focus on the adoption of improved technologies and practices in dairy farming and milk handling using practical learning methodologies to help dairy farmers and farm assistants acquire and develop their knowledge, attitudes, and behaviour in dairy management. Specific attention will be paid to animal nutrition including forage and forage seeds production, hay storage and conservation (hay, silage, etc.), complementary and strategic feeding and feeding strategy, water requirement, and water mobilization, etc. Other subjects will include animal health, animal genetic resources management, milk handling and hygiene, climate smart technologies, heat detection, animal identification and performance recording, etc. Skills will be developed in group formation and management (which could provide a basis for strengthening downstream dairy cooperatives), basic literacy and numeracy skills and record keeping. In addition, the LFFS modules will include training materials on human nutrition (in particular infant and young child feeding and maternal nutrition) and climate risks management with a strong emphasis on climate risks along the dairy value chain. The identification of social, economic and environmental risks associated with the enhancement of the dairy farming will strengthen the social and ecological resilience of dairy farmers. Farm assistants will be encouraged to develop other skills related to livestock keeping, such as constructing rainwater harvesting tanks and biogas systems, in order to develop their livelihoods.

74. ***Support for short and medium-term research*** on key strategic thematic areas affecting smallholder dairy productivity, climate-smart practices dairy production practices, techniques and/or technologies. The project will facilitate and support short and/or medium-term collaborative research initiatives in animal nutrition, animal health and animal genetic that will be selected through a transparent demand-driven and competitive process coordinated and involving higher education students (MSc and PhD students). The project will also work in close collaboration with the IFAD-funded Post-harvest and Agribusiness support Project (PASP) to identify and ensure the diffusion, through the L-FFS, among smallholder dairy farmers of good practices, techniques and/or technologies proven to have high potential of reducing GHG's emission intensity in smallholder dairy production, and preparation of modules and training tools for dissemination to farmers.

75. ***Promotion and support for development of Gender Action Learning System (GALS)*** in order to increase awareness of gender roles in the households and communities by improving their capacity to negotiate their needs and interests and find innovative, gender-equitable solutions in livelihoods planning and value chain development. The project will integrate GALS into the L-FFS modules to foster behavioural change of farmers and household members. As necessary, RDDP will support the training of Master L-FFS in GALS who will train the L-FFS facilitators to implement the approach and tools for participating farmers.

Sub-component 1.2 – Sustainable access to public and private livestock services (USD 8.49m)

76. The objective of the sub-component is to sustainably enhance access of smallholder dairy farmers to public and private livestock support services and inputs including access to good animal nutrition and quality animal feed, animal health services, and appropriate Animal Genetic Resources (AnGR). The sub-component will complement the L-FFS' activities where animal nutrition, animal health, and genetic improvement will be largely addressed. The main interventions will include:

77. ***Improved animal nutrition and access to quality animal feed*** by assisting in the formulation of optimized feeding rations and feeding strategies for different smallholders dairy production systems. The project will support 450 producers to develop, supply and promote use of improved forage seeds and vegetative planting materials (flood and drought tolerant) among smallholder dairy farmers and promote small-scale animal feed production units.

78. **Enhanced public and private animal health proximity services** by reinforcing capacities of 175 public sector vets and the 12 District Veterinary Officers; enhancing diseases prevention and control; strengthening animal diseases diagnostic capacities; and improving milk quality and food safety. The project will also support, on a pilot basis, the establishment of three private sector-based networks each comprising eight Animal Health Workers (AHW) working under the supervision and the professional responsibility of a Veterinary Doctor. This approach will be further up-scaled to cover six additional AH networks.

79. **Improved access to appropriate AnGR** by reinforcing the capacity of the Masaka Bull Station and assisting the participatory preparation and implementation of a breeding programme³³ and Animal Identification and Performance Recording System (AIPR) for smallholder's dairy cows. In addition, the project will support the development and efficiency of AI services by enhancing the capacity for the production and distribution of liquid nitrogen and reinforcing the capacity of public and private inseminators in order to achieve at the end of the project 25,000 AI and a success rate of 70%. The project will also support, in synergy with component 3, the implementation of the steps and procedures for private and public veterinary doctors and technicians to acquire the official status of Authorized Agent in AI.

Sub-component 1.3 – Asset building and climate-smart productivity of poor households (USD 8.67m)

80. The objectives of the sub-component will be to (i) assist poor households with no cattle to enter into dairy farming, and (ii) improve smallholder farmers' capacity to invest in climate-smart and strategic productive investments. The main interventions will include:

81. **Support to the Girinka programme** using the same criteria set by the Government to identify the beneficiaries and through local purchase of the heifers in order to mitigate the impact that would be generated by an increased number of cows (e.g. increased Greenhouse Gas [GHG] emissions), and contribute to strengthen national capacity in AnGR.

82. **Support and incentives for climate-smart and strategic investments.** The objective is to increase smallholder dairy farmers' capacity to implement climate-smart and other strategic investments aiming at sustainable increase in milk productivity and improved milk quality. The project will provide incentives for eligible beneficiaries to facilitate the demonstration and adoption of climate-smart and strategic investments - such as improved dairy sheds with improved water access and waste management, biogas plants, rainwater-harvesting tanks, solar-powered milk cooling tanks, small-scale forage choppers, community investments addressing water shortages in drought-prone areas (boreholes, watering points) - by supporting both working and investment capital on the basis of a 60-40% ratio contribution between the project and the beneficiaries.

83. Eligible micro-projects will include initiatives implemented for demonstration purposes within one farm of a member of a L-FFS, or community-level initiatives benefiting all members of L-FFS groups. When installed for demonstration purposes, proposals will be submitted jointly by the L-FFS's group but the contribution will have to be paid in cash or in kind by the L-FFS member who will host the micro-project. In the case of an initiative benefitting the entire L-FFS group, the contribution will be paid in cash or in kind by all members of the L-FFS. RDDP will put in place demand-driven mechanisms aiming at transparently and competitively identifying eligible initiatives to be co-financed by the project.

84. **Support for preparation of enterprise development plans.** The objective is to facilitate the development of small-scale productive investments and income generating activities at the farm-level and up to the first milk collection point. The project will support smallholder dairy farmers and other eligible beneficiaries to develop bankable productive business plans. The intervention will aim at leveraging project investment resources by investment borrowing from the commercial banking system to promote and support innovative productive investments with higher risks or less predictable profits such as the establishment of seed multipliers and specialized forage producers, and small-

³³ Defines as systematic and structured programs to change the genetic composition of a population, based on objective performance criteria (NLBP, 2015).

scale feed production units. The detailed mechanisms, procedures, and eligibility criteria will be outlined in the PM. See also Appendix 13 on rural finance.

85. **Implementation arrangements.** Component 1 will be implemented under the overall responsibility of the MINAGRI's Single Project Implementation Unit (SPIU) and the direct coordination of a Program Manager (PM) to be recruited for the project. The PM will be assisted by qualified, locally recruited experts. For component 1, the technical expertise will include: (i) a FFS specialist, (ii) an animal health specialist, and (iii) an animal production and genetic management specialist. Implementation will also involve four Technical Committees (TC) headed by the director of the relevant technical department of the RAB: (i) a Coordination and Technical Committee (CTC) for the L-FFS activities; (ii) a Scientific Committee for Dairy Research (SCDR); (iii) a Technical Committee for Animal Nutrition and Animal Genetics (TC/ANAG); and (iv) a Technical Committee for Animal Health (TC/AH). The mandate and the composition of these committees will be detailed in the Project Implementation Manual (PIM) (Attachment 1 in Appendix 5 presents the responsibilities and composition of the Technical Committees). During implementation, the project will ensure the cooperation of relevant specialized technical agencies and/or private service providers. In addition to the Department of Animal Resources of RAB, other specialized institutions identified as implementing partners include the Rwanda Council of Veterinary Doctors (RCVD), Food and Agriculture Organization (FAO) of the United Nations and Heifer Project International (HPI).

86. Heifer international will co-finance and be responsible for implementation of RDDP support to the *Girinka* programme. The FAO will be contracted by the project through Letters of Agreement (LoA) to provide methodological and technical assistance including on-the-job training in: (i) Prospective study on demand and supply for feed and GHG emissions; and (ii) conceptualization and preparation of a breeding programme for smallholder dairy cows including the development of an Animal Identification and Performance Recording System AIPRS) for dairy cattle.

Component 2: Producer Organization and Value Chain Development (USD 28.85m)

87. The objective of this component is to strengthen the organization of smallholder dairy farmers and improve their access to input, service and output markets. The aim is to support farmers to take advantage of the productivity gains expected to be realized through investments made under component 1 to increase earnings by accessing profitable markets through investments in a milk delivery system that ensures food safety and curtails the high losses currently experienced in the value chain. Given the small-scale nature of milk production by individual farmers, investments under this component will seek to simultaneously address milk aggregation and bulking for economies of scale; strengthen milk collection infrastructure; reduce losses of milk and improve safety measures along the value chain; and support strategic actions and investments in improved penetration of the domestic and regional markets through processing and market linkages forged under public-private partnerships with producers (4Ps).

88. To help address quality and food safety concerns of milk handled through the informal sector which currently dominates milk trade in the country, the project will make investments towards awareness creation, training and capacity building of milk collectors and traders to adhere to the standards laid out in the new MO on milk collection, transportation and trade. Consequently, the component is organized around three sub-components: (i) organization and capacity building of dairy farmers' cooperatives and other value chain players; (ii) investments in climate resilient milk collection, processing and marketing infrastructure; and (iii) leveraging financing for climate resilient dairy enterprise development in all segments of the value chain. Activities under this component will build on the work of HPI in Rwanda in the areas of dairy business hub development, social capital building among smallholder resource poor households and creating sustainable market linkages.

Sub Component 2.1 – Organization and capacity building of dairy cooperatives and other VC players (USD 7.05m)

89. To address the current low participation of dairy farmers in existing cooperatives, the project will provide support to existing dairy cooperatives in targeted areas to strengthen their internal organization, business orientation and management capacity to make them attractive partners to dairy

farmers in their quest for improved access to markets and partnerships with other VC players and private sector. The objective is to strengthen these farmer organizations to a level that they are able to efficiently provide services to farmers in milk collection and payments; bulk purchase and delivery of dairy farming inputs; direct (or indirect) provision of extension, AI and animal health services³⁴; and linkages to financial services through the “hub” model already successfully tested in the country.

90. Strong linkages will be established with activities undertaken under component 1 in mobilization of farmers into farmer field schools in a way that these L-FFS become the building blocks for membership of the cooperatives. Support will also be provided in establishment and strengthening of dairy cooperatives in project areas where none exist. Besides farmers, the project will also support the organization and capacity building of other key actors in the value chain: milk collectors and traders; dairy equipment fabricators and service providers; and other service providers. Rural women will receive support to develop individual or collective income generating activities and microenterprises to serve the dairy sector and the rural economy. The key activities under this sub-component fall under the following three areas:

91. **Organization and capacity building of dairy cooperatives.** Under this activity the RDDP will support: mapping and rapid assessment of all primary and secondary dairy cooperatives in the targeted area; formation, registration and support for establishment of governance structures for those under formation; preparation of five-year bankable enterprise development plans (EDPs) to guide investments for business growth; and tailor-made capacity building of the cooperatives structured to address the specific capacity gaps identified in their EDPs (in governance, business management and technical areas). Support will also be provided in establishment of modern information communication technologies modelled along the Agriculture Infrastructure ICT platform increasingly gaining popularity among dairy cooperatives and other farmer organizations within Eastern Africa. Support under this area will also target district-level cooperative unions where such are required for joint action in bulking of production, processing and marketing modelled along the successes of IAKIB dairy cooperative in Gicumbi district. Provisions are also made for strengthening the capacity of the national dairy farmers’ federation (NDDFR) to service its members, coordination of the roll out of specialized dairy cow insurance services at individual and cooperative, and provide a unified voice for dairy farmers in advocating for growth of the sector.

92. **Organization and capacity building of milk collectors and traders.** In recognition of the important role played by the informal sector in the dairy value chain and the critical need for their involvement in the transformation of the milk collection, transportation and trading functions to adhere to hygiene and quality standards under the new regulation, RDDP will provide support in the following areas: mapping and rapid capacity assessment of the various categories of players in milk trade (milk collectors, transporters, wholesalers, retailers and exporters); sensitization, training and capacity building in adoption of good practices in milk handling and trade; support in establishment of suitable milk trading structures (milk kiosks and bars); and certification. In recognition of the emerging “milk-selling point” distribution model used by leading milk processors, the project will support the refinement and rollout of this *franchising* model to increase outreach and penetration in urban and rural areas paying special attention to issues of inclusion, particularly of small-scale informal milk traders. Provisions are also made for development of this milk distribution model to schools, health facilities and other institutions by MCCs or processors with partnerships with local MCCs.

93. **Capacity building of service providers.** Besides producers and traders who constitute the largest number of actors in the dairy sector, there are many other key players in the value chain whose capacity is critical for growth of the industry. These include, fee-for-service milk transporters who collect milk from farmers and deliver it to MCCs on the farmers’ behalf; equipment repair and servicing technicians; dairy equipment fabricators; and input suppliers, among others. The project will support mapping and capacity assessment of these service providers, including rural women that are able and willing to offer those services, and provide tailor-made support to build their capacities.

³⁴ The project will seek partnerships with existing service providers where these exist.

Sub-component 2.2 – Investment in milk collection and processing infrastructure (USD 5.24m)

94. The project area currently has a total of 65 MCCs for which MINAGRI has already undertaken detailed analysis of their level of operation, management capacity and infrastructural development requirements. In addition, a large number of small private milk collectors and kiosk milk sellers operate in the project area, handling significant quantity of the milk marketed. Building on this as a starting point and using a demand-driven approach structured around the 4P concept, on one side, RDDP will support the expansion and capacity utilization of a milk collection infrastructure stretching from the village level (collection points), satellites (where required) and milk aggregation at MCC level that ensures food safety standards are maintained in accordance with the recently issued Ministerial Order (MO) on milk collection, transportation and trade. On the other side, the project will support upgrading of the capacity of small private dairy operators who intend to comply with new food safety standards included in the above-mentioned MO. Within this sub-component, the project will promote access to low-carbon energy supply (biogas or solar power as appropriate) to enhance and ensure a competitive and sustainable dairy value chain as well as climate proof existing or new infrastructures (e.g. drainage systems, tiling of floors to ease cleaning process and hygiene, and increased number of rainwater harvestings facilities, etc.).

95. Activities under this sub-component will include: (i) technical and investment support to MCCs to expand outreach and improve capacity utilization (starting with existing MCCs but also with a provision for new ones where required); (ii) feeder roads improvement in milk production clusters which have limited links to collection and marketing points; (iii) 4P modality investments in processing and improved market penetration of dairy products in the domestic and regional markets; and (iv) incentive packages to upgrade dairy collection, handling and marketing of small private dairy operators at district level.

96. ***Investment in expansion and improved utilization of milk collection infrastructure.*** Support under this activity will be aimed at, first and foremost, improving the utilization of already installed milk collection infrastructure and then, on a secondary basis, seek to expand similar infrastructure to underserved areas. Support to existing MCCs will be demand-driven and tailor-made to the capacity needs of the facility in line with the three categorizations of MCCs in the country. Investments will be modelled along cost-sharing principles and will include targeted refurbishment and rehabilitation of physical infrastructure to meet standards set under the new regulation on milk trade; repair and installation of milk cooling equipment; investments in improved connectivity to reliable sources of water and electricity; and limited support in upgrading operational infrastructure for effective management. Through close partnership with subsidiary member groups of dairy cooperatives, support will also be provided in establishment of satellite and Cell/village level collection site infrastructure that meets the standards of a first level milk collection point under the MO.

97. ***Feeder roads improvement.*** To ensure ease of access to milk collection points and centres in all targeted districts, the project will liaise closely with the Feeder Roads Programme under MINAGRI to ensure that parallel resources committed by the government to support the construction and upgrading of feeder roads to MCCs are availed for the purpose. This is particularly relevant for the Gishwati rangelands in the West where already 116 Kms have been identified for construction and upgrading. For other areas not covered under the current government commitment, the project provide limited support in spot improvement of critical points (last-mile/small bridges) which may be constraining adequate road accessibility to collection centres.

98. ***Incentive-based package for upgrading of milk retail infrastructure.*** Building on capacity building support to informal milk collectors and traders under sub-component 2.1., the project will provide incentive-based support for development and adoption of innovative models of milk kiosks, bars and zones which meet quality standards of the new MO among traders. Support will target technology development for climate resilient infrastructure; training and capacity building of fabricators; and incentive-based support to traders for mass adoption of the technology.

99. ***4P modality investments in expansion and improved utilization of processing infrastructure.*** Under this activity, the project will provide support in appraising the status of investments in dairy value addition and processing facilities in the country and the level of capacity

utilization; and develop and implement tailor-made capacity building support to improve current capacity utilization and expansion in areas which are not adequately developed. Priority will be given to investments aligned with the productive partnership models which leverage public, private and producer investments to take advantage of the emerging opportunities in the dairy industry.

Sub-component 2.3 – Leveraging financing for climate resilient dairy enterprise development (USD 16.56m)

100. To improve the accessibility of financial services at all levels of the dairy value chain, the project will link focused project investment resources to leverage private sector co-investment and borrowing from the commercial banking system. Project resources will be allocated to support the incremental costs related to business plan investments in low-carbon energy supplies and post-harvest equipment, infrastructure, climate-resilient buildings and associated training to develop the dairy hubs' capacity to establish and operate such investments and improve their efficiency and sustainability. At the level of the dairy producer, financial services activities will promote access to livestock insurance services and to formalize existing informal savings and credit services within dairy hubs and the creation of SACCO windows. Access to loans will be facilitated through financial literacy trainings as well as through improved financing to aggregators in dairy value chains. For these VC actors the project will support financial incentives to better tailor the financial services offered at present by the financial sector to them to their specific working capital and investment financing requirements.

101. RDDP will include a range of different financial services to support the requirements of actors in the dairy value chain. To this end, savings, insurance, loan and possibly also leasing facilities will be promoted as service options to dairy producers and aggregators such as MCCs, dairy processors, transporters and milk and dairy product vendors.

102. Deposit promotion will be accentuated through facilitating the opening of SACCO windows in existing MCCs and dairy hubs. Almost all dairy cooperatives need support to separate financial services and to strengthen the dairy coops to offer small-scale deposit and loan facilities. Livestock dairy cow insurance services with a potential link to lending transactions will be promoted wherever this has not been included by partner financial institutions, and for the mobility of sector and district animal health workers and private service providers, motorcycles will be made available through a financing facility and in cooperation with a specialized leasing provider.

103. Financing requirements of value chain actors will be addressed through project facilitated financial instruments after verification of scope and type of financial services requirements with an initial inventory of prospective clients at project start up. Financial literacy activities will ensure that access to financial services in dairy value chains is secured for small scale producers that are currently unreached by formal financial services.

104. Proposals for financial services will include arrangements for livestock insurance that are specifically tailored to both public service provision (livestock insurance for one cow programme) and livestock insurance for private individuals and cooperatives, the latter two with the objective to facilitate the access of these dairy farmers and cooperatives to loans from financial institutions. The project will help participating groups establish or strengthen their track record with financial institutions enabling these groups to graduate into viable enterprises that are competitive and effectively linked to local, national or regional markets, and capable of attracting private sector commercial financing.

105. **Implementation arrangements.** This component will be implemented by MINAGRI in close collaboration with HPI in areas relating to development of the Hub model. Within the MINAGRI SPIU an Agribusiness and Farmer Institutions Officer will be recruited to complement the capacity of the Marketing Support Officer already providing marketing support to ongoing IFAD-funded projects. For organization and capacity building of farmer cooperatives, a working relationship will be forged with the RCA both at national and district levels. Management of the financial services activities will be carried out in collaboration with the Business Development Foundation (BDF) building on structures and mechanisms already established for administration of similar funds under other IFAD funded projects in Rwanda.

Component 3: Institutional and Policy Development (USD 1.8m)

106. The objective of this component is to facilitate the consolidation of an evidence-based, inclusive policy framework and institutional structure for the Rwandan dairy sector. The component proposes to work across the phases of the national policy cycle – during policy formulation, implementation and evaluation – and will emphasize several core ways of working. These include partnership and learning from previous experience, integration into national policy processes and existing governance structures, being inclusive of the preferences, knowledge and experience of dairy farmers as well as other private and public sector actors, and to utilize and generate evidence to inform policy decisions. The component is structured around three sub-components: (i) policy formulation; (ii) policy implementation and institutional strengthening; and (iii) policy related analysis and technical assistance.

Sub-component 3.1 - Policy formulation (USD 0.32m)

107. Under this sub-component, the project will support the formulation of policies, laws and regulations necessary to improve the efficiency and effectiveness of the Rwandan Dairy Industry. The following will be the two core activity areas of support:

108. **Facilitation of formulation of a National Dairy Policy** needed to strengthen the sector. While the current NDS is an important document with excellent buy-in from various level of government as well as private actors, an updating of the 2004 policy on dairy is needed to actualize the strategy and provide specific indications on regulations and incentives for the industry. Specific support areas under this activity will include evidence-based technical review and updating of existing policies, laws and regulations; stakeholders consultations (ensuring that it reflects the views of rural women, youth, smallholder dairy farmers as well as the larger players) and consensus building on the new policy; and facilitation of the drafting and adoption process through the various organs of government, following the processes set out in the Cabinet Manual of the Office of the Prime Minister.

109. **Facilitation of drafting of strategies, laws, regulations and by-laws for the industry.** In addition to the Dairy Policy / Dairy law described above, additional regulations and strategies will be required for the sector. The laws currently identified in need of formulation that the project proposes to support include: the development of the regulatory framework to implement the concept of Authorized Agents for Artificial Insemination, a broader set of regulations and laws on animal breeding, animal feed standards, community purchase programmes for milk products and the identification of key conditions for successful privatization of veterinary services and a roadmap for its implementation. As above, the process of drafting and approving these laws and strategies should be led by the government, in conjunction with apex organizations such as the RNDP and the RCVD, and should involve the participation of smallholders and other actors in the production and sale of dairy products.

Sub-component 3.2 - Policy implementation and institutional strengthening (USD 1.16m)

110. To support effective implementation of policies in the dairy sector, the project will support the decentralization of policies and strategies related to the MO on milk collection and trade. Additionally, it will implement a follow-up (second phase) programme aimed at raising awareness on nutrition and milk and support the strengthening of milk production cooperatives and the apex organizations for the sector. The following are the three main activity areas:

111. **Policy implementation.** In August 2016 the MO on milk collection and trade will become mandatory. RDDP will support the next phase of implementation of the order with regards to training for milk sellers (at MCC and kiosk level), awareness raising, pre-audits, auditing/testing and certification. The activities will be implemented by RALIS, who is currently mandated to implement the MO. The package of support will include training for those implementing the policy (inspectors), training for milk sellers, demonstration and testing equipment for inspectors and additional costs of implementing the order. It is expected that the implementation of the MO will work in tandem with component 2, which will provide support for development of business plans for MCCs and milk kiosks, where those plans aim to upgrade equipment and selling conditions to comply with the order.

112. **Campaign on milk and nutrition.** RDDP will build on successful previous campaigns aimed at raising awareness about milk consumption to take a broader approach to raising awareness about nutrition and milk; and more general dietary diversity. In particular, the promotion of milk at household level of resource-poor farm households will be promoted as milk might be the only animal source protein accessible and affordable. Additionally, it will support creation of a specific module to be utilized in the FFSs on nutrition and support the dissemination of other campaigns about nutrition at the household, health service and school level.

113. **Institutional strengthening.** RDDP will assist the RNDP and RCVD to strengthen, at the apex level, their capacity to undertake critical policy analysis, to communicate with and receive communication from members, and contribute to the drafting of relevant laws, regulations and policies. With regards to the RCVD, the project will support plans to monitor and evaluate policies, as well provide training for private vets, in order to improve their capacity to act as a professional organization. At the grassroots level, the project will strengthen the capacity of farmers' organizations and other service providers in the dairy industry (ensuring effective voice for women, youth and smaller players) to effectively participate in the policy process organized through RNDP by providing them with better knowledge about the policy space, policy processes and mechanisms for their participation in the process (including the formulation of governance structures to enhance representation).

Sub-component 3.3 - Policy related analysis and technical assistance (0.31m)

114. This sub-component aims at supporting the government, in cooperation with development partners, to refine and rollout a pilot scheme to test the distribution models for the One-Cup programme with a particular focus on utilizing local procurement, in line with interventions to support the increased availability of processed, safe milk in project area milk sheds. Additionally, the sub-component will facilitate analysis and technical assistance on the dairy value chain, MINAGRI's Agriculture Gender Strategy and the Community and Local Economic Development Strategy. Core activities under this component will include:

115. **Testing of distribution models for the "One-cup of milk per child per day" programme.** Building on the strategy (2015) proposed by MINAGRI on options for up-scaling the One-Cup programme, the project will fund a pilot scheme to test and report on the efficiency and effectiveness of varied distribution mechanisms, with a strong focus on local/community purchase. As component 2 of the project intends to upscale capacity to process pasteurized and fermented milk (and other dairy products) on a decentralized basis, the pilot intends to encourage the purchase of this milk as part of the incentive to create an institutional market for milk and provide milk to schools on a more efficient and affordable basis. The pilot will rely on support from the three line ministries responsible for this programme, and work in tandem with sub-component 3.1. (policy initiatives related to creating incentives for local/community procurement) and component 2.

116. **Analysis and technical assistance.** In order to enhance systems for collection, compilation and reporting of quality data in the dairy sector, the project will work with FAO's MAFAP programme, which already has presence in the country and collaboration with MINAGRI, on collecting information on liquid milk/dairy products, as well as finance more in depth studies on the dairy value chain and dairy products. Additionally, RDDP will coordinate analysis on MINAGRI's progress towards achieving its Agriculture Gender Strategy by drafting a number of studies and hiring consultants to undertake a review. This should complement national systems on ensuring gender outcomes in project and other ministerial work (i.e. the performance contract system). A similar mechanism is in place to determine the contribution of the project/dairy industry and lessons learned for the Community and Local Economic Development strategy. A study to analyse the project lessons on how to improve the climate sustainability of the *Girinka* programme is envisioned.

117. **Implementation arrangements.** Activities under this component will be coordinated by a dedicated Policy Officer in MINAGRI, who will be responsible for following all identified laws, regulations and policies through the national policy process, facilitating the implementation of pilots and managing policy related knowledge management together with the M&E specialist. The Ministerial Order on preservation, collection, transport and selling of milk will be implemented by

RALIS staff. Some studies will be implemented by external consultants (national and international), whereas FAO staff involved with the MAFAP programme in coordination with MINAGRI will work on data collection and specific studies related to the dairy value chain.

D. Lessons learned and adherence to IFAD policies

118. RDDP builds on the lessons learned from past and ongoing experiences to improve and enhance the national dairy industry through the dairy hub model. This section highlights the lessons of most direct relevance to the RDDP (see Appendix 3 for a more extensive review):

119. Limited access to relevant and affordable inputs, technology, training and finance has been identified as one of the bottlenecks for the dairy industry in Rwanda. This is exacerbated by the inappropriate markets and supply chain inefficiencies. At the farmer level high transactions costs coupled with blockages in information and weak market orientation mean that farmers have little leverage in the sector. Production efficiency and quality constraints relating to animal feed and breeds are hampering production. Poor access to other relevant and affordable business development services, appropriate technology and quality inputs (such as artificial insemination, feed management techniques, hygiene know-how and disease control) limits quality of production at farm level.

120. Dairy hubs are a good example of an agro-industrial innovation, but they are only a necessary first step in the process of developing more efficient BDS and well-functioning dairy markets across Rwanda. The business sustainability of dairy hubs that supply inputs, provide services and process and market dairy products will depend on their continued ability to provide value-added services and good returns to their farmer members. Lessons learned from Kenya and other countries in the region highlight the importance of milk collection organizations in improving access to market and expanding productive bases. On the other hand, there is a need to stimulate consumption of dairy products in the country through various mechanisms, including school milk programs as more consumption increase demand for dairy produce and can potentially encourage long-term investments in production and quality.

121. The dairy value chain in Rwanda is defined by weak or lack of information, skills and business know-how at all levels to compete effectively in the market. Additionally, the overall costs of collecting and marketing are still high due to high transport and electricity costs and low access to inputs and equipment needed to increase efficiency. Transport capacity is limited and in some cases lack of infrastructure for milk channelling also compromises milk quality. Seasonality of supply compound these issues. Available evidence shows that MCCs, as they are designed with the current capacity utilized, are not generally profitable because of both cost of operating versus prices received.

122. The outreach of a range of relevant and timely services is essential for the success of dairy hubs if well managed and operationally sustained. There is a need of horizontal and vertical linkages to be developed in a manner that ensures that the desire, skills and momentum for change are maintained. New interventions should focus on sustainability and innovation in capacity enhancement, business partnership building and service facilitation. Business service provision at dairy hubs level should be taken as an entry point for dairy farmers mostly organized into cooperatives from which they expect to take advantage of a wide range of quality services. Hubs should be strengthened to provide more accessible and affordable services, build robust and sustainable business partnerships with other dairy value chain operators, and achieve economies of scale hence ensuring long-term viability.

123. Capacity building activities must focus on facilitative activities such as market research, provision of information for consumers, new BDS product development, supplier trainings, monitoring and evaluation. These activities are aimed at facilitating BDS market improvement by increasing demand and/or improving supply. Interventions should be flexible and responsive to the market dynamics and efforts should be made to coordinate with other development actors. It will be necessary to promote quality stable services via dairy hubs and build positive reputations of these facilities to offer reputable and transparent fee-based services.

124. There is need to continue started dairy sector development efforts that increase the production and sales of quality raw milk, support operational business oriented MCCs (dairy hubs) and sustainably increase revenues from milk sales, inputs and other services. Such efforts should include enhancing the services provided to dairy farmers (such as inputs, training, loans and technologies), stimulating the demand for services via service demonstrations and promoting appropriate technologies. It requires also capacity building activities focused on farmer's cooperatives and member as the pillars' of the success of the dairy hub model.

125. **Adherence to IFAD policies:** RDDP complies with IFAD's policies on targeting, gender equality and women's empowerment, private sector, climate change, environment and natural resource management. The project is designed to be consistent with the IFAD's Private Sector Development and Partnership Strategy, its Rural Finance Policy and the associated Decision Tools for Rural Finance. The project is also in line with the approaches outlined in the Framework for Gender Mainstreaming in PMD Operations.

126. The preliminary Environmental and Social category is B, considering that the project approach will promote enhanced natural resources management and better integration of livestock and crop production. RDDP will ensure that climate resilience technologies (e.g. solar energy and biogas technologies) are widely promoted along with capacity building, improved management of natural resources and dairy cattle herds, which in return, will contribute to mitigation of environmental risks. Under RDDP, a "climate smart dairy production intensification system" is defined as a system in which households have access to sustainable forage production (e.g. improved forage varieties tolerant to drought or/and flood or agroforestry fodder species for improving and diversifying livestock diet), water availability, use of renewable energy for dairy processing, and manure and waste management handling for reducing environmental pollution, soil erosion, loss of biodiversity and greenhouse gas emissions. See Appendix 12. Compliance with IFAD policies and Social, environmental and climate assessment programme review note (SECAP).

III. Project implementation

A. Approach

127. The lead agency in implementation of RDDP will be the Ministry of Agriculture and Animal Resources (MINAGRI). Within the ministry, the day-to-day operations of the project will be managed by the Single Project Implementation Unit (SPIU) which currently implements the other ongoing IFAD-supported projects in Rwanda - PRICE, PASP and KWAMP. In line with SWAp principles and to mainstream project implementation within the government agencies responsible for dairy development, RAB, RVDC and RCA will be responsible for supporting implementation of core project activities. As RDDP implementation partners, these agencies will deliver the specialised facilitation and technical services within their mandated roles to support project implementation and incorporate assessment and mitigation of short- and long-term climate risks in their services. In addition, the dairy sector stakeholder associations: the RNDP, NCCR, RNDF and RCA, where appropriate, will be retained on a fee for service basis to provide necessary capacity building and support services to targeted dairy cooperatives and other grassroots sector associations.

B. Organizational framework

128. **Project oversight.** In line with the practice for other IFAD-funded projects in Rwanda, MINAGRI will constitute a Project Steering Committee chaired by the PS, MINAGRI to provide policy direction of the project; approve AWPBs; and provide oversight to the programme management team to ensure effectiveness. Membership of the PSC will include: DG RAB (Vice Chairman), DG Livestock (MINAGRI), representative of MINECOFIN, DG Planning MINALOC, SPIU Coordinator, RDDP Manager (Secretary), Head of Livestock Department in RAB, RCA, and MINICOM. The PSC will meet at least twice a year.

129. **Project management.** The SPIU will recruit a Program Manager for the RDDP and additional professional and support staff to oversee the day-to-day operations of the project. In addition to subject-matter specialists identified under each of the components, the new staff will include officers

for Nutrition, Gender, Targeting and community mobilization, and M&E, learning and knowledge management. At district level, MINAGRI will appoint a Project Coordinator for each targeted district other than those served by the PASP project which already has a Coordinator partly responsible for dairy value chain related activities. See Attachment 3 in Appendix 5 for draft job descriptions of the SPIU technical staff.

130. **Performance-based contracts in project implementation.** The implementation of the RDDP will be structured around performance-based MoUs with key government agencies, partnership agreement with key partners (FAO and HPI) and service contracts with recruited service providers. To ensure uninterrupted service delivery during project implementation, MINAGRI will draw multi-year agreements with the key government implementing partners and HPI but provide for annual reviews to ensure strict adherence to achievement of results. All other service contracts requiring multi-year engagement will be issued on an annual basis, renewable only upon achievement of clearly set performance thresholds.

C. Partnerships with other initiatives

131. The RDDP will be implemented by MINAGRI, and project investments will be integrated with on-going and planned initiatives/projects related to livestock/dairy development and rural infrastructure development, supported by IFAD and/or partner financial institutions and the Government. In particular, RDDP will seek to build synergies with the following programmes:

- *IFAD-funded “Climate Resilient Post-Harvest and Agribusiness Support Project” (PASP)* which includes a blended ASAP grant. RDDP will be implemented in six of the PASP targeted zones. PASP has a number of activities in the dairy sector such as improved access to MCCs, capacity building of existing cooperatives, and support from business development service providers. Since both projects are complementary, efforts will be made to ensure adequate synergies.
- *IFAD-funded regional grant “Dairy Hub model Integration into IFAD-funded projects” (DHI)* to Heifer International that has recently been approved will support dairy development activities in selected areas in Rwanda and Tanzania. Within Rwanda it will be implemented in two districts one of which overlaps with RDDP. The DHI project will provide valuable lessons on the implementation of the dairy hub development model.
- *IFAD-funded regional grant “Greening livestock: Incentive-based CSA interventions for reducing the climate impact of livestock in East Africa”* implemented by the International Livestock Research Institute (ILRI), will enhance RDDP’s capacity to ensure climate resilience of dairy development activities.
- *World Bank- and Netherlands-funded Rural Feeder Roads Programme* that is supporting road development in rural areas will support the construction and upgrading of rural access roads linking milk production areas and MCCs and therefore facilitate milk movement from farms to MCCs as well as the marketing of dairy products.
- *AfDB-funded Livestock Infrastructure Support Project (LISP)* that supports infrastructure such as livestock watering systems and MCCs will be also instrumental for improving delivery of milk to MCCs as well as small scale processing plants.
- *USAID-funded Rwanda Dairy Competitiveness Program II (RDCP II)* that supports cooperatives with milk equipment, transportation of milk to MCCs and promotional campaigns for development of the dairy market will also be a key partner in the implementation of the RDDP.
- *Livestock Intensification Project (LIP)*, funded by the Government of Rwanda, has components that are synergetic with the proposed RDDP and aim at genetic improvement of local breeds, animal feeding and veterinary service delivery.
- *Government of Netherlands dairy sector support initiatives* targeting capacity building and training activities in the dairy sector will be also an important collaborating partner, particularly with respect to two model farms owned by private investors which are being developed to serve as centres for capacity building of smallholder farmers.

- *FAO supported Modernization of Agriculture project.* FAO is implementing a food security programme in cross-border districts of Rwanda, Burundi, DRC and Uganda, in support of the Modernization of Agriculture under NEPAD and CAADP Frameworks which are relevant to the RDDP. The project is being implemented in Gicumbi District to provide dairy farmers with reliable access to quality inputs and profitable and sustainable markets. It has also supported milk collectors and processors on milk preservation, hygiene and value addition. It provides support to IAKIB cooperative in Gicumbi District which is a successful model that RDDP will seek to replicate in its areas of intervention.
- *MINAGRI's "Twigire Muhinzi" extension programme* that was successfully implemented by the RAB in collaboration with the Belgian Technical Cooperation provides a good model for the establishment of FFSs.
- *BMDf-funded East Africa Dairy Development Programme* that was implemented in Rwanda by Heifer International (2008/2013) will be as used as a model for the establishment and strengthening of dairy hubs in RDDP's areas of interventions.
- Under the ongoing *FAO, IFAD WFP and UN Women Joint Programme on "Accelerating progress towards rural women economic empowerment"*, IFAD is specifically supporting: (i) women's associations to upgrade into cooperatives, and (ii) the introduction and implementation of GALS. The latter includes developing a network of national master GALS trainers and manuals and tools. These resource persons and materials will support the promotion of GALS in RDDP activities.
- The ongoing IFAD-supported grant with Oxfam Novib *Integrating household methodologies in agricultural extension, value chains and rural finance initiatives in Rwanda, DR Congo and Burundi* will also build significant capacity in Rwandan NGOs and civil society to design and implement GALS at group and household levels in connection to the RDDP.

D. Planning, M&E, learning and knowledge management

132. Project management will be guided by a results-based management approach which aims at ensuring that all processes, services and activities of the project and its implementing partners will contribute to the achievement of project targets within the framework of the project's theory of change. As part of this approach, planning, monitoring and evaluation will be results-oriented to enable tracking of progress towards outputs, outcomes, impact and sustainability.

133. **Planning.** Planning will be guided by the project's strategy, log-frame and broader results framework which will inform the development of annual work plans oriented towards planned results with clear identification of how planned activities are expected to lead to those results. A draft AWPB will be drawn up in consultation with implementing partners, including beneficiaries (e.g. cooperatives) where relevant. The SPIU will be responsible for the process and for the inclusion of and collaboration with key stakeholders in the planning process. AWPBs will be cleared by the Project Steering Committee and sent to IFAD 60 days prior to the end of each programme year for no objection.

134. The AWPB will be informed by an assessment of current implementation progress and will describe the strategic direction of the project for the coming year along with results expected (targets) under each component and how those results will be achieved. This will be complemented by a resource plan, budget and risk analysis for each result. The AWPB will include plans for training and technical assistance, M&E and procurement for the year in question.

135. **Monitoring and evaluation.** The objectives of the project's M&E system are three-fold: (i) it will provide information on progress towards results useful for results-based management at all levels, (ii) it will enable the tracking of physical progress against the targets set in the AWPB, and (iii) it will collect and disseminate lessons for learning purposes vis-à-vis options for scaling up, replication and risk management.

136. The system (see Appendix 6 for details) will be set up to incorporate regular data collection and analysis by beneficiaries and implementing partners, to be coordinated and compiled at SPIU level with analysis and results fed back to implementing partners and beneficiaries, as well as upstream to MINAGRI (feeding into the Ministry's Management Information System) and to IFAD. An

ICT-enabled system will be developed for on-going monitoring where reporting partners use mobiles or tablets for real-time reporting which feeds directly into the project's overall management information system. This will enable the timely monitoring and evaluation of results as well as tracking of activities and budget expenditure given by the AWPB, so allowing for improved analysis of effectiveness and efficiency.

137. In line with IFAD's results and impact management system (RIMS), results will be measured at three levels; outputs, outcomes and impact. Following the theory of change, a results framework will be elaborated which demonstrates the logical links between the results at their different levels and thereby enables the meaningful analysis of whether the project is on-track towards its planned results even in the first few years of implementation when higher-level results are not yet expected. The project log frame will be extracted from the results framework and linked to the economic and financial analysis in line with IFAD guidelines on log frame preparation.

138. The following will be the key elements of the M&E system for RDDP: (i) an M&E manual detailing scope, organisation and contents of the M&E system; roles and responsibilities; how data (sex- and age-disaggregated where appropriate) will be collected, analysed, reported, used and otherwise managed; timeline for M&E-related activities; staffing and capacity building plan; budget; etc.; (ii) annual M&E plans; (iii) project results chain, results framework and log frame; (iv) Management information system (v) baseline and completion surveys; (vi) mid-term review; (vii) annual outcome surveys; (viii) continuous progress monitoring of activities and outputs; (ix) risk assessment; (x) thematic studies, e.g. on targeting, climate-smart *Girinka*, gender equality and women's empowerment etc.; (xi) IFAD RIMS reporting; and (xii) field visits and joint implementation reviews.

139. **Learning and knowledge management.** The core relevance of the M&E system is in the use of the information it elicits for planning and decision-making as well as accountability. A knowledge management strategy for the dairy sector (in alignment with the broad KM and communication strategy of MINAGRI) will be developed built on three core pillars of knowledge management: people, processes and technology. Quarterly review meetings with implementing partners will be organised by project management to discuss progress towards results in relation to each quarterly progress report, the format of which will explicitly include a focus on lessons learnt in terms of challenges, good practices, etc. Study tours, exchange visits and learning routes will be organised for lateral knowledge transfer.

140. Concurrently, downward flowing information about project progress to beneficiaries and implementing partners in the field is of utmost relevance in fostering ownership and participation. Systems for these information flows will be developed and used on a regular basis, including stakeholder review meetings, planning workshops, and a newsletter to be shared with all dairy cooperatives. The project will collaborate with the Agricultural Information and Communication Centre (CICA) within MINAGRI to produce relevant knowledge products and communication materials, such as press releases, extension materials, and radio spots.

141. The project management information system will capture information related to planning, monitoring, evaluation and learning and act as a database and information system for project management and relevant stakeholders.

E. Financial management, procurement and governance

Project specific risk. Currently, there are three ongoing IFAD funded projects in Rwanda - KWAMP, PRICE and PASP. The projects are managed and supervised under one umbrella country portfolio implementation unit mainstreamed within MINAGRI known as the 'Single Project Implementation Unit (SPIU)'. This arrangement is the first within the IFAD Eastern and Southern Africa portfolio. It has been in place for over five years now and has worked well with recorded success in timely delivery and implementation of the projects as well as cost efficiencies, earning the country portfolio as a whole, a consistent favorable financial management rating of highly satisfactory. Some of the specific advantages include: (i) established financial management systems and structures in place have always benefited new projects coming on board, enabling quick start-up and take-off of the project

with limited or no financial management challenges; (ii) existing staff experienced in IFAD financing management procedures facilitate knowledge and skills-sharing with any new staff joining the SPIU; (iii) improved efficiency, lean staffing structures hence saving costs – e.g. there is only one Director of Finance and Chief Accountant for all the projects, however each project has a specific Accountant recruited for day to day tasks; and (iv) uniformity of approaches and processes, faster implementation, quicker leverage of lessons learned, and improved accountability. Based on these factors, the fiduciary risk assessment at design is rated Low, and it is recommended that the RDDP be also implemented under the MINAGRI/SPIU arrangement.

142. **Country context and inherent risk.** Rwanda has been ranked highly in terms of maintaining a high level of integrity in public administration. The Country has also made significant progress in establishing mechanisms to support integrity and transparency in the public procurement systems. The 2015 Corruption Perception Index (CPI), released by Transparency International (TI), ranks the country as the fourth least corrupt country in Africa and 44th globally (<http://www.transparency.org/cpi2015#results-table>). The report shows an improvement in Rwanda's percentage score from 49% (2014) to 54% (2015), placing it on an overall inherent risk rating bracket of medium risk. Accordingly, Rwanda and its institutions are acknowledged as substantially accountable, effective and efficient, participatory, transparent, responsive and equitable in public administration.

143. **Organization and staffing.** The proposed FM-arrangements including budgeting, accounting, internal controls, flow of funds, financial reporting, and audit arrangements will follow the FM arrangements already in place within the SPIU. The proposed FM arrangement are described in Appendix 7 and will be outlined in detail in the revised Project's implementation Manual which will be prepared before project start up and reviewed during the first year of implementation. Attachment 1 in Appendix 5 provides a draft outline of the PIM.

144. MINAGRI is undergoing a re-structuring process and one of the possible scenarios is devolving donor funded projects into MINAGRI implementing agencies: Rwanda Agriculture Board (RAB) and National Agriculture Export Board (NAEB). If the re-structuring process approves devolving donor funded projects into MINAGRI implementing agencies, the risk of delayed implementation of activities as a result of changes in structure of the current system may have an impact on RDDP. It is therefore recommended that a fiduciary capacity assessment be done in line with IFAD requirements and guidelines to ascertain the agency's ability to manage project funds in an efficient manner. The new proposed arrangement of project implementation under the agencies will therefore require No objection approval from IFAD.

145. **Project budgeting system.** The RDDP AWPB will be prepared in the format described in the IFAD guidelines for AWPBs by the SPIU with substantial participation of other implementing partners - NGOs and Government agencies. Each AWPB will include a detailed description of planned Programme activities by component, sub-component and activity, and a procurement plan for 18 months. The SPIU will establish the funds available for the AWPB for a particular year as per cost tables. The Project District coordinators/Officers will align the activities to the needs of the beneficiary Districts with due regard to the performance contracts entered into by the Districts. The participation of District authorities in this exercise will be paramount, and an activity schedule, prepared by the project district coordinator and approved by the district authorities will be submitted to the SPIU for analysis and consolidation of the project AWPB. At this point, the SPIU will ensure that the activities presented for financing are eligible. After consolidation, the draft AWPB will be submitted to the PSC and MINAGRI for approval and later to IFAD for comments and acceptance, no later than 60 days before the beginning of the relevant financial Year. No withdrawal of funds shall be made from the Loan/Grant Accounts until the AWPB has been approved. If required, the SPIU may revise the AWPB half yearly.

146. **Project bank accounts.** It is a government policy that all government agencies will open their bank accounts in the National Bank of Rwanda. Accordingly, RDDP will open and maintain three bank accounts: Counterpart Account in RwF for the government counterpart funds, the Designated Account in USD and the Operations Account in RwF. The following will be the signatories to the said bank accounts: Permanent Secretary (PS)/Director General for corporate services of MINAGRI (alternate: SPIU Coordinator) and the SPIU Coordinator (alternate: SPIU DAF). The operation and counterpart fund

account will be used to make payments to suppliers, service providers and contractors. Management rules for the DA will be based on provision 4.04 of the new IFAD General Conditions for Financing, according to which operational conditions (bank, Authorized Allocation, currency, signatories) are specified in the financing agreement.

147. **Accounting systems.** Accounting records will be maintained in accordance with IPSAS-cash basis of accounting. The SPIU is currently using TOMPRO software for all IFAD funded projects in an efficient and satisfactory manner. TOMPRO is multi-project software, and hence the SPIU will not be required to purchase another FMS, but engage the services of the developer to issue a license for RDDP. The coding structure of the Chart of Accounts (CoA) for all government projects/entities is pre-determined by the Ministry of Finance (MINECOFIN). The essence is to facilitate government to consolidate financial statements at the end of every financial year. RDDP will also adopt the government recommended CoAs. In order to track expense and revenue accounts by component, category, financier and activity, TOMPRO software allows for the development of an analytical chart whose journals and accounts post to a separate ledger (the analytical ledger). The set up (of the analytical chart) follows the layout of activities in component and category form, as provided for in the project cost tables. Once the cost tables have been drawn, RDDP will setup the analytical CoAs in the FMS, according to the agreed components, subcomponents and activities.

148. **Internal controls and internal audit.** In order to effectively safeguard project resources, internal controls have been instituted at the SPIU in the whole framework of financial and administrative procedures. The identified controls range from proper record keeping and posting, authorization of accounting, procurement and administrative documents, balancing and checking, physical security of assets, double signing (approval) arrangements, to financial reporting and monitoring. An Internal Audit (IA) department is however vital to check overall compliance to internal controls and provide support towards improving systems, procedures and processes. The SPIU has got an Internal Audit (IA) department, staffed by one person. However, at the moment the only IA position in the department is vacant. The SPIU will recruit an Internal Auditor in line with government labor laws, as IA is considered good practice and it is generally part of the underlying financial management control framework.

149. **External audits.** The current projects are all being audited by the Office of the Auditor General (OAG) as mandated under the government Act/Law. The Office has legal personality and financial and administrative autonomy; hence, while discharging its responsibilities, the Office is independent and does not receive any injunctions from other organs. This makes it acceptable and preferable to IFAD. A review of the quality of the OAG reports for the current projects indicate highly satisfactory performance ratings, with positive comments given for the level of detail of the audits and use of acceptable standards - INTOSAI auditing standards. It is recommended therefore that RDDP will also be audited by the OAG. A complete set of Financial Statements specific to RDDP will be prepared in accordance with International Public Sector Accounting Standards (IPSAS) - modified cash basis.

150. **Procurement arrangements.** The government procurement regulations require that the SPIU (as a procuring entity) will undertake procurement planning and stipulate the nature and responsibilities of the Tender Committee, as well as who is eligible to be in the tender committee. The Government has also undertaken the use of national Standard Bidding Documents (SBDs). The Rwanda Public Procurement Authority (RPPA) has prepared a Standard Manual for Public Procurement (Public Procurement User Guide) for the benefit of procuring entities. The manual sets out procurement methods to be used and the thresholds. A procurement manual specific to the SPIU is thus not necessary and the SPIU will not be required to have one. The SPIU shall apply open competitive bidding for procurement of supplies, works, goods and other services except when it is not ideal. Foreign bidders are also allowed to participate. National Tendering is set at ≤RwF 600,000,000 for goods and services and ≤RwF 1,200,000,000 for works. Goods, services and works' tenders with values beyond the values stated above go through International Tendering processes. Other procurement methods are: Request for Quotations (RwF ≤1,000,000), Single-source procurement/Direct contracting (RwF ≤100,000 and other conditions), Restricted tendering (RwF ≤5,000,000 and other conditions), Force Account (Works difficult to quantify and no threshold is set here), and Community Participation (RwF ≤20,000,000). Details of conditions and thresholds for different procurement methods are set out in Appendix 8.

F. Supervision

151. **Project supervision** will be carried out directly by IFAD jointly with MINAGRI as the Lead Agency with the participation of HPI. Two implementation support and supervision missions will be conducted every year to review effectiveness of the programme approach in targeted districts; planning; gender and targeting; procurement and financial management; partnerships; and monitor the achievement of outputs, outcomes and impact.

152. **A Mid-Term Review** will be organised by MINAGRI at the end of the third year to: (i) assess achievements and interim development results, and effectiveness of project implementation; (ii) identify key lessons learnt and good practices; and (iii) provide recommendations to ensure sustainability of results beyond completion.

153. **IFAD country office** will play a key role in supervising the project by continually assessing bottlenecks and risks to successful implementation and sustainability; monitoring changes in implementation circumstances that require adjustments to project design; appraising the continued relevance of the project objective to the country, target groups and IFAD development priorities; and proactively proposing adjustments to the project design, implementation arrangements and log frame when appropriate.

154. **Reporting arrangements.** The SPIU will submit by-annual progress reports according to a format acceptable to IFAD. These reports will include physical and financial progress updates. Physical reporting will be done against a set of indicators based on the log frame. Financial reporting will be done against the approved budget

G. Risk identification and mitigation

155. The following are the main risks of the project and the proposed mitigation measures:

Main risks	Mitigation measures
High: Weak management capacity of dairy cooperatives.	RDDP is expected to support focused capacity development programmes to foster the governance and management capacity of dairy cooperatives.
Medium: Business management capacity of dairy hubs does not develop fast enough to cope with their expansion and ensure that activities are managed effectively in support of dairy value chain development.	RDDP is expected to provide inputs appropriate to the needs of the hubs that will be supported by an extensive training and business coaching programme. Where appropriate, the project will support a "turnaround" programme that has proved effective under other projects supporting cooperative development.
Low: RDDP financial incentives encourage non-commercial hub investments.	RDDP financial services strategy focuses on fostering the commercial lending sector by not subsidizing interest rates, but instead by linking focused project investment resources to leverage private investment and borrowing from the commercial banking system in support of smallholder dairy farmers and other actors in the value chain through 4Ps; and in so doing, develop commercial value chain relationships and services that are market-driven and sustainable.
Medium: Under investment in rural roads, water and electricity development perpetuates the problem of low quality milk available for processing, high costs of production and limited opportunities for export.	Infrastructure development is instrumental to develop a vibrant and competitive dairy industry in Rwanda. Government has committed to provide additional resources under the Feeder Roads Programme to finance feeder roads improvements under component 2, currently estimated at USD 12.8 million.

Low: Common External Tariff barriers and unregulated importation of cheaper milk products from external markets (especially from neighbouring countries, Kenya and Uganda) suppress local initiative to increase dairy production and value addition through modern processing.	A Study on Development of Dairy Policy, Regulatory and Institutional Framework for the proposed RDDP has been conducted in collaboration with IFAD's Policy and Technical Division. The study reviewed the present policy, regulatory and institutional framework for the dairy sector and identified the necessary building blocks that would contribute to enhancing such framework and defined an approach for developing it. The proposed plan of action is included in component 3 of the project which has been endorsed by MINAGRI.
Low: Disease outbreak (FMD, RVF, CBPP) can cause losses for dairy producers and the dairy industry if contingent and prophylactic plans are not effectively and efficiently funded and implemented by national veterinary authorities.	The Government has put in place mitigating factors for disease control as there are regular vaccination campaigns against these diseases as well as an elaborate movement control of livestock and livestock products. Lessons learnt from IFAD funded projects in other countries of the region, notably Zambia and Malawi on disease control, have been taken into account in formulating appropriate measures under the project for strengthening the national capacity to mitigate risks of disease outbreaks.
Medium: The effect of climate change would have significant impact on natural resources, in particular pasture and forage/crop production, affecting seasonal available grazing, and thereby reduce nutrition and consequently lactation levels of traditional and improved breed cattle.	RDDP will train participating dairy farmers on forage conservation techniques and invest in pasture improvement and conservation at farm level. The project will also promote investments in climate-resilient and low-carbon post-production procedures, cooling, processing and value addition to generate reductions in product losses and increase farmers and rural labourer incomes.

IV. Project costs, financing, benefits and sustainability

A. Project costs

156. The total cost of RDDP including physical and price contingencies is estimated at USD 65.1 million (RwF 51.2 billion) of which USD 62.7 million (RwF 46.7 billion) are baseline costs and USD 2.4 million (RwF 4.5 billion) are allowances for physical and price contingencies. The baseline cost broken down by project components is as follows: (i) Climate-smart dairy production intensification: USD 26.5 million (RwF 19.7 billion), representing 42% of total base cost; (ii) Producer organization and value chain development: USD 28.8 million (RwF 21.5 billion), representing 46% of total base cost; (iii) Policy and institutional development: USD 1.8 million (RwF 1.3 billion), representing 3% of total base cost; and (iv) Project coordination and management: USD 5.6 million (RwF 4.2 billion), representing 9% of total base cost. Table 2 below summarizes the total costs by component and sub-component. The detailed cost tables and additional summary tables are shown in Appendix 9.

Table 2: Project costs by component

	(RwF Million)			(US\$ '000)			%	% Total
	Local	Foreign	Total	Local	Foreign	Total	Foreign Exchange	Base Costs
A. Climate-smart Dairy Production								
1. Knowledge, Attitudes and Behaviour	4 411,7	2 514,9	6 926,6	5 921,7	3 375,7	9 297,4	36	15
2. Sustainable Access to Public and Private Livestock Services	3 788,6	2 538,8	6 327,3	5 085,3	3 407,8	8 493,1	40	14
3. Asset Building and Climate-Smart Productivity	5 463,2	997,9	6 461,0	7 333,1	1 339,4	8 672,5	15	14
Subtotal Climate-smart Dairy Production	13 663,4	6 051,5	19 714,9	18 340,1	8 122,9	26 463,0	31	42
B. Producer Organization and Value Chain Development								
1. Organization and Capacity Building of Farmer Cooperatives	3 685,1	1 566,4	5 251,5	4 946,5	2 102,5	7 049,0	30	11
2. Investment in Milk Collection and Processing Infrastructure	1 342,9	2 562,4	3 905,3	1 802,6	3 439,4	5 242,0	66	8
3. Financing for Dairy Enterprise Development	11 994,5	340,4	12 334,9	16 100,1	456,9	16 556,9	3	26
Subtotal Producer Organization and Value Chain Development	17 022,6	4 469,1	21 491,7	22 849,2	5 998,8	28 847,9	21	46
C. Policy and Institutional Strengthening								
1. Policy Formulation	138,9	101,7	240,6	186,4	136,5	322,9	42	1
2. Policy Implementation and Institutional Strengthening	658,5	209,1	867,6	884,0	280,6	1 164,6	24	2
3. Policy Related knowledge management	168,8	63,2	232,0	226,5	84,8	311,4	27	-
Subtotal Policy and Institutional Strengthening	966,2	374,0	1 340,2	1 296,9	502,0	1 798,9	28	3
D. Project Coordination and Management								
1. Project Management	2 267,7	1 105,0	3 372,6	3 043,9	1 483,2	4 527,0	33	7
2. Monitoring and Evaluation	537,3	263,9	801,3	721,3	354,3	1 075,5	33	2
Subtotal Project Coordination and Management	2 805,0	1 368,9	4 173,9	3 765,1	1 837,4	5 602,6	33	9
Total BASELINE COSTS	34 457,2	12 263,4	46 720,7	46 251,3	16 461,0	62 712,3	26	100
Physical Contingencies	10,5	10,5	21,1	14,2	14,2	28,3	50	-
Price Contingencies	2 858,5	1 637,4	4 495,9	1 479,5	849,0	2 328,4	36	4
Total PROJECT COSTS	37 326,3	13 911,4	51 237,6	47 745,0	17 324,1	65 069,1	27	104

157. The total cost includes taxes amounting USD 4.0 million (6% of total cost) and an amount of foreign exchange estimated at USD 17.3 million (27% of total cost). The investment and recurrent costs account respectively for 92% and 8% of the total cost.

B. Project financing

158. The project will be financed by: (i) IFAD to the tune of USD 44.7 million (corresponding to 69% of total cost), through a highly concessional loan of USD 43.6 million and a country grant of USD 1.1 million; (ii) Heifer International for USD 4.0 million (6% of total cost); (iii) Private sector/banks for USD 6.6 million (10%); (iv) Government of Rwanda for a total of USD 3.9 million (6%), which would be in terms of tax exemptions; and (v) Beneficiaries for USD 5.9 million (9%). Table 3 below lays out the detailed financing arrangements.

Table 3: Financing plan by component (USD'000)

	IFAD Loan		IFAD GRANT		Heifer International		Private/Banks		Beneficiaries		The Government		Total	
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
A. Climate-smart Dairy Production														
1. Knowledge, Attitudes and Behaviour	8 973,6	91,4	-	-	-	-	-	-	-	-	840,4	8,6	9 814,1	15,1
2. Sustainable Access to Public and Private Livestock Services	6 485,2	72,6	535,7	6,0	404,0	4,5	115,6	1,3	603,6	6,8	790,4	8,8	8 934,5	13,7
3. Asset Building and Climate-Smart Productivity	6 084,4	68,5	-	-	594,0	6,7	1 584,8	17,8	-	-	625,5	7,0	8 888,7	13,7
Subtotal Climate-smart Dairy Production	21 543,3	78,0	535,7	1,9	998,0	3,6	1 700,4	6,2	603,6	2,2	2 256,3	8,2	27 637,3	42,5
B. Producer Organization and Value Chain Development														
1. Organization and Capacity Building of Farmer Cooperatives	4 236,0	57,0	-	-	2 908,7	39,2	-	-	-	-	283,5	3,8	7 428,2	11,4
2. Investment in Milk Collection and Processing Infrastructure	3 146,2	56,7	344,7	6,2	90,2	1,6	-	-	928,2	16,7	1 036,7	18,7	5 546,0	8,5
3. Financing for Dairy Enterprise Development	7 368,1	44,3	-	-	-	-	4 866,7	29,2	4 400,0	26,4	11,7	0,1	16 646,5	25,6
Subtotal Producer Organization and Value Chain Development	14 750,2	49,8	344,7	1,2	2 998,9	10,1	4 866,7	16,4	5 328,2	18,0	1 332,0	4,5	29 620,7	45,5
C. Policy and Institutional Strengthening														
1. Policy Formulation	332,3	98,8	-	-	-	-	-	-	-	-	3,9	1,2	336,2	0,5
2. Policy Implementation and Institutional Strengthening	1 073,4	88,4	-	-	-	-	-	-	-	-	141,0	11,6	1 214,4	1,9
3. Policy Related knowledge management	65,8	20,7	210,3	66,3	-	-	-	-	-	-	41,3	13,0	317,3	0,5
Subtotal Policy and Institutional Strengthening	1 471,5	78,8	210,3	11,3	-	-	-	-	-	-	186,1	10,0	1 867,8	2,9
D. Project Coordination and Management														
1. Project Management	4 767,4	98,8	-	-	-	-	-	-	-	-	59,1	1,2	4 826,5	7,4
2. Monitoring and Evaluation	1 086,5	97,3	-	-	-	-	-	-	-	-	30,3	2,7	1 116,8	1,7
Subtotal Project Coordination and Management	5 853,8	98,5	-	-	-	-	-	-	-	-	89,4	1,5	5 943,3	9,1
Total PROJECT COSTS	43 618,8	67,0	1 090,7	1,7	3 996,9	6,1	6 567,1	10,1	5 931,8	9,1	3 863,9	5,9	65 069,1	100,0

159. Project financing from IFAD broken down by expenditure category is shown in Table 4 below:

Table 4: IFAD financing by expenditure categories (USD'000)

	IFAD Loan		IFAD GRANT	
	Amount	%	Amount	%
1. WORKS	510,2	1%	-	0%
2. VEHICLES	145,4	0%	-	0%
3. EQUIPMENT & MATERIALS	5 095,1	12%	344,7	32%
4. GOODS, SERVICES & INPUTS	9 730,6	22%	210,3	19%
5. CONSULTANCIES	5 689,7	13%	535,7	49%
6. TRAINING & WORKSHOPS	9 724,1	22%	-	0%
7. GRANTS & SUBSIDIES	7 777,2	18%	-	0%
8. SALARIES & ALLOWANCES	3 737,9	9%	-	0%
9. OPERATING COSTS	1 208,6	3%	-	0%
Total PROJECT COSTS	43 618,8	100%	1 090,7	100%

C. Summary benefits and economic analysis

160. The economic and financial analysis (EFA) is focused on the project benefits expected at farm level, at MCC level, at processing level and at marketing level. These benefits arise from the overall improvement of productivity and production of milk as well as organizational and managerial skills of farmers and their cooperatives in collection, processing and marketing of milk and other dairy products. It is estimated that the project will support directly a total of around 80,000 smallholder dairy farmers and 65 MCCs within the project area. The project is expected to yield additional benefits to smallholders and other dairy value chain stakeholders, including amongst others:

- Increased cash income, arising from enhanced productivity as a result of adoption of improved dairy farming practices and access to high-quality inputs and extension services, through the Hub Model approach;
- Enhanced nutrition and food security through increased milk quantity and quality, along with better access to social services such as education and health;
- Increased employment and business opportunities along the dairy value chain owing to the increase in the share of milk production that is marketed/processed as well as matching grants to develop public private partnership initiatives;
- Increased tax revenue and net foreign revenue stemming from reduced imports of dairy products and increased exports to neighbouring countries such as Burundi and Democratic Republic of Congo (DRC).

161. **Financial analysis.** The project financial analysis has been carried out for the project activities that lend themselves to it and where sufficient data were available. It has been conducted at the farm level and at the MCC level.

162. **Dairy farmer.** The Livestock Sector Investment and Policy Toolkit developed jointly by the World Bank, FAO and CIRAD has been used to performed the analysis using a livestock herd growth model as detailed in the WP Nr 2. The analysis has been conducted for a typical beneficiary of RDDP rearing two cows under the “zero grazing” system which is the most widespread smallholder dairy farming system in Rwanda, in addition to being the one recommended by the government for the whole country. Two farm models have been developed on the basis of livestock practices in Rwanda: (i) the Zero-Grazing model with Ankole Breed (ZGA), in which local breed cows are progressively upgraded by crossbred cows through artificial insemination and natural service and (ii) the Zero-Grazing model with crossbred cows (ZGC), in which the increase of milk production will result from the enhancement of smallholder’s capacity in managing animal nutrition, health services, milk quality, husbandry practices, etc. In the with-project situation a zero herd growth hypothesis has been considered in view of limited access to land and an Improved Zero-Grazing model showing better performance in milk productivity, milk quality, demographic and zoo-technical parameters, access to market, etc. The details regarding these models are shown in WP Nr 2. The results show a quite acceptable financial profitability for both models. The financial internal rate of return (FIRR) is 43.4%

for ZGA model and 22.6% for ZGC model, and the net present value (NPV) is respectively USD 2,600 and USD 662, at an opportunity cost of 17%.

Table 5: Farm models - summary of financial analysis results

Models	FIRR	NPV (RwF)	NPV (USD)
Local breed model	43.4%	1,935,667	2,600
Cross breed model	22.6%	493,679	662

163. **Milk collection centre.** Three MCC models have been developed in line with the current categorization of MCCs in Rwanda: (i) MCC category 1, in which the MCC operates well and supplies farmers most of the much-needed services; (ii) MCC category 2, in which the MCC is in operation well but provides only few services to farmers; and (iii) MCC category 3, in which the MCC is currently not operating at all either because it is new or has closed down due to various reasons. The results show that under the hypotheses made, the project is financially profitable from the standpoint of all categories of MCC (details in the Appendix 10). The internal rate of return ranges from 25% to 34% and the net present value at an opportunity cost of 17% is positive in all models, ranging from around USD 32,000 (RwF 24 million) to USD 88,000 (RwF 66 million). The cash-flow analysis to assess the financial sustainability reveals that a MCC which is already operating (categories 1 and 2) would be able to pay back within one year the loan required to fund the incremental working capital and its contribution to the additional equipment cost. However, for a MCC in category 3, the repayment period should be extended to four years because of higher need of incremental working capital.

Table 6: MCC models - summary of financial analysis results

Models	FIRR	NPV (RwF)	NPV (USD)	B/C
MCC category 1	28.7%	26,147,778	35,098	1.12
MCC category 2	25.4%	23,823,701	31,978	1.11
MCC category 3	34.7%	65,903,731	88,461	1.11

164. **Small scale processor.** An analysis has been carried out to assess the financial profitability of processing at the level MCC. On the basis of IAKIB's unit transformation project, it results that the activity of dairy processing by MCC is profitable provided that the MCC is able to address the issue of marketing of final products. Under conservative assumptions, the FIRR and the NPV are estimated respectively at 48.5% and USD 2 million.

165. **Milk retail point.** The profitability of the franchise distribution model put in place by Inyange and Crystal dairies (Milk zone/milk selling point) has been assessed, as RDDP seeks to support the expansion of this network of fresh pasteurized milk marketing. The FIRR and NPV are respectively 36.6% and USD 10,770, meaning that this activity is financially viable, provided that the retail point is established in a place where it is possible to sell at least 450 to 500 liters/day.

166. **Economic analysis.** A cost-benefit analysis at shadow prices has been carried out for a period of 20 years in domestic currency at domestic price levels. The financial prices and the streams of costs and benefits have been converted into economic values, by removing taxes, subsidies and other transfers; using a shadow exchange rate to convert the foreign exchange price of traded items into domestic currency and using specific conversion factors. The economic benefits taken into account are those that are readily quantifiable; they derive from the increase in the production of milk and other livestock products at the farmer level (marketed and self-consumed) and the increase in the income generated by MCCs and milk retail points.

167. The project would yield an economic internal rate of return (EIRR) of 26.2% and a net present value (NPV) of USD 44.1 million at a 12% economic discount rate. The project is therefore profitable from an economic standpoint. Furthermore, the sensitivity analysis carried out shows that the economic profitability of RDDP will remain satisfactory even if the project cost increases by 50%, the project benefits decrease by 50% or if the benefits lag behind by 2 years.

Table 7: Sensitivity analysis results

Indicators	Base case	Increase in project costs			Decrease in benefits			Delay of benefits	
		10%	20%	50%	-10%	-30%	-50%	1 year	2 years
EIRR	26.2%	24.3%	22.6%	18.4%	24.1%	19.3%	13.3%	22.1%	19.0%
NPV (USD million)	44.1	40.3	36.5	25.2	35.9	19.5	3.2	34.0	25.0

D. Sustainability

168. The project will contribute to improving the livelihoods of targeted dairy farmers and to strengthening the resilience of their production systems, through the promotion of dairy farming as a profitable business. To build ownership and sustain investment in the dairy value chain, the project implementation approach is focused on grassroots institution building as well as participatory and bottom-up approaches with emphasis on community development. In essence, the sustainability of RDDP investments and development results will be ensured through the following complementary thrusts:

- **Promotion of a community-driven development approach.** The RDDP support strategy is based on: (i) the extensive use of a participatory approach in project planning, implementation and monitoring, as well as community engagement and institutional collaboration which enhances local ownership of project activities and investments; (ii) technical and human capacity building of stakeholders to enhance sustainability, including the use of the field-tested Hub Model to provide extension services and ensuring availability of technical support at affordable cost for beneficiary farmers. Integration of innovative approach such as GALS will be fundamental to set sustainable changes through fostering more equitable gender roles and relations at household and group levels. The climate smart dairy intensification approach will strengthen community resilience through the sharing of dairy farming best practices and adoption of green innovations to cope with extreme climate events.
- **Institutional sustainability.** By considering institutional building as a fully-fledged component, RDDP emphasizes the need for a conducive and inclusive institutional framework, in which smallholders are involved from the formulation to the implementation of policies. The project will support dairy farmer cooperatives, the Rwanda National Dairy Platform and the Rwanda Council of Veterinary Doctors to strengthen their technical and organizational capacities, thereby ensuring continuity and sustainability of support after the implementation period of RDDP.
- **Community contribution to project cost and technology transfer.** Emphasis on cost-sharing with beneficiaries ensures effective ownership. Moreover, empowerment of dairy groups through livestock farmer field schools for technology transfer and dissemination of knowledge will contribute to creation of sustainable social capital. Through enhanced entrepreneurial capacities, farmer groups and communities are expected to be more involved in running business enterprises such as milk cooling and processing as well as initiatives to seek extension services, develop business proposals to be financed by financial institutions, and conclude contracts with nation-wide milk processors.
- **Participation of the private sector.** In line with Government emphasis on demand-driven and private sector-led approaches in delivery of extension services to smallholder farmers, the project will make use of private service providers as well as institutional partnerships for delivery of support. The private sector involvement is likely to contribute to the increase of efficiency and sustainability of the project. In this regard, services such as artificial insemination, animal health services, animal feed processing, business planning and entrepreneurial skills development as well as financial literacy will be provided by the private sector.

- **Promotion of partnerships and linkages with key stakeholders such as** Heifer International for dairy business hub development and FAO for technical assistance regarding animal health and feed are key for the implementation of the RDDP. In addition, the project will collaborate with other national partners such as the Business Development Foundation, Rwanda Agriculture Board, and the Rwanda Council of Veterinary Doctors to ensure and enhance continuity of project interventions beyond IFAD support.
- **Economic and financial sustainability.** RDDP has been designed in accordance with a value chain approach whose sustainability rests chiefly on commercial incentives and private sector participation. The project will support dairy farmers, MCCs and other dairy value chain stakeholders to build financially self-sustaining commercial linkages based on commercial incentives rather than reliance on subsidies. Results of the economic analysis show that the project has a good and resilient economic profitability that should remain satisfactory even in case of strong adverse developments in project costs, benefits and implementation delay.
- **Scaling-up approach.** In broad terms, scaling up of results under the RDDP will be achieved through linking focused project investment resources to leverage private investment and borrowing from the commercial banking system through a 4P approach; and in so doing, developing commercial value chain relationships and services that are market-driven and sustainable. The project will strengthen the dairy value chain and, in particular, the linkages between smallholder dairy producers and their organizations on one hand, and processors or traders on the other; it will promote the development of a scalable model for integrating financial and non-financial services to dairy farmers into the commercial relationship between them and processors; and it will support efforts to reduce the cost of doing business in the dairy processing industry, so creating incentives for further investment in the sector as a whole.

Appendix 1: Dairy sector context

Status of production, issues and challenges

1. **Cattle population.** Rwanda has made tremendous strides in rebuilding its livestock sector in the last two decades since the 1994 socio-political crisis during which an estimated 80% of cattle and 90% of small ruminants were decimated. Total cattle population has increased more than two times from the pre-1994 level of below 600,000 heads and now stands at 1.35 million comprising 616,000 (45%) local breeds (mainly *Ankole*), 439,000 (33%) dairy cross-breeds, and 295,000 (22%) dairy pure breeds (see Table 1 below). In terms of the national herd size, Rwanda can be said to be well poised to become a significant milk producer in the region with its dairy herd of 734,000 million cattle (40% pure breeds, 60% crosses) comparing quite favourably with Uganda's dairy herd of 1 million (40% pure breeds; 60% crosses); Tanzania's 1.14 million (35% pure breeds, 65% crosses), Kenya's 3.5 million (50% pure breeds, 50% crosses); and Burundi's and DRC's total cattle populations of only 778,000 and 750,000, respectively (with only nascent dairy sectors).

Table 1: Cattle population, breeds and milk production in Rwanda, 2015

District and Regions	Nr Cattle	Local Breed		Crossbred		Purebred	
		Nr.	%	Nr.	%	Nr.	%
SOUTH	399.472	182.196		130.045		87.231	
WEST	218.295	99.563		71.064		47.668	
NORTH	254.060	115.875		82.707		55.478	
EAST	423.191	193.015		137.766		92.410	
MVK (Kigali city)	54.774	24.982		17.831		11.961	
Total for Rwanda (2015)	1.349.792	615.631	46%	439.414	33%	294.747	22%
Estimated National Production							
% adult female		57%		57%		57%	
Nr female		353.264		252.405		168.979	
Calving rate %		57%		70%		86%	
Nr reproductive female (lactating)		201.361		176.684		145.322	
Productivity (Kg/day)		2,1		5,5		9,6	
Period lactation (Days)		230		250		280	
Total Production (kg of milk)		97.156.541		242.940.038		390.917.143	
Total Production (MT of milk)	731.014	97.157		242.940		390.917	

NB. Yield and production based on quantity milked after calve intake
Source: MINAGRI, May 2016

2. Although cattle farming is widely spread across the country, the highest concentrations of cattle are in the Eastern Province accounting for about 31% of the total cattle population, with Nyagatare, Kayanza, Bugesera and Gatsibo districts having the highest concentration in the Province. Other notable districts with high concentration of cattle population include Gicumbi and Gakenge in the North; Ngororero, Rutsiru and Karongi in the West; Nyamagabe, Muhanga and Kamonyi in the South; and Gasabo in the greater metropolis of Kigali City. These correspond to the 5 milk-sheds¹ in the country each of which has its peculiar characteristics, opportunities and constraints which require a differentiated approach in addressing.

3. **Projected supply and demand for milk:** During project preparation, projections for the supply and demand for milk over the next 10 years were carried out by the design team together with a group of senior livestock officers from the MINAGRI. On the supply side, official data provided by the Rwanda Agricultural Board (RAB) for cattle herd growth over the last years (see Table 2) and parameters discussed and agreed upon with MINAGRI were used to estimate the evolution of milk production over the next ten years using the Livestock Sector Investment and Policy Toolkit (LSIPT2) and the DynMod herd modelling tools³.

¹ Rwanda has five main milksheds, the Eastern, Kigali, Northern, Southern and Western milksheds that have different production systems.

² Developed in partnership with the CIRAD, the World Bank and the FAO. The detailed results of this analysis is presented in Annex 7 of Working Paper 02.

³ Developed by CIRAD and ILRI.

Table 2: Cattle population in Rwanda by breed, 2008 - 2015

Livestock population between 2008 and 2015 (Nr. Head, MINAGRI, 2015)									Average Growth
	2008	2009	2010	2011	2012	2013	2014	2015	
Local Breeds	921.477	896.873	921.470	761.145	721.831	691.715	676.032	615.611	-5,6%
Crossbreds	198.571	232.204	321.442	271.261	293.428	317.405	443.043	439.400	12,0%
Purebreds	74.847	89.442	91.908	110.826	119.882	129.678	213.925	294.738	21,6%
Total	1.194.895	1.218.518	1.334.820	1.143.231	1.135.141	1.138.799	1.333.000	1.349.749	1,76%

Source: MINAGRI Livestock Data, May 2016

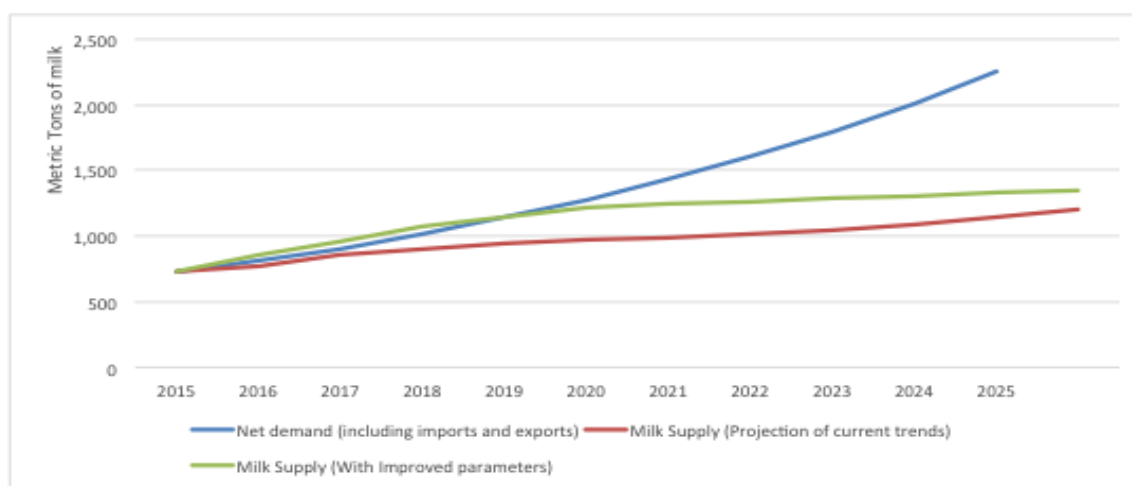
4. Two scenarios have been assessed. In the first scenario, the projected milk production has been estimated using the likely current trends and applying the following assumptions:

- Local breeds: a continued reduction in the number of local breeds reflecting a current trend (-5.4%/pa) that has to be addressed to avoid disappearance of the breed;
- Crossbreds: the continuation of the current growth (12.4%) reflecting the increased crossbreeding of both local breeds and pure breeds; and
- Purebreds: a progressive reduction in number (-2.7%) due to increased crossbreeding.

5. In a second scenario, projected milk supply has been estimated applying the improved parameters considered for the RDDP on the entire herd. In addition, for all breeds, it has been assumed that the long term average herd growths will be reduced due to an increased pressure on land and, consequently, a reduced feed availability forcing smallholders to limit the size of the herd through increased off-take including in female classes⁴. Resulting estimated growth rates are: local breed: -2.2%; crossbreds: +3.1%; purebreds: -4.8%.

6. On the demand side, demand for milk has been estimated using a simple standard model capturing population growth, inflation, revenues and elasticities of demand to price and income. The resulting projected balance between supply and demand for liquid milk over the next 10 years is illustrated in the Figure below.

Figure A1-1: Projected milk supply and demand over the next 10 years



7. The figure highlights the very likely increase in the deficit of supply over demand in the coming years and provides a solid rationale for the need of the project: if the dairy cattle herd grows at the same pace as current trends, the country will end up with an unsustainable situation. However by improving the situation, the occurrence and importance of the deficit can be delayed if effective interventions are implemented to improve yield per animal rather than increasing the number of

⁴ The detailed results of this analysis is also presented in Annex 7 of Working Paper 02

animals including: (i) policy interventions; (ii) capacity building of farmers in support of intensification; and (iii) improved access to services and improved animal genetic resources. Major limiting factor justifying an intensification pathway will be land access and availability, and animal feeding.

8. Another important findings from the analysis is the very likely trend towards the disappearance of the local breed which would justify supporting the national effort to maintain a population of purebred *Ankole* cattle as a mean to ensure biodiversity and access to a gene pool of livestock highly adapted to the Rwandese environment. In areas such as the Eastern part of Rwanda, crossbred cattle herds (with 25 to 50% of local breed bloodline) would be suitable animals for maximizing dairy production under semi-extensive production systems rather than dairy purebred livestock.

9. **Dairy production systems.** Rwanda has four main dairy production systems: pastoral, agro-pastoral, zero-grazing, and commercial:

- **Zero-grazing system.** This system is the most widespread throughout the entire country. Average herd size and cultivated land per household range between 2 to 5 animals (1 to 3 cows) and about 0.6 hectares, respectively (EICV3). Over 60% of the cattle are crossbreeds. The most common feeding system is zero grazing where animals are fed with forages, mostly *Pennisetum purpureum*. The system is characterized by low productivity due to limited skills, poor access to livestock extension and advisory services and inputs, poor reproduction performance, limited access to diversified forages and the lack of proximity animal health services. Depending on the breed, the milk productivity averages at about 2.1 Kgs/day for 230 days in the Zero-Grazing system with *Ankole* (ZGA) and around 5 to 6 Kgs/day for 250 days in the Zero-Grazing system with Crossbred (ZGC). This system has received significant outreach among the poor through the Girinka programme and the communal kraal system.
- **Pastoral (open grazing) system.** This system is mainly practiced in the Northern and Western highlands where rangeland of about 12,000 ha in the Gishwati plateau has been demarcated and leased to the local community and cooperatives for livestock purposes. Land size per household ranges from 5 to 10 ha and herd size from 10 to 15 cows, the majority (90%) crossbreeds. Due to good rainfall during most months of the year, this milkshed has generally good access to water and pastures and as a result, milk productivity is good with averages reaching 15 litres per day. The market development potential is also good both from local demand and from neighbouring urban markets in Eastern DRC (esp. Ngoma). However, as a result of cattle movements from Eastern DRC, cattle are facing a higher risk of Trans-boundary animal diseases (TADs) such as Foot and Mouth Disease (FMD) and Contagious Bovine Pleuropneumonia (CBPP). Partly due to the mountainous topography of the area but also because most settlements are relatively new, another key challenge in this milkshed is bad condition of rural feeder roads which limit market access for produced milk. As a result, farm-gate milk prices in this cluster are the lowest in the country sometimes going as low as RwF 100/litre.
- **Agro-pastoral (semi-intensive grazing) system.** This system is mainly dominant in the Eastern milkshed which has the largest cattle population (40%) and relatively large land sizes per farmer that can be up to 25 ha and therefore adequate for forage production, compared to the national average of 0.33 ha/household. This system evolved from the traditional extensive communal grazing system following the introduction of land tenure laws with confinement regulations which led to a major shift in husbandry and feeding practices. Herd size is also relatively large ranging from 10 to 25 cows per household. The region however regularly faces prolonged dry seasons (of 3–4 months) that adversely affects water and feed availability, animal health and milk productivity. The proximity to Akagera Park, Gako forest and the Ugandan border exposes the animals to TADs. Farmers in this region have easier access to market due to availability of a large number of milk collection centres (MCCs) and dairy factories.
- **Commercial dairy farming system.** This system is mainly practiced in the peri-urban areas of Kigali. In this system, farmers raise large number of mostly pure or cross breeds and are exposed to modern husbandry practices. They enjoy an easy access to livestock inputs, services and

markets. However, due to the concentration of large numbers of animals, there is more prevalence to diseases such as Mastitis and Brucellosis.

10. **Milk production.** Estimates by MINAGRI show that milk production has increased significantly from 50,000 MT in year 2000 to 731,000 MT in 2015. Out of this total, 242,940 MT (33%) is produced from cross-breeds, 390,917 MT (53%) from pure breeds and the balance, 97,157 MT (13%) from local breeds. This corresponds to the productivity levels of the different breeds currently estimated to range from an average of 2.1 litres/day for 230 days for local breeds, 5.5 litres/day for 250 days for cross-breeds, and 9.6 litres/day for 280 days for pure breeds. This low productivity stands out as one of the key areas that Rwanda must address to attain the level of competitiveness that can be accorded by the already sizeable dairy herd and the suitable agro-climatic conditions for dairy production in the country. The key to addressing this low productivity is strengthening capacity of smallholder dairy farmers; improved animal genetic resources; enhanced access to adequate feed and feeding practices and strategy; and better access to livestock services including animal health and AI.

11. **Advisory and extension services, and knowledge generation.** Despite promising progress thanks to the adoption by the GoR of the "Farmers Field School (FFS)" approach through the "*Twigire Muhinzi*" programme, farmer's knowledge and capacities to learn are yet limited to ensure a good understanding of the advantage of new improved techniques and technologies. Hence, milk productivity and milk quality are progressing at a too low pace. Over the past decades, Advisory and Extension Services (AES) have been limited by a low extension agent to dairy farmer ratio⁵ and inadequate extension agent capacity including the lack of transport, lack of equipment and training material and the lack of methodological support. Regarding research, the situation remains unclear. The transfer of the "Institut de Sciences Agronomiques et de Recherche" (ISAR) to a mixed animal research and extension programmes within the RAB led to the transfer of a number of researchers to extension without being appropriately prepared to this new function. In addition to reduced research capacity, transferring highly specialized researchers into broad specialization areas in a large range of fields including animal health, breed improvement, animal feeding, animal husbandry, milk hygiene, etc. is a long and often unsuccessful process.

12. With regards to targeting, extension generally services remain inadequate for a large number of poorest and women farmers. Lessons learned to improve outreach include: (i) more attention to women and men's practical needs and interests in farming activities to ease the uptake of new knowledge and skills; (ii) adapting training content to be suitable for illiterate people, including women and poor farmers; (iii) increasing the number of extension personnel and recruiting more women as extension personnel; (iv) designing more women-friendly technologies in order not to overburden them; and (v) paying attention to location and timing of training to increase proximity and attendance. Master Trainers from RAB have recently been trained on gender topics to better address these challenges

13. **Animal genetic resources (AnGR).** Over a period of just about one decade, Rwanda has succeeded in transforming the genetic structure of its national cattle herd from one dominated by local breeds to the current structure where local breeds account for less than half (46%) of the cattle population and the rest are cross-breeds (33%) or pure dairy breeds (22%). This transformation can largely be credited to importation of improved breeds under programs such as *Girinka* ("One cow per poor family") which has resulted in the distribution to poor families of more than 230,000 cows with improved genetics and cross-breeding of local breeds through Artificial Insemination (AI). These progressive developments in the genetic composition of the national herd are however also accompanied by new challenges and risks which in the medium and long term could significantly compromise the efforts and progress accomplished. These challenges include: increased feed requirements and pressure on land; the progressive disappearance of the local breeds; and the higher sensitivity to diseases of exotic and crossbreed cattle all of which require attention. Increased sensitivity to disease induces a higher utilization of drugs which results in increasing resistance of diseases to drugs (anti-microbio resistance) and, in turn, increased occurrences of diseases and higher requirement for use of drugs. MINAGRI has drafted an animal genetic improvement strategy

⁵ The East Africa Dairy Development (EADD) program has estimated that, on average over a year, a dairy farmer is reached 2.5 times by a public or private (NGOs, MCC) extension agent.

(2012) and a breeding policy (2015). These documents provide the guidelines for the introduction of new exotic breeds and the conservation of the indigenous species. However, the country now needs a rationale and well thought breeding programme and tools such as an Animal Identification and Performance Recording system to support its implementation.

Artificial insemination (AI) services. Since early 2000, the GoR has taken a number of steps and efforts in order to improve the national capacities for AI. A local production unit of semen and a liquid nitrogen production equipment have been purchased and established at the Masaka bull station. A number of AI inseminators have been trained and equipped and a cold chain developed. However, in spite of the investment, the success rate remains low (between 40 to 45% according to RAB). However, this figure does not take into account the number of repetition needed to reach a positive insemination and the real success rate remains unknown. According to studies of the EADD Programme, the lowest rate of adoption of AI among the EADD countries was found in Rwanda, where farmers' preference for AI varied between 3 and 28%. The limited farmer's skills in heat detection is often the main reasons given to explain the low results. The problem is also largely due to the organization and the logistic of the AI chain, the capacities and motivation of the inseminators. In the future, the GoR would like to see the private sector take over the delivery of AI services under a commercial mode. In the future, the Government would like to see the private sector take over the delivery of AI services under a commercial mode. However, as an isolated activity, the AI service cannot generate enough revenue to survive. The activity has to be seen in the larger context of the privatization of the veterinary services which is a complex operation requiring strong policy measures and commitment from the government.

14. **Animal feeds.** Inadequate quantity and quality of animal feed in Rwanda is a key factor that is preventing dairy cows from reaching the potential milk productivity that could be expected. The progressive substitution of the local breed by crossbreeds has placed animal nutrition among the highest priority issues that need to be addressed in the country's dairy sector. A well balanced mixed forages of grass and legumes could cover the needs of non-productive animals and of a dairy cow producing 5 to 6 litres of milk per day. However, improved dairy cows, cannot reach their potential productivity if they are exclusively fed on Napier grass without additional intake of proteins. Current situation is that there is limited forage production and lack of diversity in the type of forage available. Furthermore, very few farmers are providing complementary feeding of concentrates to their animals due to many factors such as limited number of animal feed processing plants, limited knowledge of farmers on the importance of improved feed supplements and the high cost of imported raw materials for feed manufacturing. The quality of concentrate available in the market is generally poor due to lack of quality control regulation of the feed industry. The profitability of supplementation with concentrates also depends on the ratio of milk price to feed cost per kilogram which has been estimated to be at least a ratio of 1.2:1 milk price per litre to cost of concentrate per kilogram. Current milk prices are therefore generally too low to provide the required market incentive to farmers to use supplementary feeding.

15. Within the Eastern milkshed, farmers are experiencing severe animal feed shortages during the dry season (June–September) that reduces milk production and increases cattle mortalities. In this cluster, cattle are raised under open and deteriorated range areas due to lack of appropriate grazing management and observance of the proper land carrying capacity leading to overgrazing and inadequate dry matter intake. Lack of conservation technologies, low availability of dry season feed, and insufficient quality commercial feeds also contribute to poor nutrition. In the Northern and Western milksheds, the high altitude and rugged topography favours kikuyu grass planted pastures fortified with clover legumes which is a sustainable farming system. This however requires rotational grazing systems and pasture management which is currently not adequately practiced by farmers.

16. **Animal diseases and health services.** The situation in Rwanda is more favourable than in most neighbouring countries in the area of animal diseases. Tick-Borne Diseases (TBDs) such as East Coast Fever, usually considered the most critical disease category in dairy production systems due to its associated high morbidity and mortality rates especially among improved dairy breeds, are relatively low in Rwanda compared to other neighbouring countries (EADD⁶). The most frequently reported diseases in Rwanda are: diarrhoea (43% of dairy households), anaplasmosis (31%) and

⁶ East African Dairy Development Programme. Baseline survey.

TBDs (21%). As a landlocked country sharing borders with four countries, Rwanda is exposed to TADs mainly Foot and Mouth Disease, Contagious Bovine Pleuropneumonia, and Lumpy Skin Disease. Control measures such as import certificates and quarantines are applied although there are concerns that the quarantine periods currently followed are inadequate. Other frequently reported diseases are brucellosis (10% incidence) and Mastitis (60%) which can be largely attributed to both lack of good practices in milking hygiene and handling, and limited capacity of public services to control milk quality and ensure food safety. The diagnostic capacity is however relatively good and the country has a number of well-equipped veterinary diagnostic laboratories (one main central laboratory and 4 satellites). High turn-over of technicians, lack of regular refresher training and lack of access to advanced diagnostic technologies are however key aspects that undermine the full utilization of this established capacity

17. **Animal health services.** Rwanda has a fairly well developed animal health services delivery system. Veterinary services are provided by the Government through district and sector veterinary officers. Dairy farmers access veterinary drugs freely and most drugs are abundant in veterinary pharmacies. Veterinary equipment is available in veterinary pharmacies and drugs can be imported duty and tax free. However, in absence of a private sector, the public sector delivery system is overstretched. A veterinary officer is responsible, on average to about 3,200 cattle in addition to all other animal species in that service area. As a result, services delivery to dairy farmers are inadequate and insufficient. Veterinary officers also lack capacity as they are inadequately trained in dairy management and do not have adequate transportation means to visit the large number of farmers in their service area. To address this shortfall, the government has adopted a strategy for promotion of private sector participation in the provision of animal health services. Some dairy cooperatives have also put in place private veterinary services and livestock insurance schemes. This has however not fully taken root and more has to be done to develop a national network of privately-owned animal health services in terms of training, policy and regulatory aspects.

Producer organization and market linkages

18. **Farmer organization.** Unlike the case of cattle population, information on the number of farmers involved in cattle farming in Rwanda is not readily available. Estimates by EICV IIV showing that 50.4%⁷ of livestock-keeping households have at least one cow suggest that Rwanda has around 850,000 cattle farmers. While there are no official figures on the number of dairy farmers, the National Dairy Farmers' Federation of Rwanda (NDDFR) puts an estimate of 400,000 (NDDFR Strategy, 2016). This would imply that about 52% of cattle farmers (450,000) have only the indigenous breeds and the remaining 48% have at least one improved dairy breeds. If this is the case, then it is highly likely that the number of dairy farmers in the country will continue growing as many of the farmers having only local breeds upgrade into improved dairy breeds either through crossing their local breeds or purchasing improved breeds from the market. Overall however, information on the number of farmers involved in cattle farming and their characterization across the various milksheds and production system is something that needs to be updated for better planning and targeting of interventions in the dairy sector.

19. Information from the Rwanda Cooperative Agency (RCA) shows that Rwanda has 314 registered dairy cooperatives with a total membership of 16,697 (39% women). Discussion with MINAGRI, RCA, NDDFR and other stakeholders show a convergence of views that out of the registered cooperatives, less than half are functional and efforts are required in re-establishment and strengthening their capacity to serve members. This notwithstanding, comparing the total registered membership to the total population of dairy farmers shows that only about 4% of dairy farmers are in any registered cooperative (functional or otherwise). This means that most of the dairy farmers end up dealing with the various input, service and output markets on their own as individuals. Given the small scale operations of the majority of dairy farmers (average of 3 cows), dealing with these markets individually puts the farmers at a significant disadvantage – and make them unable to command the economies of scale necessary to attract profitable business relationships in these

⁷ The EICV series of studies (I – 4) done every three years shows that the number of livestock keeping households in Rwanda has declined 72.8% in 2005, 68.2% in 2010 to 64.5% in 2014. Over the same period however the proportion of cattle keepers among households with livestock has steadily increased from 34.4% in 2005, 47.3% in 2010 to 50.4% in 2014.

markets. This is partly responsible for the low milk prices paid to farmers (RwF 120 – 180/litre)⁸ which in turn act as a disincentive to farmers to invest in improved farming practices and increased productivity.

20. Discussions with the RCA indicate that while Rwanda has long history of farmer institutions, dairy cooperatives in the country are a relatively new phenomenon most of them dating only over the last 10 years⁹. Most of the existing dairy cooperatives can therefore be characterized as generally new, low in membership, and weak in organizational structures for effective leadership, governance and day-to-day management of operations. This in turn becomes a self-reinforcing feature that makes the cooperatives not attractive to existing and new members. Within this overall general characterization, however, there are a number of cooperatives which have emerged (such as IAKIB¹⁰ in Gicumbi) with strong leadership and effective management structures and have started demonstrating their influence as strong farmer organizations not only to their members but also to the growth of the entire value chain. Such model dairy cooperatives in Rwanda and others in the region¹¹ present a strong case for making deliberate efforts to build stronger farmer organizations if smallholder dairy farmers are to effectively participate in the growing dairy value chain in the country. Key areas requiring support include membership mobilization (including emphasis on women, youth and poorer smallholders) for grassroots ownership and direction; registration (as many are at formation stage and not yet formally registered); support for establishment of key governance, management and operational structures; and capacity building in business and technical areas for effective service delivery to members.

Table 3: Distribution of dairy cooperatives in Rwanda, 2016

District	Name of Union	Number of primary cooperative	Number of members		
			Men	Women	Total
KIGALI PROVINCE	-	7	66	40	106
Gasabo	-	3	12	21	33
Kicukiro	-	3	54	19	73
Nyarugenge	-	1	-	-	-
SOUTHERN PROVINCE		64	2,904	2,163	5,067
Gisagara	-	5	194	160	354
Huye	-	15	565	584	1,149
Kamonyi	KFCU	11	216	74	290
Muhanga	MCFU	5	53	39	92
Nyamagabe	-	11	599	392	991
Nyanza	NFCU	6	852	579	1,431
Nyaruguru	-	7	225	285	510
Ruhango	RUDAUGO	4	20	5	25
WESTERN PROVINCE		105	2,482	1,456	3,938
Karongi	-	1	50	13	63
Ngororero	-	10	153	158	311
Nyabihu	UPROCENYA	25	655	566	1,221
Nyamasheke	-	1	16	14	30
Rubavu	IARU	19	484	127	611
Rusizi	-	5	238	241	479
Rutsiro	URUKUNDO	44	886	337	1,223
NORTHERN PROVINCE		78	1,983	1,231	3,214
Burera	IABU	12	182	68	284

⁸ The lowest farm gate prices in the region.

⁹ The Policy on Cooperatives was formulated in 2003 and enacted into Law in 2006

¹⁰ Started in 2003 from the merger of 12 dairy farmers associations, IAKIB has grown to be the leading dairy cooperative union in Rwanda today with a membership of 684 members, 38 permanent staff (including a professional Managing Director) and collects milk from approximately 7,000 farmers across Gicumbi district (and even surrounding parts of neighbouring Rulindo and Burera districts). It is currently managing 6 MCCs and plans to construct 7 more and 20 collection points in the next 5 years to effectively cater for current and projected increase in daily milk collections from current 28,000 – 35,000 litres to 50,000 – 60,000 litres within its catchment area.

¹¹ Such as Githunguri Dairy Farmers Cooperative which has the third largest dairy processing plant in Kenya today.

Gakenke	UEG	6	29	3	32
Gicumbi	GILCU	41	1,235	773	2,008
Musanze	IAMU	5	204	233	437
Rulindo	UPROCEBRU	14	333	154	487
EASTERN PROVINCE		67	2,718	1,391	4,109
Bugesera	UCEVABU-HURANINKA	13	664	531	1,195
Gatsibo	GDFU	10	525	204	729
Kayanza	KDCU	8	121	195	316
Kirehe	IAKI	4	214	38	252
Ngoma	-	4	117	131	248
Nyagatare	NDFU	16	731	120	851
Rwamagana	RWALU	12	346	172	518
		18	314	10,191	6,506
					16,697

Source: Rwanda Cooperative Agency (RCA) records, May 2016; Rwanda National Federation of Dairy Cooperatives, May 2016

21. **Milk marketing.** Estimates on the dairy sector in Rwanda suggest that about 45% of the milk produced in the country is consumed by milk producing households and the balance (55%) is marketed in the rural and urban markets, with a small part exported to neighbouring countries, mainly Burundi and DRC as fermented milk. Out of the total marketed milk, a small proportion (about 10–15%) is sold directly by dairy farmers to end consumers – other households in the neighbourhood who do not have cattle or are facing milk deficits, local markets, kiosks and rural restaurants. The rest of the milk (85–90%) is sold through either informal milk traders (alternative market system) or through dairy farmer cooperatives who have over the years since 2006 been supported by the government and various development partners to establish a cold chain of MCCs with linkages to processors and large milk traders. The cooperatives channel is however currently estimated to be handling only 15-20% of total marketed milk. Milk marketing in Rwanda is therefore currently largely dominated by informal milk traders who handle upwards of 70-75% of all milk sold by farmers. On the whole, it is estimated that the rural market currently consumes around 70% of marketed milk while the rest is sold in Kigali and other urban markets, with some going to urban markets in neighbouring Burundi and Eastern DRC, annually estimated at up to 12m MT.

22. The Rwanda National Dairy Strategy categorizes milk marketing in the country into two channels/systems: a commercial system involving milk collection through a cold chain where quality assurance can be maintained; and an alternative marketing system (AMS) mainly involving informal milk collection and trade where no systems are put in place to ensure quality standards are maintained. For food safety and sustainable growth of the dairy sector, a key thrust of the sector strategy is to increase the proportion of milk sold through the commercial system where all milk entering the market is tested at the point of delivery by the farmer and handled through a cold chain of milk aggregation, transportation, processing and marketing where proper hygiene and food safety standards are assured. Milk collection through the cooperatives is modelled along the commercial system while the trading channel dominated by informal milk collectors and traders mainly constitutes the AMS which the government seeks to transform to ensure adherence to quality standards.

23. **Milk collection infrastructure.** To ensure food safety standards are maintained in traded milk, Rwanda has recently (December 2015) passed a Ministerial Order regulating the collection, transportation and selling of milk. Under this new law, all milk sold in Rwanda must first be collected at a place where its quality testing is possible before being marketed. This law recognizes two types of milk collection points: simple sheltered milk collection sites; and modern milk collection centres:

24. **Simple milk collection points/sites:** This is the simplest milk collection infrastructure and involves a structure that provides shade, is close to a road, sheltered from dust, and is equipped with clean containers (aluminium milk cans) and milk testing equipment (at least an alcohol-gun; lactodensimeter and thermometer). It is at such sites that farmers are expected to deliver their milk destined for sale so that its quality can be tested before the milk is taken over by either a dairy cooperative or a milk trader. Milk testing at the collection site is expected to be done by a trained and licensed milk quality control technician who issues a certificate of origin for milk that passes the milk test showing: identification of the collection point; name of the milk transporter/trader and destination of the milk; quantity and test results; and certification by the milk testing technician. Such collection points are expected to be close enough to farmers' homesteads to allow for direct delivery by farmers.

Milk aggregation at a simple collection site is expected to take minimal time as milk must be delivered to a preservation facility within two hours after milking.

25. Available information on the dairy sector in Rwanda shows that no milk collection site in the country currently meets the expected specifications under the new law. Currently, milk is either collected directly from farmer's homesteads or at designated roadside points mostly without any shade. Rough estimates suggest that the country requires at least 2,000 milk collection sites at the grassroots level to handle the current level of milk production sold by farmers.

26. **Milk Collection Centres:** A modern milk collection centre is defined as one that meets the following specifications: (i) a floor made of strong and non-slippery tiles, designed in such a way that allows easy drainage and cleaning; (ii) walls with white tiles extending to a distance of two meters high; (iii) adequate ventilation, sufficient light and windows with screens to prevent entry of flies and other insects; (iv) a ceiling built with strong and appropriate materials to help in prevention of temperature changes, vermin and dirt from the roof; (v) a large roof made in appropriate material and impervious to water in order to prevent leaking; (vi) an appropriate waste disposal system; (vii) a reliable supply of clean water; (viii) located at least 200 meters away from any unsanitary area; (ix) has electricity or generator; (x) a strong security fence; (xi) a well-equipped milk laboratory; and (xii) a milk cooling room.

27. Rwanda currently has 100 MCCs¹² established along the lines of a modern milk collection centre. The construction of these MCCs has been ongoing since 2006 supported by the Government and a number of development partners. A recent assessment of the operational status of the current MCCs conducted by MINAGRI on the basis of service delivery to farmers, connection to essential utilities (electricity and water) and operating capacity puts the 100 MCCs into three categories: 28 in category 1 where most of the services are offered and milk collection, cooling and selling is done well; 58 in category 2 where not all services are offered due to various capacity limitations; and 14 which are not operational either because they are newly constructed or have closed down for various reasons. Overall, however all the 100 MCCs have buildings which meet the statutory requirements for a modern MCC (with exception of minor refurbishment requirements in a few of them), all have at least a 3-phase generator and 86 of them have electricity connection (34 on 3-phase and 52 on single phase). The biggest shortfall is in functional capacity of cooling facilities and reliable water connection. While all the MCCs have cooling facilities (most with at least 2 tanks of up to 7 MT combined capacity), for many of the MCCs, part of this installed capacity is not functional largely due to disrepair or because of electricity connection (single phase, when the coolers require 3-phase electricity). Most of the MCCs complain about access to clean and reliable water supply. All these factors combine to lower the functional capacity of most MCCs to 50–60% of installed capacity and stands out as an issue that needs to be addressed.

28. Beyond functional capacity of established structures and facilities, a major challenge facing MCCs is the overall level of utilization of the facilities by farmers. Available information shows that more than 60% of the MCCs have daily milk collections below the 2,000 litres minimum threshold used in the business model for establishment of MCCs. Overall, estimates by MINAGRI suggest that only about 25–30% of the total installed capacity of existing MCCs is being utilized. While there are many interrelated factors behind this low utilization, the main ones relate to: farmer organization and ownership of MCCs; management capacity; and market linkages:

29. **Farmer organization and ownership of MCCs:** Most MCCs were constructed before mobilization and organization of farmers was sufficiently carried out to allow for broad based ownership and participation of dairy farmers in the MCC business. To date the assets of most MCCs are still owned by the government¹³ while the operations of the MCCs are in the hands of dairy cooperatives which have only a small membership from dairy farmers in the MCC catchment area. While it is not a must that all farmers supplying milk to an MCC must be members of the dairy cooperative that owns the facility, experience from many parts of the world show that utilization of such facilities is highest where membership is broad-based. Within Rwanda, capacity utilization of

¹² 65 MCCs are located in the 12 districts targeted under RDDP.

¹³ Recent discussions between MINAGRI and dairy cooperatives have reached an agreement to sell the assets of MCCs to dairy cooperatives managing them at a rate of Rwf 20 million per MCC.

MCCs is highest among dairy cooperatives which have strong membership and leadership such as IAKIB in Gicumbi. A key issue that must be dealt with as dairy cooperatives seek to increase membership (and particularly so before the MCC facilities are sold to the cooperatives) is the cost of shares for new members which is currently generally unaffordable to many smallholder farmers, especially women-headed households and the youth. For IAKIB for instance, a new member is required to pay a minimum of RwF 300,000 (USD 450) to join the cooperative.

30. **Management of MCCs:** The leadership and governance of all MCCs in Rwanda is currently vested in dairy cooperatives and it is the leadership of the cooperative that is responsible for establishment and oversight of the MCC management. The day-to-day operations and management of MCCs is however carried out by professional staff along three emerging models: (i) cooperative union-led management where several MCCs are collectively managed by a pool of professional staff employed by the cooperative union; (ii) primary cooperative-led management where each primary dairy cooperative employs a few staff to run operations (with some key activities still carried out by officials of the co-operative); and (iii) lead firm/processor-led management where a number of MCCs (especially in the East) have entered into a management contract with the buyer of their milk (Inyange dairy processor) to undertake day-to-day operations of the MCC. While the effectiveness of MCC management is directly related to the strength of the dairy cooperative and leadership behind it, the joint management of MCCs at cooperative union level and the processor-led management contact models have demonstrated better results. Where MCCs are well managed, service delivery to farmers is better and in turn capacity utilization of facilities is much higher. In a number of cases, capacity utilization of MCCs has totally collapsed as a result of mismanagement of the facilities leading to non-payment of milk proceeds to farmers.

31. **Market linkages:** The extent to which a MCC has an established and reliable market for its milk is a key factor in the utilization of installed capacity. Establishment of these market linkages are however also closely related to the extent to which farmers are well organized and able to bulk their milk for economies of scale to attract serious buyers, and as well as capacity of the cooperative leadership in identifying and brokering long-standing business partnerships with buyers. In areas where MCCs have reliable and profitable markets, farmers are receiving reasonable prices for their milk (ranging from RwF 160 – 180/litre) and are paid on time. Even though these prices are not very competitive compared to what traders sometimes pay to farmers (RwF 180 – 250 in some areas), farmers find it more attractive to supply their milk to their cooperative because of the stability of the prices, assurance of balloon payments at the end of the month and ancillary services provided by the cooperative – financial services, dairy inputs and animal health/extension services. Where MCCs have not established reliable markets and are forced to sell to traders, prices paid to farmers are not attractive and regular/reliable payments to farmers are not assured. Many MCCs without well established markets have lost money through non-payment by buyers and in turn have lost the trust of their members. Support in establishment of reliable business partnerships is therefore an important area of support to dairy cooperatives/MCCs which will increase the utilization of installed capacity and service delivery to farmers.

32. To support the establishment of a milk collection infrastructure that meets Rwanda's need for adherence in milk quality standards of traded milk, it is important that measures are taken to increase the functional capacity of existing facilities and its utilization. Beyond this however, an analysis of the distribution of the existing MCCs vis a vis current levels of milk production shows that there is still a need for expansion of the second tier milk collection aggregation centres. Estimates show that at least 177 MCCs are required in the country to handle current levels of milk sold by farmers at 85–100% capacity utilization levels¹⁴.

¹⁴ Within the project area, a total of 97 MCCs would be required compared to the current of 65 (assuming a 6,000 litres/day capacity utilization). An analysis of existing MCCs however shows that the location 6 of the current 65 MCCs is in areas currently without sufficient milk production. On the whole therefore the shortfall of MCC facilities in the 12 districts is 38.

Table 4: Adequacy of milk collection infrastructure in targeted districts

District	No of hhds	Milk production (MT)	Administrative units			Number of cooperatives		Number of MCCs		
			Sectors	Cells	Villages	Unions	Primary coops*	Current	Optimal	Gap
Nyanza	77,522	24,586	10	51	420	1	6	3	5	2
Ruhango	76,968	30,880	9	59	533	1	6	3	6	3
Huye	77,915	18,442	13	77	508	-	4	2	4	2
Rutsiro	71,267	20,107	13	62	485	1	8	3	14	11
Nyabihu	65,855	16,843	12	73	473	1	7	4	9	5
Rubavu	88,849	9,864	12	80	525	1	7	7	2	(5)
Gicumbi	86,075	36,193	21	109	630	1	14	9	12	3
Burera	67,453	22,986	17	69	571	1	7	1	6	5
Musanze	84,756	19,871	15	68	432	1	2	2	2	0
Nyagatare	105,365	68,482	14	106	628	1	20	19	20	1
Kayanza	96,320	37,391	12	50	421	1	9	7	13	6
Rwamagana	74,175	20,602	14	82	474	1	5	5	4	(1)
Total, RDDP	962,888	325,747	162	886	6,100	11	208	65	97	32
Total, Rwanda	2,424,898	731,014	416	2,148	14,837	18	314	100	177	77

Notes: * Figures to be re-confirmed by MINAGRI
Source: MINAGRI, Dec 2015; RDDP computations

33. **Road access infrastructure.** As a highly perishable commodity, milk quality and market access is highly dependent on the condition of feeder roads from the production areas to milk collection centres which have cooling facilities. Although Rwanda has one of the highest road densities in the region, the general characterization of road infrastructure in rural areas is that roads connecting villages and farming areas to one another and to markets are inadequate and poorly maintained. Official estimates by the Rwanda Transport Development Agency (RTDA) show that 85% of feeder roads (District Class II roads) are in unacceptable conditions and identifies strategies for addressing this challenge¹⁵. The highest benefits to the agricultural sector and rural livelihoods come from improvements in feeder roads linking farms to markets (1-5 Kms) and to Sector centres (5-10 Kms). Within the 5 milksheds in Rwanda, the Western milkshed (Gishwati rangelands) is recognized to have the poorest feeder roads which significantly curtails accessibility to milk collection points and centres. Within this area alone a total of 116 Kms of feeder roads are identified as critical to linking areas of high milk production to MCCs and market centres.

34. One of the key initiatives of the Government towards improving the condition and adequacy rural access roads is the Rwanda Feeder Roads Development Project (RFRDP) implemented within MINAGRI. The government has committed to establish strong links between RFRDP and RDDP to ensure that all milk production areas targeted by project in the Western milkshed are given priority in feeder roads development. Similar synergies will also be necessary with programs and other government initiatives addressing rural infrastructure (roads, water and electricity) in all the targeted districts.

35. **Value addition and processing.** Perhaps owing to the fact that Rwanda's dairy industry is relatively young, the country's processing base for milk and other dairy products is still fairly under-developed. The country has five main milk processing plants¹⁶ and about 25-30 small and medium scale processors of cheese and other dairy products. The largest milk processor is Inyange Industries with a processing capacity of 80 MT/day and currently the market leader controlling over 75% of the market share of processed milk and milk products in the country. To this list, two new additions in the coming months will be the newly constructed Mukamira Dairy Processing Plant in Western Province with a processing capacity of 80 MT/day which is expected to start operations in 2016 through a 4P arrangement¹⁷; and Burera Dairies in the North assisted by UNDP under the Community Processing Centre (CPC) initiative. In total, Rwanda is currently estimated to have about 280 MT/day milk

¹⁵ MINAGRI – Rwanda Feeder Roads Development Project, 2015.

¹⁶ These include Inyange Industries, Nyanza Dairy, Savanah Dairy, Haji Dairy and Blessed Dairies.

¹⁷ Constructed by MINAGRI with 12% contribution from 12 dairy cooperatives. Discussions on possible management contract with Inyange for day-to-day operations are ongoing.

processing capacity. Estimates by MINAGRI show that although capacity utilization has been improving over the last 3 years, it is still at around 35-40%.

36. Key challenges facing the processing industry include: low and inconsistent supply of good quality milk partly due to seasonality of milk production, poor organization of farmers for supply to MCC infrastructure and competition from the informal market who pay better prices; high cost of processing and packaging largely attributed to capacity under-utilization, cost of imported packaging materials, cost of power and inefficient processing technologies; and low product diversification and market penetration in the local and regional markets. The result is that although Rwanda now has large volumes of milk produced in the country, a very small proportion is processed to acceptable quality standards and marketed to consumers in the country at a price affordable by a wide cross-section of consumers. Although farm-gate prices paid to farmers are the lowest in the region, consumers on the contrary pay the highest prices for processed milk and other dairy products due to inefficiencies in the processing channel of the value chain. Yet, this is a critical channel for the growth of the dairy sector in the country and efforts must be towards unlocking the constraints that hinder capacity utilization and efficient operations for delivery of high quality and affordable products to consumers in the domestic and regional markets.

37. **Milk trade.** The marketing of milk in Rwanda is dominated by informal traders who are estimated to handle 75-80% of the milk sold in the country. These traders generally fall into two categories: those who buy milk from the farmers, transport it and sell it to other intermediate buyers (traders or processors) generally called milk collectors; and those who retail milk to the final consumers either through door-to-door deliveries (hawkers) or through designated milk structures interchangeably called milk kiosks, bars or zones. The volume of milk traded per trader per day varies from a few 20 litre containers to upwards of 10 MT by a few large-scale traders. The majority of traders are however small-scale handling on average 100 litres per day. While the exact number of milk traders is not known, rough estimates by the Milk Collectors and Traders cluster of the Rwanda National Dairy Platform (RNDP) place the figure at 5,000-8,000. The milk Collectors and Traders cluster of the RNDP currently has 400 members. These figures however exclude the thousands of general retail outlets who sell milk as part of the general merchandise the trade in (general shops, supermarkets and kiosks).

38. A general characterization of milk trade in the informal sector is that milk handling and trading is done through a system that does not ensure quality and food safety. Milk is generally collected from farmers without any testing, is transported in plastic containers which are not easy to maintain required hygiene standards, and the entire handling and trading environment is open to deliberate or opportunistic adulteration/contamination of the milk. Yet, this is the only main channel through which the majority of consumers in the domestic and regional market are able to get milk produced in Rwanda at an affordable rate (of less than half the price of processed milk).

39. The new Ministerial Order on milk collection, transportation and marketing seeks to improve the quality of traded milk and ensure minimum food safety standards are maintained in the sector. Under this new law, all milk traders must be licensed for do milk business and must adhere to food safety standards in milk handling and trading. Traders can only sell milk that has been tested at the point of delivery by the farmer and certified that it is safe for human consumption; the milk must be transported in well closed stainless steel containers; and traded in premises (milk kiosks/bars) meeting specified standards of hygiene and public health. The law also specifies standards for the quality of traded milk in terms of density (at 20 °C) and acidity. Discussions with the RNDP show that while stakeholders view this law as necessary for the long-term growth and sustainability of the dairy industry, significant investments are required to support the transformation process towards compliance. Currently, only about 10–15% of traders meet the conditions laid out in the new law. Critical areas of support required include: mobilization, sensitization and training of traders on milk handling and trading practices that meet standards laid out in the new law; access to financial and technical services for upgrading to required milk handling and trading standards; and support to milk certification and quality control system to ensure effective delivery of services. Support is also required in public awareness among consumers for demand driven enforcement of the standards.

40. **Market expansion potential.** Recent assessments of the market for milk and other dairy products in Rwanda and neighbouring countries show significant growth potential. Within the country, there is significant scope for increased per capita milk consumption beyond even the 80 litres expected to be reached in 2017 which is still much lower compared to other milk producing countries in the region¹⁸. Riding on increasing per capita incomes and government's commitment to eradicate malnutrition and food insecurity by 2020, it is possible for well-tailored domestic market expansion measures to succeed. The "One-cup-per child per day" government programme successfully piloted in the last three years and currently under consideration for national roll-out is one such initiatives. Under the auspices of the sector-wide association of all stakeholders, the Rwanda National Dairy Platform, there have also been successful market promotion campaigns supported by the government in partnership with a number of development partners. These are areas that need continued support. Market expansion initiatives can however only succeed on the back of mechanisms that improve the availability of affordable, safe and good quality milk to the various market segments.

41. Estimates of the potential for the penetration of Rwandan milk and other dairy products in the regional market show good prospects for the DRC, Burundi and Northern Tanzania markets, in that order. With a population of 78 million people and only 750,000 cattle (most of them local breeds), neighbouring DRC presents an enormous market for Rwandan milk, starting with the burgeoning border town of Ngoma and extending to other parts of the entire Eastern Region. Burundi's 10 million population also presents a significant market potential for Rwandan dairy sector given the small population of the dairy herd (estimated at less than 200,000 improved breeds). This also applies to Northern Tanzania. Market analyses of effective mechanisms for penetrating these markets have however not been conclusive. This is an area that needs further work with emphasis put in supporting private sector-led market penetration models.

Dairy value chain finance¹⁹

42. Rwanda has a well-developed financial sector with recent studies by the National Bank of Rwanda (NBR in collaboration with FinAccess) showing that due to growth of the financial sector, 90% of Rwandans now live within 5 Kms of a financial institution. By the end of 2015, the financial sector in Rwanda comprised 17 banks²⁰ with 161 branches and 2,236 bank agencies; 13 microfinance institutions and 480 SACCOs²¹; and 12 insurance companies with 14 insurance brokers and 322 agents. Despite these developments, estimates by the NBR show that slightly more than 50% of Rwandans remain unbanked even with the advancements taking place in mobile banking. Efforts are however being made to reduce the number of unbanked to less than 20% by 2017.

43. In terms of access to finance of parts of the rural population however, the current situation is not yet fully sufficient. Information from the NBR shows that while the proportion of new authorized loans as a percentage of GDP has steadily increased from 5.2% in 2000 to 12.4% in 2015, the average sectoral share of credit is extremely skewed with 55% of credit going to services, 32% to industry; 11% to consumer credit, and only a mere 2% to agriculture despite the fact that this sector accounts for 33% of GDP. The only significant providers of credit to the agricultural sector are rural SACCOs (24.5% of agriculture share in total portfolio) and microfinance institutions (10.2%)²². Most SACCOs are however fairly young²³ and although recent assessment by the NBR shows that 92% of them have now reached break-even, many still have capacity gaps in their quest to provide efficient services to their clients.

44. Within the dairy sector, most farmers who are members of a dairy cooperative have access to finance through various financial service windows offered by the cooperatives. These include savings and loans through SACCO wings of the dairy cooperatives²⁴, direct advances by the cooperative from milk sales (deducted at the end of the month), or linkages (through written guarantees) to commercial

¹⁸ Milk per capita consumption in Kenya and Uganda is 148 lt, and 120 lt, respectively.

¹⁹ See Appendix 13 on Rural finance.

²⁰ 11 Commercial banks, 4 microfinance banks, 1 development bank and 1 cooperative bank (NBR,

²¹ 64 urban (non- Umurenge) SACCOs and 416 rural (Umurenge) SACCOs.

²² The combined outreach of MFIs and SACCOs in Rwanda is 2.4 clients (41% women)

²³ The first UMURENGE SACCO was started in 2009 by the government

²⁴ IAKIB has a successful SACCO which is now in the process of transformation into a commercial bank.

banks where the cooperative operates its accounts. Other mechanisms through which dairy farmers have access to financial services is through self-help mechanisms of Accumulated Savings and Credit Associations and Table Banking initiatives. On the whole, however, only a small proportion of dairy farmers are members of dairy cooperatives (2–7%) and therefore the majority of smallholder dairy farmers remain in the unbanked category with limited access to finance. At the production level, the need for finance in the sector includes for acquisition of improved breeds; construction of zero-grazing units; pasture development; and other dairy farming inputs and equipment. All other segments of the value chain also require financial services: milk collectors (containers, transportation); milk collection centres; processors and milk traders. Outreach among women and the poor is constrained both by limited financial services and low levels of financial literacy.

45. Key investment areas required in improving the accessibility of financial services in the dairy sector include: financial literacy among farmers and other actors in the value chain; capacity building of financial service windows of dairy cooperatives and their SACCOs; and incentives for financial institutions to increase their service offering to the dairy sector including support in appropriate product development. A key area of support here is in development of agriculture information communication infrastructure through which farmers' assets, their production and milk deliveries are captured and updated on an ongoing basis and this information availed to linked financial institutions and other service providers. This is a development that is taking place in the Eastern Africa region with impressive results in increased visibility of smallholder dairy farmers and access to financial and other services to farmers.

Dairy policies and institutions

46. **Dairy policy framework.** Rwanda has already achieved much in shaping an enabling policy framework for dairy development. This has resulted from many interventions and support programs from the government and various development partners over the past decade. The current policy framework governing operations of the dairy sector was formulated in 2004 as part MINAGRI's Animal Resources Policy (2004). The sections of the 2004 policy addressing dairy issues focussed chiefly on raising milk production to address low per capita milk availability. Additionally, following a land reform policy (2004) and Act (2005), the dairy farming approach shifted from extensive communal grazing systems to more intensive smallholder systems. Thus the core elements of the policy were focused on increasing production through the following channels: changes to grazing systems, improved breeds and genetic profile of dairy cows, incentives for creation of farmer associations, integrated livestock/farming systems, improved animal feed and performance, decentralization of service delivery; increased linkages between training, research and extension; and overall creation of an enabling environment for the dairy industry.

47. Since 2004, a number of other policies, laws, strategies and plans aimed directly at increasing the production and consumption of safe milk and dairy products have been put into place. These include: Animal Health Law (2008); Animal Nutrition Strategy (2009); the Milk Value Chain Master Plan (2009); National Dairy Strategy (2013-2018); Charter for 'One Cup of Milk per Child' programme (2014); Strategic Plan for Mastitis Prevention and Control in Rwanda (2015); Rwanda Breeding Policy and National Herd Book (2015); and Ministerial order on milk hygiene (2015). These policies, laws and strategies have been complemented by dedicated public sector funding for investment in the dairy sector which has made it possible for the significant achievements to be made in implementation of the various policies and strategies.

48. As in all countries, the dairy regulatory environment is complex due to the perishability of milk. It involves many aspects including: licensing and inspection of milk handling premises; surveillance on the quality and safety of milk and dairy products; review and development of dairy standards; and management of dairy imports and exports. Current dairy standards include: Flavoured milk Specification; Milk powders and cream powders specification; UHT milk specifications; Pasteurized liquid milk specification; Unprocessed whole milk specification; Fermented and cultured milks – Specification; and Code of hygienic practice for milk and milk products.

49. The developments that have taken place in the dairy sector over the last decade since the current policy was formulated in 2004 are immense and require an updated policy framework. The

2012-2017 National Dairy Strategy was the first step taken by the government towards this update. This needs to be taken further to a policy and regulatory framework that takes into account the current and projected developments in the sector.

50. **Dairy institutions.** The primary responsibility for the animal production and farming aspects of the dairy industry fall under the Ministry of Agriculture and Animal Resources (MINAGRI). Within MINAGRI, the Rwandan Agricultural Board (RAB) provides animal support services, and the Rwanda Agriculture and Livestock Inspection Certification Services (RALIS) and National Agricultural Export Board (NAEB) also have relevant roles. MINAGRI runs three important policies relevant to RDDP: the One cow (*Girinka*) programme, communal kraal system (where cows are zero grazed in communal cow sheds) and the “One-cup per child per day” programme.

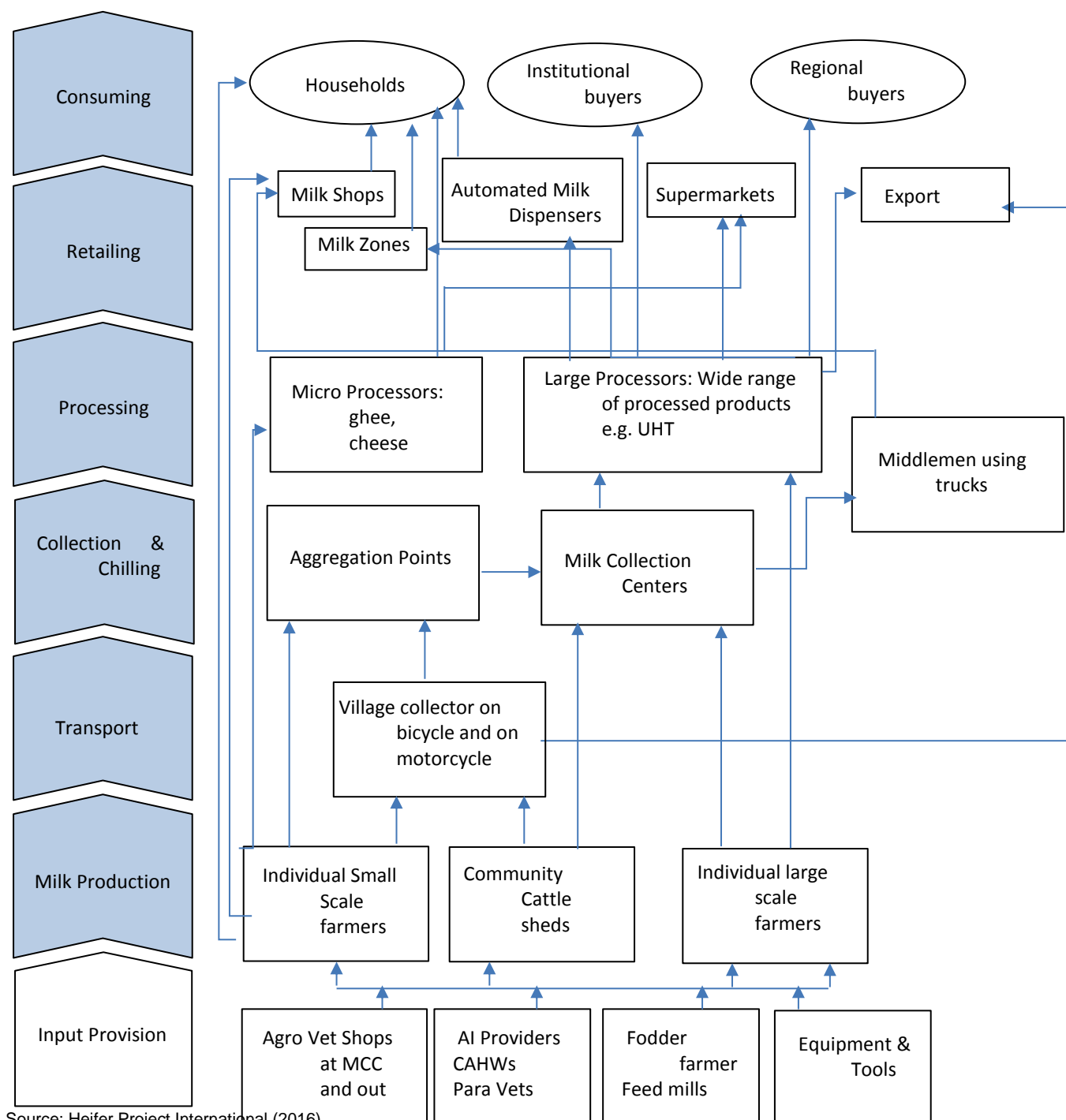
51. A number of other government ministries and non-ministerial agencies are also involved in the dairy industry including the Ministry of Trade and Industry (MINICOM), which runs the private sector federation, Rwanda Cooperative Agency, National Industrial Research and Development Agency and the Business Development Foundation; the Ministries of Education (MINEDUC) and Health (MINISANTE), who are One Cup implementing partners and partners for the planned nutrition campaign; the Ministry of Local Government (MINALOC), which acts as local district and sector authorities for agriculture/food planning, investment and implementation as well as originating agency of the Local Economic Development strategy.

52. Three other non-ministerial institutions are also important: Rwanda Standards Board (RSB); Rwanda Environmental Management Authority (REMA), which regulates the use of plastic packaging relevant to the dairy industry as well as working on sustainable natural resources; and Rwanda Development Board (RDB). Plans are underway to merge the regulatory roles of the RSB and RALIS into a new institution: Rwanda Inspectorate and Certification Authority (RICA). This will be an institution critical in provision of services to the dairy sector towards compliance with the new Ministerial Order on milk hygiene. For it to perform its expected role, significant capacity development will be required.

53. Other important institutions in the dairy sector include Rwanda National Dairy Platform (RNDP) and Rwanda Veterinary Doctors Council (RVDC):

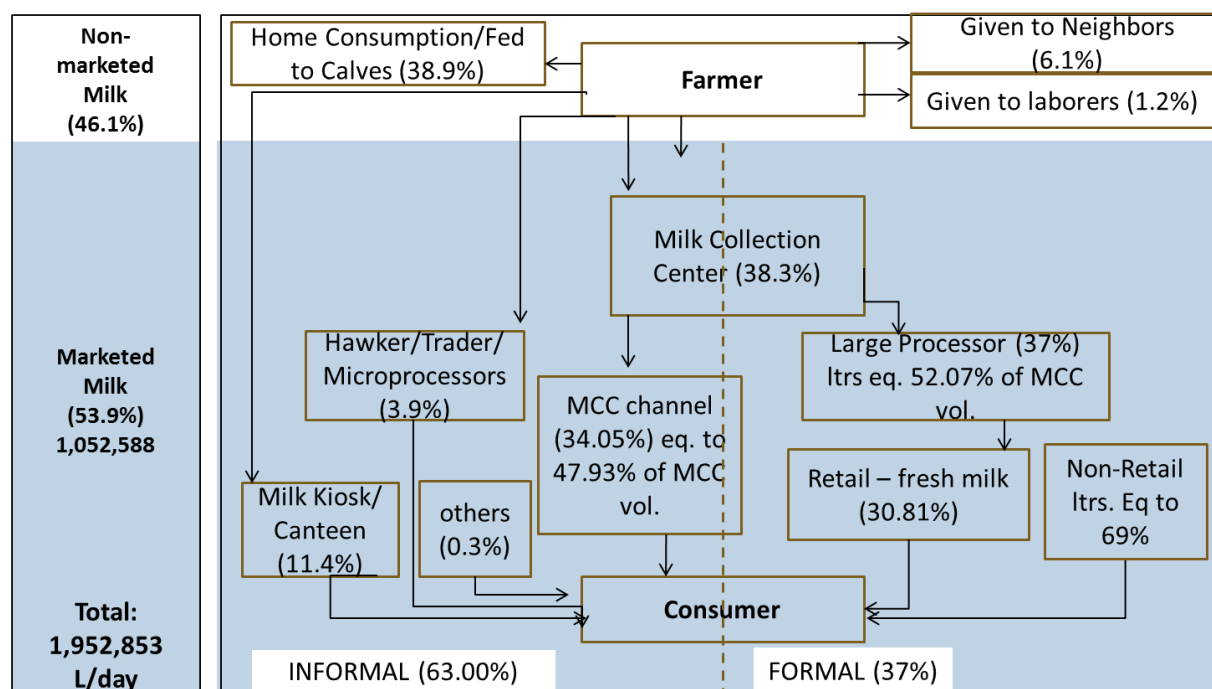
- **Rwanda National Dairy Platform** was launched in mid-2014 and legalized in mid-2015. It is a multi-stakeholder private organisation of dairy industry business professionals operating in all dairy value chain segments, small- and large-scale. Five member clusters represent: (i) milk producers, (ii) milk sellers, (iii) milk processors, (iv) service providers, and (v) consumers. The Platform also brings together relevant elements of government and development partners. Its main functions are to promote and advocate for the dairy industry, having assumed these responsibilities from the defunct Rwanda National Dairy Board. The Platform has eight strategic operational priorities and launched its 5-year Strategic Plan in November 2015. The plan contains a detailed logical frame and a budget still at the draft stage; it is currently receiving limited support from the nearly completed USAID / RCDP-2 project. It is soliciting more substantive support to become fully independent and to build capacity to implement its strategic plan. The key support area required is in strengthening the capacity of the institution to act as a platform able to capture and communicate with its various member groups and analyse, propose, draft and critique existing policies related to the industry in an advocacy role.
- **Rwanda Veterinary Doctors Council** is a statutory body of veterinary doctors and other professionals in the livestock sectors established in 2013 to govern certification and regulation of the work of these professionals in delivery of animal health and extension services. As a new institution, its capacity is still low and requires significant strengthening.
- **Other institutions:** Other important institutions in the dairy industry include National Dairy Farmers' Federation of Rwanda (NDFFR); Rwanda Milk Sellers' Association (RMSA); Rwanda Dairy Processors Association (RDPA); Rwanda Cheese Makers Company (RCMC); and Dairy Quality Assurance Laboratory (DQAL).

Dairy Value Chain Map



Source: Heifer Project International (2016)

Physical flow of in the Dairy value chain



Source: Heifer Project International (2016)

Share of value of fresh raw milk

	Production	Collection & Chilling	Processing	Retailing		
	Producers	MCCs	Processors	Milk Shops	Milk Zone	Supermarkets
Price Received	140	180	320	300	400	800
Share of Value	17.50%	5.00%	17.50%	15.00%	10.00%	60.00%

Source: Heifer Project International (2016)

Appendix 2: Poverty, targeting and gender

1. **Human development in Rwanda.** Rwanda is ranked 163rd in the 2014 Human Development Index (out of 188 countries based on composite statistic on life expectancy, adult literacy rate, annual GDP, etc.). From an inclusive social analysis perspective, the Multidimensional Poverty Index (MPI)¹ identifies multiple deprivations at household level with regard to living standards, health and education. According to this index, 71% of the Rwandan population in 2010 were multi-dimensionally poor and an additional 18% lived near multidimensional poverty. The Gender Development Index shows residual disparities between male and female. Women live longer than men (67 years versus 61.1 years) but spend less time at school (3.2 mean years of schooling versus 4.3) and earn less than men (PPP\$ 1312 compared to 1612 GNI per capita). The country is ranked 80th in the Gender Inequality Index (out of 155 countries).

2. **National poverty.** In 2014, the incidence of poverty – i.e a total consumption below the total poverty line of 159,375 RWF (USD 213) annual per capita - was at 39% compared to 45% in 2010/11 while extreme poverty dropped from 24% to 16.3%². This resulted in improvements in household living conditions, in terms of access to electricity, quality of roofing materials, improved sanitation and access to drinking water, and asset ownership including mobile phones. Poverty is mainly a rural phenomenon in Rwanda with an incidence of 43% in rural areas compared to 22% in urban areas. Agriculture is estimated to have a share of 79% in Rwanda's total employment and 84% of workers are estimated to be poor (having less than PPP\$ 2 per day).

3. **The “Ubudehe” programme.** The *Ubudehe* programme is a national initiative launched in 2001 that now constitutes a comprehensive wealth-ranking system, recognised at all administrative levels. Communities periodically rank the households in their area on a scale of 1 to 4 according to their perceived poverty and vulnerability status (Table 1). Originally comprising six categories, the system was revised to four categories in 2015 to match the current socio-economic context of the population. The names for each category were also removed because they caused stigma for households labelled as extremely poor or very poor. The *Ubudehe* system is used by Government and the majority of development actors, including IFAD, to determine who is eligible for targeted services such as health insurance, *Girinka* programme or university scholarships. It is estimated that 16% of the total population in Rwanda are in category I (the most vulnerable), 30% in category II, 54% in category III and 0.5% in category IV.

Table 1: *Ubudehe* categories and characteristics

Category	Characteristics	Population (% of total population)
I	<ul style="list-style-type: none"> no ability to own or rent a house food insecure unable to meet basic household needs, such as soap and clothes main focus of social protection programmes 	1.5 million (16.0%)
II	<ul style="list-style-type: none"> own house or are able to rent one get food and earn a wage from working for others but rarely get full time work eat one or two meals a day 	3 million (29.8%)
III	<ul style="list-style-type: none"> at least one person in the family is working in government or private sector as an employee or employer includes farmers who produce enough for food at home and a surplus to sell and those with small and medium enterprises 	5.8 million (53.7%)
IV	<ul style="list-style-type: none"> high incomes, own house, luxurious lifestyle big business owners people working in international organizations, industries or any other company, public servants, owners of malls, trucks, among others 	0.06 million (0.5%)

Source: Ministry of Local Government (2016)

¹ The MPI identifies overlapping deprivations at the household level across the same three dimensions as the Human Development Index (living standards, health, and education). It shows the average number of poor people in a population and the deprivations with which poor households contend. The correlation to poverty is made when a household is deprived in multiple indicators.

² EICV4 2013/14

4. **Youth.** The National Youth Policy (2005) defines *youth* as between 14-35 years. The Fourth Rwanda Population and Housing Census of 2012 identified that 53% of the population were under 20 years old. Around 82% of the population are under 40 years old and only 3% are aged 65 years and above, among which females markedly outnumber males. Less than 1% of households are headed by a minor (a man or woman under 21). However, for the purposes of RDDP, the UN definition of youth will be used (15-24 years) in relation to the activities to develop and strengthen the livelihoods of young farm assistants.

5. **Minorities and people living with disabilities.** Following a government strategy to strengthen national identity *Ndi Umunyarwanda* ('I am Rwandan'), all people are now considered as "Rwandan" without any other specific ethnic distinction. About 4% of the population live with a disability and this is found to have no cause or impact on the poverty status, as they belong to different wealth categories. They head about 9% of households.

6. **Rural women.** The livelihoods of over 80% of Rwanda's population depend directly or indirectly on the agriculture sector³. The agriculture sector is worked mainly by poor women (86%) with lowest levels of schooling and highest rates of illiteracy (23%). As a result women remain in the subsistence agriculture, they receive low prices for their products due to weak knowledge of markets, they lack capacities to participate in agri-business and are employed in low-paid positions in secondary agriculture. All these result in a vicious cycle of poverty that transcend generations. Women contribute immensely to the agriculture value chain by providing labour for planting, weeding, harvesting and processing in addition to reproductive activities and community work. They also produce and sell vegetables from home gardens or forest products and the income obtained is mainly used on meeting family food, health and education needs. In male-headed households, women work for more hours (15.5 hours) than men (7 hours), spending over three hours more on farming activities than the seven hours worked by men, in addition to five hours on unpaid reproductive and household work.

7. Men control larger livestock (cattle and sometimes goats as well). Women often have no decision making powers regarding the products (manure, milk, draught power) and money (if the livestock is sold). This imbalance can be a source of gender based conflicts, for example, where women are responsible for rearing, but have no control over the benefits of the resource. Women also find it difficult to build up assets, which restricts their access to loans because of a lack of collateral. Women access micro-credit through formal and informal arrangements.

8. Access to extension services is limited for both male and female farmers, but more-so women farmers and poor households. In part, this reflects their low literacy levels and a lack of confidence to attend meetings, but it is also a result of the high workload of extension personnel, their lack of gender-related knowledge and skills, few women extension staff, and limited research on gender-sensitive technologies and addressing the priorities of rural women. The use of lead farmers and providing extension services through cooperatives also by-passes poorer smallholders. The high cost of individual shares puts cooperative membership beyond the reach of poor farmers, women and youth. Women are under-represented in mixed organizations and only four women cooperatives are registered in the dairy sector (two in the province of Kigali City).

9. **Women-headed households.** In rural areas, 26% of households were headed by women in 2014. Women-headed households are more likely to be economically active as they have no one else to support their families or provide for their subsistence, with fewer adult members who generate incomes. However, they are more food insecure, more vulnerable to shocks and more likely to be poor than male-headed households. These household heads are often widows and have less education than their male counterparts. Their lack of skills hinders their adoption of new technologies and capacity building activities do not always offer a conducive environment for women to participate.

10. **Socioeconomic role of the dairy sector.** Dairy cows provide milk for household consumption and sale; manure for improving soil productivity; and constitutes a source of wealth and asset storage. They contribute to building confidence and creating social cohesion, and enhancing social status. However, they are labour intensive, requiring regular feeding and watering, as well as milking. Rural households have different ways of acquiring a cow: (i) through the national programme *Girinka* and Pass-on the gift; (ii) local purchase at the market (price varies from 500 000 to 700 000 RWF); or (iii) caring for another's cow and then receiving a calf. Usually vets or neighbours are consulted in the

³ This section draws on the findings, analysis and gender gaps in the agriculture sector presented in the Agriculture Sector Strategy prepared by MINAGRI (2010).

choice of breeds. Women-headed households can benefit from a dairy cow only if they have a son, a neighbour or are able to hire a boy (wage labour) to help her with dairy activities, especially milking (which women were traditionally not allowed to do). In some areas this left the women vulnerable to engaging in transactional sex in exchange for milking. There is a preference in selling milk to shops/restaurants and neighbours who offer better price than milk collection centres but these local markets are limited in quantity.

11. The increasing adoption of “zero grazing” system close to home enables all household members to participate in dairy production related activities. Tasks are generally divided along gender and age lines as follows:

- men milk
- women prepare and clean milk containers
- boys (sons) fetch water and forage, transport manure
- girls (daughters) clean the cowshed
- men and boys are often in charge of selling the milk or transporting it to collection points.

12. Particular constraints and challenges are disaggregated by gender and described as follow:

Challenges/constraints as perceived by men

- low productivity of dairy cow
- lack of capacity to maintain clean cowshed
- limited parcels to cultivate forage
- animal diseases and lack of money to pay for veterinary services
- inadequate knowledge/skills of women to care for the cow
- lack of communication between men and women
- lack of appropriate knowledge and skills (such as respecting timing for milk activities)
- disasters and insecurity

Challenges/constraints as perceived by women

- high cost of raising a dairy cow
- high cost of having a decent cowshed
- labour force
- not enough forage
- lack of water
- lack of knowledge (for instance good practices of feeding a cow)
- lack of services/assurances provided by cooperatives
- lack of access to financial services (due to collateral requirement) and no full control over the loans (to be shared with husbands)

13. The dairy sector creates a large number of on-farm wage jobs as farm assistants, mainly for young men, in addition to the family labour employed. Rural off-farm jobs are generated in the collecting, marketing and processing of milk, mainly in the small-scale informal sector. These provide livelihood niches for poor women and men, many of whom will not own cows themselves.

14. **Girinka.** The programme was introduced in 2006 against a backdrop of high levels of poverty and childhood malnutrition. Approved in 2006, *Girinka* originally aimed to reach 257,000 beneficiaries but this target was revised upwards in 2010 to reach 350,000 beneficiaries by 2017. To date, about 230,000 heifers have been distributed. The selection of beneficiaries is conducted at the community level under the principles of the *Ubudehe* programme whereby the local community meets to decide which members should benefit from *Girinka*, meeting specific criteria (Box 1). Before beneficiaries receive a heifer, they undergo training run by the Rwanda Agricultural Board (RAB). The high cost associated with constructing a cow shed (about RWF300,000) may act as a barrier for poor families, especially for households headed by women.

Box 1: Criteria to be *Girinka* beneficiary

- not already own a cow
- have constructed a cow shed
- have at least between 0.25 – 0.75 hectares of land, of which some must be planted with fodder
- be an *Inyangamugayo* (person of integrity) in the community
- be considered poor by the community and have no other source of income

Beneficiaries who do not have enough land individually may join with others in the community to build a common cow shed (*ibikumba*) for their cows.

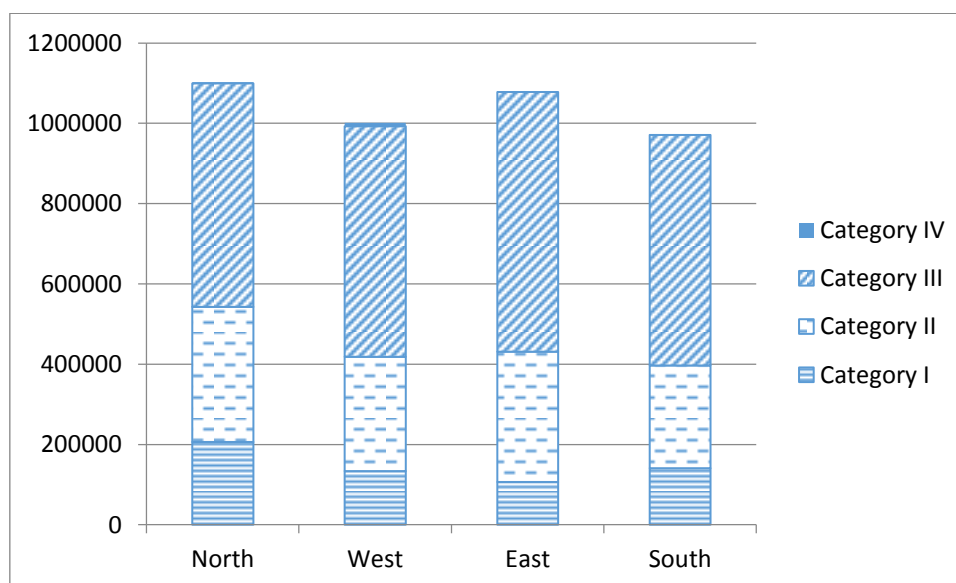
15. **Gender equality.** Rwanda has made great progress in promoting gender equality, largely driven by strong Government commitment. Gender equality is enshrined in the constitution and

Rwanda was the first country in the world to have more than 50% female members of Parliament. However, traditional patriarchal attitudes continue to prevail and, for example, there continues to be a high level of tolerance for domestic violence by both men and women. To overcome the challenges facing farmers and ensure women's inclusion in the agricultural sector, the Government has adopted the Agriculture Gender Strategy prepared by MINAGRI in 2010. The Strategy sets clear steps to ensure that the programmes and activities targeting the agricultural sector set a strong foundation for equal rights and equal opportunities for both women and men in rural development. It is in line with Rwanda's Constitution of 2003, the Economic Development and Poverty Reduction Strategy, the National Gender Policy and MINAGRI's Strategic Plan for the Transformation of Agriculture in Rwanda.

16. **Gender Action Learning System (GALS).** Rwanda has developed considerable expertise in the use of GALS, within IFAD-supported projects and grants. This innovative approach increases awareness of gender roles in the households and communities by improving their capacity to negotiate their needs and interests and find innovative, gender-equitable solutions in livelihoods planning and value chain development. By engaging with both women and men at the household level, households experience significant and sustainable improvements in household dynamics and well-being as well as more equal sharing of household tasks between women and men, decision-making power and control of assets, and increases in income. By addressing the causes of gender inequalities, rather than only treating the symptoms, experience in Rwanda and elsewhere demonstrates that this results in deeper and more sustainable improvements in rural livelihoods. The project will be able to draw on in-country expertise in GALS developed through IFAD-supported KWAMP and grants with Oxfam Novib and civil society organizations.

17. **Project district characteristics.** The distribution of the RDDP population by districts/provinces and *Ubudehe* categories is presented in Attachment 1. It is interesting to note that the overall distribution of the RDDP potential population by wealth category is very close to the national distribution. The project districts in the Northern and Eastern Provinces have the largest populations, with over 1 million people in each (Figure 1). The poorest project areas are in the North (where 21% of the households are in Category I and a further 31% in Category II). The fewest households in Category I are found in the East (11%) and the fewest in Category II are found in the South (26%). The largest number of households in Category IV are in the West, representing 1% of the population.

Figure 1: Number of people in RDDP districts by province and *Ubudehe* category



18. In terms of the prevalence of poverty at RDDP district level, Gicumbi has the largest number of households in Category I (22,000) and has the highest prevalence (25%), followed by Burera (16,700; 22%) – both are in Northern Province. In terms of Category II, Nyagatare in the East has the

largest number of households (36,000; 39%), followed by Musanze (29,300; 34%). The richest district, with over 1,250 households in Category IV is Rubavu in the West. For more details see Attachment 1.

19. **Profile of target groups.** The RDDP will directly target 95,000 rural households, of whom 80,000 will be men and women dairy farmers and 15,000 in wage labour and off-farm activities along the dairy value chain. Women-headed households will account for at least 30% of the target. Women from male-headed households will also benefit from project activities, whether as smallholder farmers or in other activities in and around the value chain. Overall, it is expected that women will account for at least 45% of total beneficiaries⁴.

20. The project will target two principal groups of **smallholder dairy farmers**:

- **51,800 smallholder dairy farmers** (70% of total smallholder target group) in the zero-grazing system who typically own up to three cows. This is the predominant livestock system in Rwanda, accounting for 92% of all livestock keepers, producing mainly for home consumption and sell a small surplus locally.
- **22,200 smallholder dairy farmers** (30% of total smallholder target group) in the semi-extensive grazing systems with up to 10 cows. They are principally located in the Northern and Eastern Provinces. They typically have 5-10 ha with good access to forage and local markets and cross-border trade.

21. Dairy productivity in both groups is constrained by limited skills, poor quality feed, weak disease control, and poor access to inputs and livestock services. Through the project, these smallholders will join L-FFS to develop skills in dairy husbandry, milk quality and hygiene, household nutrition, basic numeracy and literacy, and record keeping. Smallholders would be encouraged to join dairy cooperatives and skills in group management could provide a platform for strengthening dairy cooperative governance. L-FFS members will participate in GALS, which can be used to support the development of the group as well as address gender inequalities at the household level. Investments – such as biogas, RWH - from the household level to first collection point will be hosted in L-FFS for individual or group use. L-FFS will also be supported to prepare enterprise development plans for financing under component 2.

22. It is expected that these activities will self-target Category II households, which may include former beneficiaries of the *Girinka* programme and farmers with a common cow shed. Direct targeting may be necessary to reach the target of at least 30% of L-FFS members to be women-headed households. Attention will be paid to avoid elite capture by households from Categories III or IV. A certain level participation by these groups may be key to promote adoption of new techniques and build on their better connectivity to markets and services. They will contribute leadership in the changes to be introduced (milk production, bulking, marketing, processing). Women-headed households in Categories II and III will play a leadership role and will be encouraged to host L-FFS.

23. The project will also directly target:

- **6,000 *Girinka* beneficiaries**, who will receive a cow with calf, and pass on the first heifer to a qualifying neighbour. These households will be drawn from Category I who meet the criteria of the government programme, with some land for forage and an ability to construct a cow shed (see Box 1). They will be encouraged to become members of L-FFS and participate in the activities listed above to build their knowledge and skills, access farmers' groups and dairy cooperatives, and later gain access to markets and dairy services (inputs and outputs). GALS will be of specific importance for household empowerment. They will also have the opportunity to participate in basic (human) nutrition education sessions to gain knowledge and skills on nutrition issues affecting in particular children under five and pregnant and lactating women.

⁴ Women-headed households will account for 30% of 74,000 smallholders (22,200) and women in male-headed households an estimated further 30% of the balance (15,540); plus an estimated 50% of *Girinka* beneficiaries (3,000) and 5,400 rural women's empowerment. Overall, women will account for at least 45% of the total beneficiaries (46,140).

- **15,400 young farm assistants** aged (15 to 24 years)⁵ working as wage labourers. They are the “hands-on” male laborers in many dairy farms, especially in female-headed households with no male adults. They are typically from very poor families (Categories I and II), with little or no education and a very limited skills base. They will form their own L-FFS (1,280) with about 10-15 members in each to develop skills in dairying and related activities (eg construction RWH tanks, livestock shed, biogas systems) to provide better quality services to smallholders and diversify their livelihood options. They will receive training in basic literacy and numeracy skills, record keeping and GALS for better livelihood planning.
- **5,400 rural women**, aged 15-35 (child-bearing age), will benefit from new economic opportunities and creation of small off-farm business opportunities. Individual or group business plans will be developed for income generating activities and enterprises directly linked to the increased milk production (local marketing through milk bars, small processing, community health work, etc.) or goods and services needed for the local markets as a result of increased household incomes. They will be empowered through skills development in GALS, financial literacy and entrepreneurship.

24. **Other beneficiaries** will include:

- 640 L-FFS facilitators (of whom at least 50% are to be women) who will be trained and supported to establish 3,200 L-FFS;
- 450 producers of forage seeds and vegetative planting materials will be supported to produce for the market;
- 175 vets, 72 community animal health workers and AI technicians who will be trained and equipped to strengthen animal health services;
- Members of dairy cooperatives not included in the L-FFS noted above who will benefit from improved governance and infrastructure investments;
- Milk collectors and traders who will benefit from sensitization, training and capacity building, investments, and certification (with attention to ensuring that the thresholds do not act as a barrier to smaller enterprises; and
- dairy processors who will benefit from investments in value addition and processing facilities, particularly those which leverage public, private and producer investments.

25. **The targeting strategy for RDDP** will be based on the following targeting mechanisms:

- **Geographical targeting.** Initially based on the presence of milksheds, production and market opportunities, RDDP can increase its poverty focus within the 12 project districts. The selection of sectors, cells and villages will be done in close collaboration with local governments and rural communities using the criteria of poverty, food insecurity and malnutrition.
- **Self-targeting.** The goods and services provided by the project will respond to the priorities, financial/labour capacities and livelihood strategies of the target groups, particularly households from Categories II and III.
- **Direct targeting.** The poorest households, young farm workers and female off-farm workers (from Category I) will be targeted directly by the project, involving the *Umudugudu* committee at village level to ensure transparent and participative methods of household selection.
- **Empowering measures.** In addition to developing technical skills in dairy production and off-farm enterprises, the project will support beneficiaries to develop skills in household nutrition, basic literacy and numeracy, business and leadership. Most significantly, the GALS is an innovative approach which deepens project impact by fostering more equitable gender roles and relations at household and group levels. It will also be used to improve the performance of cooperatives, groups, other VC actors and smallholder dairy farmers by identifying common areas of interest, addressing inequalities and strengthening mutually-beneficial linkages for VCD.

⁵ For the purposes of RDDP, the UN definition of youth will be used (15-24 years) in relation to the activities to develop and strengthen the livelihoods of young farm assistants.

- **Enabling policy and institutional environment.** The project benefits from a highly enabling policy and institutional environment fully supportive of the development of the dairy sector, with a pro-poor and inclusive approach. Identified gaps in terms of policy, laws, regulations and institutional framework will be addressed with RDDP support.
- **Procedural measures.** Attention will be given to costs/beneficiary contributions, timing and administrative procedures required for effective participation of the various target groups, especially regarding access to advisory services of the MCCs and and private livestock support services. To ensure the target of at least 50% L-FFS facilitators are women, attention to the location, timing and childcare facilities may increase their opportunity to participate.
- **Operational measures and monitoring.** A Gender, Targeting and Community Mobilisation Officer has been appointed in the MINAGRI Single Project Management Unit (SPIU) to coordinate implementation of the gender and targeting strategies. Training will be given to project staff and implementing partners. At the field level, extension personnel will be trained in the GALS and rolled out to L-FFS, MCCs and dairy cooperatives, among others. Poverty and gender studies, including the use of the Women's Empowerment in Agriculture Index (WEAI), will be conducted at baseline, mid-term and completion to assess the effectiveness and relevance of the strategies/mechanisms. M&E indicators will sex- and age-disaggregated.

26. **The gender strategy for RDDP** aims to provide equal opportunities for women and men to participate in and benefit from development of the dairy value chain through RDDP activities. Women are specifically targeted to account for at least 50% of the L-FFS facilitators; women-headed households to account for 30% of members of L-FFS; and one target group comprises young women. Women from male-headed households will also benefit from project activities, whether as smallholder farmers or in other activities in and around the value chain. Implementation of the gender strategy will pursue the following objectives:

- **Expand women's economic empowerment through access to and control over productive and household assets.** Women heading households and women in male-headed households will have opportunities for empowerment, whether they own a cow or not. Their financial and business skills will be strengthened to build small businesses or effectively engage in dairy farming related activities.
- **Strengthen women's decision-making role in the household and community and their representation in membership and leadership of local institutions.** The use of GALS will ensure that women are fully part of decision-making in the household and regarding dairy activities. Their participation in L-FFS will be used to encourage their membership and leadership in dairy farmers' organizations and apex organizations. Women in cooperatives will receive leadership training and cooperative leaders will receive gender awareness training. Women will have incentives (per diem, transportation allowances) to participate in the district and national forums for dairy policy formulation.
- **Achieve a reduced workload and an equitable workload balance between women and men, girls and boys.** Climate-smart investments will support the use of labour-saving technologies, such as rainwater harvesting, and the intensification of dairy production provides opportunities for biogas systems which can be used for household energy. GALS will stimulate discussions at the household level regarding workloads which invariably result in an improved allocation of tasks between household members.

IFAD Targeting checklist

Checklist	Design
1. Does the main target group – those expected to benefit most – correspond to IFAD’s target group as defined by the Targeting Policy (poorer households and food insecure)?	The main target group will be poor smallholders and farm and off-farm workers (men, women and youth).
2. Have target sub-groups been identified and described according to their different socio-economic characteristics, assets and livelihoods – with attention to gender and youth differences	The target groups have been described in line with national system of wealth ranking <i>Ubudehe</i> categories, including women-headed households, young men and women.
3. Is evidence provided of interest in and likely uptake of the proposed activities by the identified target sub-groups?	Lessons learned from national programmes and previous IFAD operations/grants provide evidence for the successful uptake of the activities and the expected impact that such activities can bring to the livelihoods of the target group.
4. Does the design document describe a feasible and operational targeting strategy in line with the Targeting Policy, involving some or all of the following measures and methods:	
4.1 Geographic targeting – based on poverty data or proxy indicators to identify, for area-based projects or programmes, geographic areas (and within these, communities) with high concentration of poor people;	Within the four selected milksheds covering 12 districts, selection of sectors/cells will be done in close collaboration with local governments and rural communities using the criteria of poverty, food insecurity and malnutrition.
4.2 Direct targeting – when services or resources are to be channelled to specific individuals or households;	Poorest households (for <i>Girinka</i>), young farm workers (for specific L-FFS) and female off-farm workers (for IGAs) will be targeted directly.
4.3 Self-targeting – when good and services respond to the priority needs, resource endowments and livelihood strategies of target groups;	Smallholder dairy farmer priority needs are to develop skills in dairy husbandry, milk quality and hygiene, and household nutrition, and to have improved access to services.
4.4 Empowering measures – including information and communication, focused capacity- and confidence-building measures, organizational support, in order to empower and encourage the more active participation and inclusion in planning and decision-making.	The Gender Action Learning System is a gender transformative tool for empowering members of groups and individual households as a mechanism to promote improved gender roles and relations. Business and leadership skills will be provided to the various target groups. L-FFS members will develop basic numeracy and literacy, record keeping skills. Farm assistants will also develop skills to diversify their livelihood options.
4.5 Enabling measures – to strengthen stakeholders’ and partners’ attitude and commitment to poverty targeting, gender equality and women’s empowerment.	With a strong national and local commitment to develop the dairy sector, Component 3 of RDDP will support the creation of an enabling environment and strengthen various dairy institutions and provide opportunities for smallholders to participate in policy engagement.
4.6 Attention to procedural measures – that could militate against participation by the intended target groups;	Special attention will be given during implementation regarding costs/contributions, timing and administrative procedures required for effective participation of the various target groups.
4.7 Operational measures – appropriate project/programme management arrangements, staffing, selection of implementation partners and service providers.	The project will benefit from the experience and supervision of the Targeting and Gender officer at SPIU. Implementing partners will be identified according to their experience in working with women and poorer households.
5. Monitoring targeting performance. Does the design document specify that targeting performance will be monitored using participatory M&E, and also be assessed at mid-term review?	A participatory M&E system will be developed and three poverty and gender studies will monitor effectiveness and relevance of RDDP targeting mechanism. Logframe and results framework will include indicators that reflect the target groups. Data will be sex- and age-disaggregated where appropriate.

IFAD Gender checklist

Checklist	Design
1. The project design report contains – and project implementation is based on – gender-disaggregated poverty data and an analysis of gender differences in the activities or sectors concerned.	The project is built upon gender analysis of the dairy sector and its contribution to reduce gender gaps as identified in the Agriculture Gender Strategy. Gender issues are mainstreamed in all project components.
2. The project design articulates – or the project implements – actions with aim to:	In addition to specific measures, all three areas will be strengthened by the use of GALS which has proven to increase economic empowerment, improve decision-making capacities and balance share of workload at HH level. The participation of women as facilitators and members of L-FFS and their membership to cooperatives need specific attention and encouragement. Biogas systems for household energy, and technologies for rainwater harvesting will be promoted by the project
• Expand women's economic empowerment	
• Strengthen women's decision-making role in the household and community and their representation in membership and leadership of local institutions;	
• Achieve a reduced workload and an equitable workload balance between women and men.	
3. The project design report includes one paragraph in the targeting section that explains what the project will deliver from a gender perspective.	The targeting approach is pro-poor and inclusive, women and young women are clearly targeted and mentioned in the PDR.
4. The project design report describes the key elements for operationalizing the gender strategy, with respect to the relevant project components.	All components include key elements relevant for implementation of the gender strategy.
5. The design document – and the project implements – operational measures, including:	
5.1 Allocating adequate human and financial resources to implement the gender strategy.	Allocated budget and implementation arrangements have been defined in the PDR and appendices to implement the strategy.
5.2 Ensuring and supporting women's active participation in project-related activities, decision-making bodies and committees, including setting specific targets for participation.	The project aims to reach at least 30% women-headed households for the dairy production and 50% of the trained L-FFS facilitators.
5.3 Ensuring that project/programme management arrangements (composition of the project management unit/programme coordination unit, project terms of reference for staff and implementing partners, etc.	The Targeting and Gender officer in SPIU will facilitate stocktaking and replication of best gender practices from other IFAD operations in Rwanda, including loans, grants and the Joint Programme which together have established a group of skilled implementing partners.
5.4 Ensuring direct project/programme outreach to women (for example through appropriate numbers and qualification of field staff), especially where women's mobility is limited.	L-FFS facilitators will be recruited among farmers (50% women) and women will be encouraged to facilitate and host FFS. All L-FFS facilitators will be trained to disseminate GALS.
5.5 Identifying opportunities to support strategic opportunities with government and other development organizations.	RDDP will contribute to analysing progress towards MINAGRI's Agriculture Gender Strategy and a close collaboration with GoR at different levels will allow knowledge sharing and policy dialogue.
6. The project's logical framework, M&E, MIS, and learning systems specify in design – and project M&E unit collects, analyses and interprets sex- and age-disaggregated performance and empowerment.	Complementary to the M&E system, gender studies will be carried out during baseline, mid-term and completion stages, using the Women's Empowerment in Agriculture Index.

Attachment 1. Household and population distribution by RDDP district and province

District	HHsCat1	PopCat1	HHsCat2	PopCat2	HHsCat3	PopCat3	HHsCat4	PopCat4	HHsTotal	PopTotal
NORTH										
Burera	16718	69030	21269	92233	37890	178847	31	180	75908	340290
Gicumbi	22030	87004	26284	118983	39726	187646	177	1036	88217	394669
Musanze	13062	49853	29371	125408	42461	189806	414	1983	85308	367050
Total	51810	205887	76924	336624	120077	556299	622	3199	249433	1102009
%	20.8	18.7	30.8	30.5	48.14	50.5	0.2	0.3	100	100
WEST										
Nyabihu	8231	32175	21646	93735	33988	157546	76	397	63941	283853
Rubavu	12738	49496	21593	96141	50845	241532	1250	7286	86426	394455
Rutsiro	14146	51534	21086	95313	36706	175036	87	507	72025	322390
Total	35115	133205	64325	285189	121539	574114	1413	8190	222392	1000698
%	15.8	13.3	28.9	28.5	54.7	57.4	0.6	0.8	100	100
EAST										
Kayanza	8270	33061	18261	82279	47042	222103	57	335	73630	337778
Nyantatare	13709	55427	36001	169780	42242	206267	40	201	91992	431675
Rwamagana	4463	17589	17130	72686	48875	218466	276	1457	70744	310198
Total	26442	106077	71392	324745	138159	646836	373	1993	236366	1079651
%	11.2	9.8	30.2	30.1	58.5	59.9	0.2	0.2	100	100
SOUTH										
Huye	11848	44841	15760	68008	50861	214898	317	1580	78786	329327
Nyanza	12988	50219	23092	99708	36569	163031	117	486	72766	313444
Ruhango	11613	45646	20677	88347	45264	195771	56	272	77610	330036
Total	36449	140706	59529	256063	132694	573700	490	2338	229162	972807
%	15.9	14.5	26.0	26.3	57.9	59.0	0.2	0.2	100	100
RDDP										
Total	263231	1031086	484901	2149268	892405	4129320	5307	29103	1645844	7337823
%	16.0	14.1	29.5	29.3	54.2	56.3	0.3	0.4	100	100
National										
Total	376192	1480167	703461	3077816	1267171	5766506	11664	58069	2358488	10382558
%	16	14.3	29.8	29.6	53.7	55.5	0.5	0.6	100	100

Source: Local Administrative Entities Development Agency (2016)

Appendix 3: Country performance and lessons learned

1. **IFAD Country Programme.** Since 1981, IFAD has financed 15 programmes and projects in Rwanda for a total investment of USD 437.6 million, of which the Fund has contributed \$239.1 million, directly benefiting 534,300 rural households. Rwanda is one of the best performing countries in the East and Southern Africa region in terms of achievements of results. At present, IFAD's portfolio in the country consists of three on-going projects: (i) Kirehe Community-based Watershed Management Project (KWAMP) which is set to close at the end of 2016; (ii) Project for Rural Incomes through Exports (PRICE); and (iii) Post-Harvest and Agribusiness Support Project (PASP), which includes a USD 7 million Adaptation for Smallholder Agriculture Programme (ASAP) grant.

2. The overall goal of the Rwanda Dairy Development Project (RDDP) is to contribute to pro-poor national economic growth and improve the livelihood of resource-poor rural households focusing on food security, nutrition and empowerment of women and youth in a sustainable and climate-resilient dairy value chain development. Specifically, the project seeks to increase competitiveness and profitability of the dairy sector for the provision of quality products from small-scale producers to domestic and regional consumers, thus improving their livelihoods, food security and nutrition whilst building overall resilience.

3. With this development objective, the project supports all three strategic objectives (SO) of the 2013-2018 results-based country opportunities strategic programme (RB-COSOP 2013-2018):

SO1: *To sustainably increase agricultural productivity through management of the natural resource base and investments in physical and social capital, including scaled-up agricultural intensification, in order to improve incomes and livelihoods.* In line with the recommendations of the European Union-funded environmental impact assessment of the agriculture sector in Rwanda (2012), IFAD will support increased economic efficiency in the use of inputs through the promotion of an integrated climate-smart production and pest-management approach based on farmer capacity-development methodologies such as farmer field schools (FFSs).

SO2: *To develop climate-resilient export value chains, post-harvesting processes and agribusiness to increase market outlets, add value to agricultural produce and generate employment in rural areas.* IFAD will contribute to achievement of government targets towards the growth of the off-farm rural sector through development of climate-resilient and low-carbon value chains. These actions aim to reduce post-harvest losses and generate opportunities for youth employment and added value of agriculture produce through processing and agribusiness.

SO3: *To improve the nutritional status of poor rural people and vulnerable groups included in the process of economic transformation.* To reach the most vulnerable groups, a more proactive effort is needed to improve nutritional outcomes throughout the IFAD portfolio, particularly targeted at women and their economic empowerment.

4. RDDP is also aligned to the Government national agriculture strategy (PSTA III) programme areas: Agriculture and animal resources intensification (P1); Research and technology transfer, advisory services and professionalization of farmers (P2); Value chain development and private sector investment (P3); and Institutional development and cross-cutting issues (P4). In addition, the project will contribute to the goals of both the Economic Development and Poverty Reduction Strategy (EDPRS) II and the National Strategy on Climate Change and Low-Carbon Development. Indeed, the project will contribute to national endeavours towards achieving rapid and sustainable economic growth, poverty reduction and climate resilient development through the promotion of low carbon energy supply.

5. **Lessons learned.** According to the 2012 Country Programme Evaluation conducted by the Independent Office of Evaluation, IFAD interventions in Rwanda have contributed significantly to improving incomes and food security in rural areas, particularly through watershed development, increased production in irrigated marshlands and hillsides, development of livestock, export crops and

rural enterprise promotion, all in line with government priorities. The CPE's overall assessment of the COSOP performance and the IFAD/Government partnership are both rated as satisfactory. The main lessons learned in the implementation of the country programme include:

- The performance of the IFAD portfolio has improved considerably since 2005, facilitated by a stronger policy and institutional environment, well-designed and well-performing projects, and the introduction of direct supervision and country presence.
- The IFAD country programme has been effective in supporting the Government's strategy to sustainably increase Rwanda's agricultural productivity, develop high-value export crops and generate non-farm employment. IFAD has provided significant resources and technical assistance to develop policies, in particular PSTA III, and supported development of MINAGRI's new institutional structure.
- Past IFAD support has been less effective in contributing to sustainable access to rural finance, partly due to the use of credit lines on subsidized end-user terms and grants, rather than the development of sustainable financial intermediaries.
- The majority of cooperative members still have weak knowledge of their rights and duties, as well as limited business skills and low literacy levels. Cooperatives should concentrate on performing basic services for their members, leaving the more-complex processing tasks to private-sector companies.
- Microenterprise interventions have reached the poorest rural groups, including unemployed rural women and youth, landless people and orphans, but increased food and cash-crop productivity have benefited mostly economically active poor people.
- KWAMP support to land regularization has resulted in reduction of land disputes, improved access to credit, recognition of women's land rights, and improved land investment such as reforestation and soil and water conservation.
- PAPSTA and KWAMP support for crop/livestock integration through the 'one cow per poor family' scheme has had an immediate impact on livelihoods, with a more than 100-per-cent increase in household incomes and improved nutrition outcomes.

3. Rwanda has also developed considerable expertise in the use of GALS, within IFAD-supported projects and grants. By engaging with both women and men at the household level, households experienced significant and sustainable improvements in household dynamics and well-being as well as more equal sharing of household tasks between women and men, decision-making power and control of assets, and increases in income. Indeed, the use of GALS was one of the factors that resulted in KWAMP winning the IFAD Gender Award for ESA in 2014 because of their specific outreach to women who accounted for more than 40 per cent of project beneficiaries. In addition, KWAMP facilitated (i) access to information, innovation and technologies for women, including biogas systems that reduced women's workload, and (ii) activities for the economic empowerment of the poorest women.

4. In addition to these IFAD-specific lessons learned, a recent review of successes and failures of a range of dairy value chain development interventions in Rwanda identified the following lessons which are of direct relevance to the design of the RDDP¹:

6. **Input provision:** Input comprises the products and services required in the production process. In Rwanda's dairy value chain, the provision of input provision is challenged by the low demand for animal drugs due to low purchasing power of producers/farmers. A second challenge is the lack of sufficient land size for extensive fodder production, leading to low supply of fodder. Moreover, AI services suffer from low number of experienced AI providers which coupled with lack of sex semen lead to delayed and high failure rate of insemination services. There is however an opportunity for these inputs to be supplied. As the market for milk product expands, it will pull the demand for inputs and services primarily provided through the established hub satellites around milk collection centres (MCCs) with a possibility of farmers paying through milk based advances or 'check

¹ Dairy Value Chain and Market Analysis Report, Heifer Project International, April 2016.

off' system. Building strong business relationship with the private sector for such investments will fill this gap, expanding the reach of business development services within hubs.

7. **Production:** Despite the cattle husbandry tradition and willingness of dairy farmers to increase production and improve milk quality supplied to MCCs, the production is still constrained by low number of dairy breeds (due to inconsistent access to and use of Quality AI services consequent to low availability of sex semen, low conception rate, timeliness of AI provision and not enough AI providers, Poor/inappropriate feeding practices (due to knowledge of farmers, low availability of raw feeding material such as cotton, sunflower, market for feeds not well developed, and low means to afford appropriate feeds 30 kg per day costing RwF 250 / kg, making the milk production at farm gate to be high compared market price of RwF 120 – 200 per litre, earning very low returns to farmers and adversary affecting farmers incentives to invest in productivity and quality enhancing technologies.

8. **Aggregation and transport:** Inadequate rural infrastructure, particularly road networks, longer distance to MCCs increase the probability of milk spoilage and ultimately in milk rejection which denies incomes to farmers. The situation is compounded by limited rural electricity, fuel availability, and efficiency of communication networks that influence all the components of the dairy value chain, resulting in inefficiencies, higher costs and ultimately reduced competitiveness. Moreover, low professionalism of cooperatives towards collective marketing result in low levels of milk supplied to MCCs. Handling milk at farm level with limited equipment and skills result in milk adulteration.

9. **Bulking and chilling:** Although around 100 MCCs have been established in all milk sheds, the underutilization of bulking/chilling capacity has implications on business profitability and inflates consumer prices. Inefficiencies include: poor milk collection that leads to milk spillage, spoilage and side marketing. Many MCCs are operating below capacity or are not operational due to lack of breakeven milk quantities caused by a double sided factor from supply side (low and inconsistent milk from farmers) and demand side (not enough pulling incentives from the upstream actor – processor – due to inconsistency in collection of milk as well as in delayed payment of raw milk). Underutilization is an indicator of underdeveloped supply chains, inefficient collection including milk spillage and spoilage, side marketing or existence of a large informal sector, and probably lack of shared value along the value chain.

10. **Processing:** With a big installed processing capacity of 350,000 litres per day in the country's five milk sheds, dairy processing offer a steady market for dairy farmers and their MCCs while adding value and availing quality dairy product with much longer shelf life to consumers primarily in-country and in towns such as Bukavu, Goma and Bujumbura. Still, the processing industry in Rwanda is challenged by the low demand of milk products due to the high prices that do not tally with the purchasing power of today's consumers. The supply gap caused by the large installed capacity of processors and low demand (and low supplies from farmer) provides an investment opportunity to diversify the dairy product range to increase shelf life and convenience of milk such as powdered milk.

11. **Retailing:** The milk distribution channel, at least in Kigali, has expanded in the recent two years with the change of Inyange's business model of distributing processed milk, especially pasteurised, through a network of joint ventures dubbed milk zones which has later been replicated by Crystal milk's Milk Point concept. This model should be also introduced to the targeted areas of the RDDP. Milk bars are still predominant selling points but face challenges related to quality/hygienic due to (i) inability to trace critical points of hazards from the variety of milk supplied by farmers; (ii) inappropriate cold chain / transport system leading to poor quality raw/fresh milk; and (iii) lack of micro processing machineries such as micro pasteurisers and sterilisers.

12. **Dairy value chain finance:** Key to the expansion of the sector, financial services along the value chain are still not easily accessed due to both demand and supply related constraints. Demanders (farmers, Cooperatives/MCCs, processors, input dealers, transporters) lack appropriate finance management skills, mastering of the dairy market dynamics, and acceptable collaterals by financial Institutions while suppliers (FIs) are limited by the high risk aversion for the livestock sector, low literacy levels on the livestock business and livestock risk management. As a result, few FIs are or have been involved in dairy value chain finance such as Duterimbere, Vision Finance, Banque Rwandaise de Development (BRD), Kenya Commercial Bank (KBC) and Banque Populaire. Despite

their high cost of production and low returns, many dairy farmers are considered creditworthy and are borrowing using other households assets as collaterals. In addition, FIs have not proper tools to appraise well borrowers which explains their lack of attention to dairy related loan products and financial services.

13. **Livestock insurance:** Unlike crop farmers, dairy farmers have not been targeted by the insurance industry as a viable market segment for their products. In Rwanda UAP and SONARWA have developed pilot insurance products on cattle mortality mainly covering diseases and accidental health risks and have found the product commercially viable because farmers are organised into cooperatives, and milk has found its way to MCCs through registered aggregators.

14. **Equipment and packaging:** Dairy related equipment is provided in-country by private enterprises that sometimes combine with the sales of other agroveter inputs and/or agro processing machineries. Large processing machines are imported from India and Germany while packaging materials are imported from Tetrapack in Kenya rendering the cost of packaging, especially in small sizes, very high. Plastic containers are easily sourced locally.

15. **The MCC – processor distribution channel has a huge potential:** In order to consolidate, expand and maintain the production and quality required by the market system, MCCs need to be vertically integrated with processor to ensure consistent supply and information. This has been proved by the model Eastern MCCs – Savannah – Inyanga which has boosted the level of quality milk (100,000 litres per day at 176 – 200 RwF / litres in 2015 compared to 20,000 litres per day at RwF 150 in 2012) supplied by farmers but also pushing processed milk to the processors outlets in a more consistent way on daily basis.

16. **The informal milk retail has a huge potential to be formalised:** The informal milk channel continue to operate in parallel to formal processed milk channel because of its relatively attractive terms it offers to farmers; direct payment, better prices, less stringent quality requirements and bigger volumes demanded more frequently. With the venue of milk zone/point concept, consumers have adopted new habits of drinking and demanding quality milk, processed and pasteurised. This represent a big market opportunity for milk traders and MCCs to collaborate on joint milk value addition to the already highly marketed fresh unpasteurised milk to attain the quality demanded by customers on a relatively cheaper price, offering more convenience to middle class milk consumers.

17. **Access to (BDS) services by the different value chain actors is still limited:** The notable weakest linkages are between AI services providers and dairy farmers. In addition, access to financial services such as savings, credit lines especially working capital and leasing products for milk processing are quasi inexistent because of constraints at both demand and supply sides mainly driven by low profitability of milk business. Livestock insurance is also relatively new and need to move from the pilot to scale up. The private sector needs to be encouraged to invest in access to these services especially AI, animal feed as well as financial services in the form of more structured finance, building on the successful check off system applied at MCCs levels.

18. **Diversification of products processed at MCC level:** There is a huge potential in diversifying the products sold by MCCs in order to diversify income streams of MCCs, increase MCCs revenues and offer farmers more reliable markets. However, most MCCs are not considering product diversification at the moment fearing extra investment required in such unreliable, fluctuating raw milk supplies and an unknown market for processed products. MCCs in South West i.e. Nyanza, Musanze and Rubavu appear willing to process milk into longer shelf life product such as yoghurt, fermented milk and cheese targeting new niche markets in DRC, Burundi and Uganda.

19. Beyond Rwanda, some of the key lessons from the recently-completed Smallholder Dairy Commercialisation Project in Kenya were as follows:

- Effective targeting is required for progression of Dairy Groups to market-oriented dairy farming. The process of graduation of Dairy Groups was challenging to reach a level where significant surplus could be commercialized, and some groups struggled to graduate to

business-oriented dairy farming. Targeting criteria should thus consider the groups' economic activity, level of organization and milk production.

- Good results for gender and youth integration were achieved. Strategies included: (i) setting quotas for women and youth access to services and activities supported by actions that facilitate their participation such as reserving 30% of leadership position to women; (ii) training sessions arranged at convenient times for women; (iii) introduction of gender-friendly technologies e.g. dairy goats, support to credit access; labour-saving technologies such as biogas and other energy saving devices; chaff cutters and small feed mixers; (iv) use of gender-sensitive participatory appraisal methodologies in the planning, implementation and monitoring processes; and (vii) sensitisation and capacity building on gender.
- Low quality of technical support to Dairy Groups affected development of results: The unavailability and inadequacy of County Cooperative Department Staff to provide expected support services to dairy groups led to poor target groups' results. Implementation modalities should be aligned to the pluralistic approach for extension and other service provision, to make up for capacity gaps in public extension services at county level.
- Subsidies for Artificial Insemination (AI) posed a challenge to private service providers: Some counties introduced different levels of subsidies to AI and animal health services to farmers. This posed a challenge for the SDCP-supported private service providers' business development. Through cooperation with the counties, SDCP should aim at facilitating a levelled playing field for operators and avoiding sudden changes in policies introducing unsustainable subsidies.
- Capacitation of small milk traders and operators requires a specific approach given their mobile and informal nature: SDCP should develop a specific approach to reach out to this target group including incentives and flexible training modalities adapted to their business schedules.
- Implementation of a Low-Cost Market Information System (LCMIS) was slow and results were limited. Setting up the LCMIS was a time-consuming process, while being out shadowed by new and emerging technologies that render the SMS platform inadequate. Data collection and updating of the system were also challenging owing to the rate at which the information became obsolete in a rapidly dynamic milk marketing environment.
- The school milk programme supported by SDCP did not yield expected development results: The introduction of the programme was expected to create an additional demand, supporting the milk commercialization objectives of the programme. However, given that the scheme was highly subsidized by SDCP, it was not sustainable. In addition, the programme did not target those most in needs for addressing chronic undernutrition (stunting), i.e. children in the age group are of 18-23 months. What's more, although milk plays its role as an animal sourced protein, in order to address undernutrition, a more comprehensive approach to increase dietary diversity (incl. consumption of micronutrient-dense vegetable and fruits) is required.

20. Finally learning from one of the most successful dairy industries in the world a 2008 Report from the Agribusiness Research and Education Network identified the following **key success factors** for New Zealand's dairy industry: (i) The evolution of industry structure to facilitate growth; (ii) farmer engagement in the development of industry policy, strategy, structure and operation; (iii) development of economies of scale; (iv) major disease-free status of national herd; (v) political support within New Zealand; (vi) continuing technological advance; (vii) political support in international markets; and (viii) successful development of international markets.

Appendix 4: Detailed project description

Goal and development objective

1. The overall goal of RDDP is to contribute to pro-poor national economic growth and improve the livelihood of resource-poor rural households. This will be achieved by focusing on food security, nutrition and empowerment of women and youth in a sustainable and climate-resilient dairy value chain. Specifically, the project seeks to increase competitiveness and profitability of the dairy sector for the provision of quality products from small-scale producers to domestic and regional consumers, thus improving their livelihoods, food security and nutrition whilst building overall resilience.

2. The specific objectives will aim at the following:

- Sustainably intensify dairy production and productivity among participating smallholder farmers. This shall be achieved through the promotion of improved climate-smart dairy farming practices and access to quality dairy inputs, extension services including veterinary and AI services; appropriate green technologies, as well as business and financial services, following a hub model approach.
- Increase incomes by at least 80% among participating smallholder farmers from dairy farming through a combined effect of the increased milk production and improved market access. This shall be achieved through the development of 30 dairy hubs; establishment and strengthening of dairy farmer organizations; and facilitation of linkages to markets and dairy value chain actors, such as milk collectors, processors, transporters, traders, and investors in milk quality through public-private-producer partnerships (4Ps).

3. Four **development outcomes** are expected:

- Smallholder dairy farming productivity and supply of quality milk to domestic and regional markets enhanced and milk consumption at household level increased;
- Organizational capacity, and enterprise skills of smallholder dairy farmers and their cooperatives enhanced;
- Infrastructure for collection, handling, processing and marketing of milk and other dairy products expanded and its utilization improved and tailored to adverse climate risks; and
- A conducive policy and institutional environment for the development of smallholder dairy industry fostered and strengthened.

4. **Approach for scaling-up results.** In broad terms, scaling up of results under the RDDP will be achieved through linking focused project investment resources to leverage private co-investment and borrowing from the commercial banking system through 4Ps; and in so doing, developing commercial value chain relationships and services that are market-driven and sustainable. RDDP will strengthen the dairy value chain and, in particular, the linkages between smallholder dairy producers and their organizations on one hand, and processors or traders on the other. It will promote the development of a scalable model for integrating financial and non-financial services to smallholder dairy farmers into the commercial relationship between them and processors; and it will support efforts to reduce the cost of doing business in the dairy processing industry, thus creating incentives for further investment in the sector as a whole.

5. **Project components:** RDDP is structured around three technical components:

Component 1: Climate-Smart Dairy Production Intensification (USD 26.46 m)

6. The objective of this component is to increase the capacity of male and female smallholder dairy farmers and farm assistants to sustainably produce and supply higher volumes of quality milk to the dairy market and home consumption. At the end of the project, it is expected that participating smallholder dairy farmers will have acquired the skills, knowledge and attitude needed to sustainably improve milk productivity, make climate smart and strategic investments, and provide an increased supply of quality milk to the market and for home consumption without increasing the carbon emission's intensity of their dairy production system. The progress and performance of the component

will be monitored through four indicators: (i) milk productivity¹ (kgs per day); (ii) milk supply to market (kgs per lactation period); (iii) average daily per cent of milk rejected at first point of milk quality control; and (iv) reduced carbon emission intensity (kg of CO₂ per litre of milk).

7. The component is organised around three main interventions: (i) enhancing the capacity of male and female smallholder dairy farmers and farm assistants to improve their knowledge, attitude, and behaviour for increased milk productivity and quality; (ii) enhancing sustainable access of smallholder dairy farmers to public and private livestock services and inputs; and (iii) supporting resource-poor households who have no cattle to acquire dairy assets under the *Girinka* program so that they can enter into dairy farming and increase their capacity to implement climate-smart and strategic investments aiming at sustainably increase milk productivity and improve milk quality.

Sub-component 1.1 – Training and capacity building of smallholder dairy farmers (USD 9.3m)

8. Under this sub-component, RDDP will improve smallholder dairy farmers' and farm assistants' capacity to sustainably increase milk productivity and quality to subsequently reduce both milk rejection at first collection point and reduce risks related to food safety. The sub-component will also pay particular attention to increase awareness of gender roles in dairy farmers' households by improving household members' capacity to negotiate their needs and interests and assist in developing gender-equitable solutions in livelihoods planning and value chain development. The main activities of the sub-component will fall under the following three areas: (i) Establishment and development of Livestock Farmers' Field Schools; (ii) support for short and medium-term research; and (iii) promotion and support for development of Gender Action Learning System (GALS).

9. ***Establishment and development of Livestock Farmers' Field Schools (L-FFS)*** targeting about 80,000 smallholder's dairy farmers and about 15,400 farm assistants in order to enhance their capacity to improve their knowledge, attitude, and behaviour for increased milk productivity and quality. The project will assist dairy farmers and farmers' assistant to engage in a process of hands-on field-based learning over a production cycle covering "calf to calf" as a time-bound. It will assist the adaptation of improved technologies and practices in dairy farming and milk handling using methodologies focusing primarily on facilitating smallholder dairy farmers and farm assistants to acquire and develop their knowledge, attitudes, and behaviour. In addition, skills will be developed in group formation and management (which could provide a basis for strengthening downstream dairy cooperatives), basic literacy and numeracy skills and record keeping.

10. The intervention will build on the "*Twigire Muhinz*" programme, which was successfully implemented by the RAB in collaboration with the Belgian Technical Cooperation. The L-FFS Masters Trainers and L-FFS Facilitators trained by this programme will be attached to the RDDP in addition to those that will be trained by the project. The activities will include: (i) development of the L-FFS curriculum and training materials in Kinyarwanda including a modular ToT's manual for the L-FFS Facilitators and simple factsheets with key messages to remember for the farmers and farmers' assistants, using this opportunity to break down cultural barriers and traditional gender roles in milk production by ensuring that the language, text and imagery is gender inclusive; (ii) selection and training of National Masters' Trainers (NMT) by an International Masters' Trainers (IMT); (iii) selection and training of about 640 L-FFS facilitators (to ensure the target of at least 50% trainers are women, attention to the location, timing and childcare facilities may increase their opportunity to participate); (iv) selection and training of smallholder's dairy farmers and farm assistants; (v) establishment and facilitation of about 3,200 L-FFS groups of 25 smallholder's dairy farmers, and 1,280 L-FFS groups of 10-15 farms assistants; (vi) supervision and guidance of the L-FFS Facilitators by the NMTs and District Veterinary Officers (DVO). The NMTs, L-FFS facilitators, and smallholder's dairy farmers and farm assistants will be identified and selected through a demand-driven process based on pre-defined criteria which, among others, will consider gender, youth and social inclusion (with particular attention to *Girinka* and *kraal* participants; 30% of L-FFS members are to be women-headed households). The selection process and criteria will be detailed in the Project Implementation Manual.

11. The activities will be implemented under the responsibility of the L-FFS of the SPIU. in close collaboration with a Coordination and Technical Committee (CTC) for L-FFS headed by the Director of the department of Animal Resources and Extension (ARE) of the RAB to be established by the project.

¹ Average kgs of milk produced per cow per day during one lactation period (excluding the milk intake of calves).

12. **Support for short and medium-term research** on key strategic thematic areas affecting smallholder dairy productivity and climate-smart practices dairy production practices, techniques and/or technologies. The project will facilitate and support short and/or medium-term collaborative research initiatives in animal nutrition, animal health and animal genetic that will be selected through a transparent demand-driven and competitive process coordinated and involving higher education students (MSc and PhD students). The project will also work in close collaboration with the IFAD-funded Post-harvest and Agribusiness support Project (PASP) to identify and ensure the diffusion, through the L-FFS, among smallholder dairy farmers of good practices, techniques and/or technologies proven to have high potential of reducing GHG's emission intensity in smallholder dairy production, and preparation of modules and training tools for dissemination to farmers

13. Implementation of the activities will be coordinated by a Scientific Committee for Dairy Research (SCDR) to be established at project start under the Presidency of the Head of the Research Department in RAB. The identification of good practices in Climate-smart Livestock (CSL) will be coordinated through the SPIU with the PASP.

14. **Promotion and support for the development of Gender Action Learning System (GALS)** in order to increase awareness of gender roles in the households and communities by improving their capacity to negotiate their needs and interests and find innovative, gender-equitable solutions in livelihoods planning and value chain development. The project will integrate GALS into the L-FFS modules to foster behavioural change of farmers and household members. As necessary, RDDP will support the training of Master L-FFS in GALS who will train the L-FFS facilitators to implement the approach and tools for participating farmers. The project will draw on in-country expertise on GALS – in other IFAD-supported initiatives and national NGOs. The methodology will be rolled out through the L-FFS groups out to the household level.

Sub-component 1.2 – Sustainable access to public and private livestock services (USD 8.49 m)

15. The objective of the sub-component is to sustainably enhance access of smallholder dairy farmers to public and private livestock support services and inputs including access to good animal nutrition and quality animal feed, animal health services, and appropriate Animal Genetic Resources (AnGR). The sub-component will complement the L-FFS' activities where animal nutrition, animal health, and genetic improvement will be largely addressed. The main interventions will include: (i) Improved animal nutrition and access to quality animal feed; (ii) enhanced public and private animal health services; and (iii) improved sustainable access to appropriate animal genetic resources.

16. **Improved animal nutrition and access to quality animal feed.** This intervention will seek to improve animal nutrition by: (i) assisting in the formulation of optimized feeding rations and feeding strategies by conducting a detailed inventory of locally-available animal feed resources, formulating optimized feeding rations and feeding strategy for each smallholder dairy production system – including the resource poor, and preparing technical modules and simple flyers for the L-FFS and small-scale feed production units; (ii) improving access to, and use of, diversified grasses and legumes forages by supporting the establishment and/or the development of 450 producers specialized in the production of drought and flood tolerant forage seeds and vegetative planting material (multipliers) with an average area cultivated of 1 ha, and organizing awareness and information campaigns on the benefits of the use of diversified forage; and (iii) promoting small-scale animal feed production units by supporting the preparation of a standard business model for small-scale animal feed production units projects for RDDP support. In addition, the project will assist, with the support of FAO, in conducting a prospective analysis of the demand and supply in animal feed in order to clarify the optimum number of animals that could realistically be kept with the locally available animal feed resources.

17. Implementation of activities will be under the responsibilities of the animal production and genetic management expert of the SPIU and the guidance of a Technical Committee for Animal Nutrition and Animal Genetics (TC/ANAG) to be established at project start under the Presidency of the Head of the Animal Genetic and Animal Nutrition Department in RAB. The support to seeds and vegetative planting materials multipliers will be implemented under the responsibilities of the Research Department of the RAB and the guidance of the TC/ANAG.

18. **Enhanced public and private animal health services.** In order to contribute in sustainably reduce the impact (mortalities and morbidities) of diseases on milk productivity and quality, the project will assist in improving access to, and efficiency of, animal health services provided by both public and private sector according to their respective mandates. Activities will be structured around two interventions:

19. **Enhancing diseases prevention and food safety:** The project will (i) reinforce 175 sector and 12 district veterinarians' capacities (training, equipment, transport means [costs-sharing]); (ii) strengthen disease prevention and control (prevalence study and contingency plan for brucellosis, vaccination campaigns for Brucellosis, FMD² and LSD³); (iii) strengthen animal diseases diagnostic capacities (equipment and rehabilitation of satellite laboratories, training and refreshing courses for labs technicians⁴); and (iv) improve milk quality and food safety (training of food safety control agents⁵, support to random audit of milk, milk facilities and milk equipment).

20. **Establishment** - on a pilot basis in three districts - of networks of private Animal Health Workers (AHW) operating under the responsibility and the supervision of a Veterinarian Doctor (VD) officially recognised by the Rwanda Council of Veterinary Doctors (RCVD). Main activities to be financed will include: (i) consultancy services to prepare the implementation plan for the pilot operation; (ii) selection of the VDs and AHWs; (iii) training of 24 AHWs (initial training and refreshing courses); (iv) co-financing of Animal Health kits and transport means (cost-sharing) for the VDs and AHWs as initial running capitals; (v) in the pilot districts, the costs of 100% of the sanitary mandate for the first three years (Y2 to Y4) and 50% of the sanitary mandate for the last two years, and in the new districts, 50% of the sanitary mandate for the last two years; (v) supervision and close monitoring of the pilot operation by the TC/AH; (vi) final assessment of the pilot operation and the preparation of an investment program for the scaling-up by the Investment Centre of FAO; and (vii) enable women and youth to become trained at AHW.

21. The activities will be implemented under the responsibility of the Animal Health Department (AHD) of the RAB in close collaboration with the Animal Health Expert of the SPIU and the overall guidance and technical support of a Technical Committee for Animal Health (TC/AH) to be established at the start of the project under the Presidency of the head of the Animal Health Department of the RAB. The TC/AH would include a minimum of two representatives of the Rwanda Council of Veterinary Doctors (RCVD).

22. **Improved access to appropriate Animal Genetic Resources (AnGR)** in order to enhance sustainable access of smallholder's dairy farmers to the most appropriate and relevant AnGR, the project will contribute to:

23. Reinforcing the capacity of the Masaka Bull Station, including rehabilitation of the bull station, purchase of an automatic straw filling and sealing, cooling and freezing system, purchase of progeny-tested bulls, and preparation and implementation of a training program for the staff of the Bull Station.

24. Assisting the preparation and implementation of a breeding programme⁶ for smallholder's dairy cows aiming at identify and promote the use of AnGR demonstrating a level of indigenous and exotic breeds optimizing heterosis according to the agro-ecological and socio-economic situation prevailing within the farming systems. A study will be conducted on the characterization of major dairy

² Food and Mouth Disease (FMD)

³ Lumpy Skin Disease (LSD)

⁴ Advanced training in microbiology, bacteriology and other diseases diagnostic techniques at IRLI laboratory in Kenya for two technicians from the central laboratory of Rubilirzi and training in microbiology and bacteriology at the central laboratory of Rubilizi (Rwanda) for about 20 technicians of satellites laboratories.

⁵ Including: milk hygiene testing and analysis, food safety verification procedures, Hazard Analysis & Critical Control Points (HACCP) procedures, Good Manufacturing Practices (GMPs), regulatory compliance, and sanitation procedures including programs and procedures related to cleaning and maintaining a hygienic work environment for producing human foods.

⁶ Defines as systematic and structured programs to change the genetic composition of a population, based on objective performance criteria (NLBP, 2015).

production systems, including household characteristics (composition, wealth, labour profiles). Activities will follow the FAO guidelines on breeding strategies for sustainable management AnGR⁷.

25. Enhancing capacity in Artificial Insemination (AI) and private AI services by (i) strengthening the capacity for the production and the distribution of liquid nitrogen (purchase and installation of a new Nitrogen Generation Plan and storage tanks for the transport of the liquid nitrogen, and conduct a feasibility study for the transfer of AI services to private sector; and (ii) support the development of private AI services (audit of AI operations, preparation of training materials, training, equipment and transport means (cost-sharing) of about 40 private AI technicians per year, refreshing courses for new and existing private AI technicians). Prior to the implementation of activities, MINAGRI will take all necessary steps to progressively remove all artificial insemination activities by public agents in areas covered by a private AI technicians. Public agents wishing to start AI activities on a private basis will have to resign from the public service. They would receive priority as candidates for the course for the new AI technicians. However, like other participants they will have to succeed the final test and be classified within the 20 best candidates.

26. Assisting in developing an Animal Identification and Performance Recording System: The system will be designed in accordance with international standards. It will be first implemented on a pilot basis in one district and progressively extended to two other districts. It will be conceived to be flexible, allowing multiple purposes including: (i) animal identification and registration; (ii) performance recording; (iii) AI and AI bulls management; (iv) animal health information and certification; and (iii) animal traceability. Activities will include: (i) conception and the drafting of the animal identification and performance recording system including the definition of a unique animal numeration system; (ii) preparation, review and update of the legislation; (iii) development/update of the software; (iv) test of the system in one district; (v) expansion in two other districts; and (vi) preparation of a scaling-up plan to cover the country.

27. The activities will be implemented under the responsibility of the Animal Genetic Improvement Department (AGID) of the RAB in close collaboration with the livestock experts of the SPIU, and the overall guidance and technical support of the TC/ANAG. For the preparation of the breeding programme, the AGID will be assisted by a qualified national expertise which would include a study coordinator and national experts on an ad-hoc basis. The activities will also receive a methodological and technical assistance from FAO (MoU) focusing on (i) preparation and implementation of the breeding programme; and (ii) development of the Animal Identification and Performance Recording System. The longitudinal field survey will be implemented in close coordination with the local authorities and out-sourced (MoU) to a qualified research institution which will involve interested MSc. or PHD students, and L-FFS facilitators, Animal Health Workers (AHWs), and sector's vets for the data collection.

Sub-component 1.3 – Asset building and climate-smart productivity among poor households (USD 8.67 m)

28. The objectives of the sub-component will be to (i) assist poor households with no cattle to enter into dairy farming, and (ii) improve smallholder farmers' capacity to invest in climate-smart and strategic productive investments. The main interventions will include: (i) Support to the *Girinka* programme; (ii) support and incentives for climate-smart and strategic investments; and (iii) support for preparation of enterprise development plans.

29. **Support to Girinka Programme.** To enable 4,000-6,000 poor households with no cattle to engage in dairy farming, the project will support the outreach of the “*Girinka*” programme in targeted districts using the same criteria set by the Government. The project will mitigate the impact that would be generated by an increased number of cows and increased GHG emissions by supporting the *Girinka* programme under the condition that heifers are selected and purchased locally. In doing

⁷ FAO. 2010. Breeding strategies for sustainable management of animal genetic resources. FAO Animal Production and Health Guidelines. No. 3. Rome. <http://www.fao.org/docrep/012/i1103e/i1103e00.htm> . Other useful guidelines to be used include: (i) FAO. 2012. Phenotypic characterization of animal genetic resources. FAO Animal Production and Health Guidelines No. 11. Rome; (ii) FAO. 2011. Molecular genetic characterization of animal genetic resources. FAO Animal Production and Health Guidelines. No. 9. Rome.

so, it is also expected to strengthen the national capacity in the production of AnGR and the development of the dairy breeds market. The project will analyse and test the feasibility of contracting farmers to produce F1 *Ankole*/Holstein heifers through the use of sexed semen. These heifer calves will then be inseminated with (sexed) semen according to the recommendations of the above breeding plan and distributed as pregnant F1 heifers to the beneficiaries. The project will support the construction of a climate smart cowshed⁸, farmer training, extension support and integration.

30. This intervention will be implemented under the responsibility of Heifer International and in close collaboration with RAB, District and Sector offices. The implementation of activities will be outsourced to a qualified service provider to be selected according to the project's procurement procedures.

31. **Support and incentives for climate-smart and strategic investments.** The objective is to increase the capacity of smallholder dairy farmers to undertake climate-smart and strategic investments aimed at sustainably increasing milk productivity and improving milk quality⁹. The project will support and provide incentives for eligible beneficiaries to facilitate demonstration and adoption of climate-smart and strategic investments by supporting both working and investment capital on the basis of a 60-40% ratio contribution between the project and beneficiaries. The project will put in place demand-driven mechanisms aiming at transparently and competitively identifying eligible initiatives to be co-financed by the project. The appraisal mission will also assess the feasibility to use RuralInvest as the main tool for project preparation and supervision. The detailed mechanisms, procedures and eligibility criteria for beneficiaries will be detailed in the PIM. See also Appendix 13 on rural finance.

32. **Support for preparation of enterprise development plans.** The intervention will specifically target investments that are commercially viable at short term. The objective is to facilitate the development of small-scale productive investments and generating income at the farm-level and within the L-FFS groups. The project will support smallholder dairy farmers and other eligible beneficiaries to develop bankable productive business plans including investment in improved livestock services that are commercially viable and will be consolidated within the activities related to access to finance included in the second component. The intervention will aim at leveraging project investment resources by investment borrowing from the commercial banking system to promote and support innovative productive investments with higher risks or less predictable profits such as the establishment of seeds' multipliers and specialized forages' producers, small-scale feed production units, small-scale processing facilities, and small equipment for direct sale to local consumers. Eligible beneficiaries will be the members of L-FFS groups, new dairy cooperatives formed from L-FFS groups, existing dairy cooperatives, livestock services providers (private AI, private vet and AHWs) wishing to initiate Income Generating Activities (IGA).

33. **Implementation arrangements:** The component will be implemented under the overall responsibility of the SPIU Coordinator and the direct coordination and supervision of a Program Manager (PM) to be recruited for the project. The SPIU coordinator and the PM will be assisted by qualified, locally recruited experts. For component 1, the technical expertise will include: (i) a FFS specialist, (ii) an animal health specialist, and (iii) an animal production and genetic management specialist.

34. Under this component, activities will be implemented in close collaboration with the Rwanda Agricultural Board (RAB) through four specialized technical committees headed by the director of the relevant technical department of the RAB: (i) a Coordination and Technical Committee (CTC) for the L-FFS activities; (ii) a Scientific Committee for Dairy Research (SCDR); (iii) a Technical Committee for Animal Nutrition and Animal Genetics (TC/ANAG) and (iv) a Technical Committee for Animal Health

⁸ A climate smart cow shed has a rain water harvesting system, appropriate flooring and waste management system to ensure efficient removal and storage of dung and urine, improved feed and watering points and green energy investments.

⁹ Examples of climate-smart's investments include biogas units, common solar milk cooling systems as first collection point (L-FFS group), small farm equipment which are proven to improve animal nutrition (e.g. improved feeds' digestibility) or reduce methane emission (e.g. forage choppers). Examples of strategic investments include initiatives for addressing water shortages in the drought-prone areas (boreholes, water harvesting, watering points rehabilitation); investment promoting innovative mechanisms for improving household nutrition and reducing women's workload.

(TC/AH). The SPIU experts will participate in these committees for which they will act as the secretariat. Where and when needed, the project will ensure the cooperation of specialized technical agencies and/or private service providers. Specialized institutions identified as possible implementing partners include the Rwanda Agriculture Board (RAB), the Food and Agriculture Organization (FAO), the NGO Heifer International and the Rwanda Council of Veterinary Doctors (RCVD).

35. The livestock experts (health and animal production/ genetic management specialist) and the L-FFS specialist will not only contribute to the supervision of the activities. They will be also expected to participate directly to the design and the implementation of the activities such as prepare training materials and conduct trainings, develop terms of reference and concept note for studies, prepare and facilitate workshops, ensure secretariat of the technical committees, etc.

Component 2: Producer Organization and Value Chain Development (USD 28.85m)

36. The objective of this component is to strengthen the organization of smallholder dairy farmers and improve their access to input, service and output markets. The aim is to support farmers to take advantage of the productivity gains expected to be realized through investments made under component 1 to increase earnings by accessing profitable markets through investments in a milk delivery system that ensures food safety and curtails the high losses currently experienced in the value chain. Given the small-scale nature of milk production by individual farmers, investments under this component will seek to simultaneously address milk aggregation and bulking for economies of scale; strengthen milk collection infrastructure; reduce losses of milk and improve safety measures along the value chain; and support strategic actions and investments in improved penetration of the domestic and regional markets through processing and market linkages forged under public-private partnerships with producers (4Ps).

37. To help address quality and food safety concerns of milk handled through the informal sector which currently dominates milk trade in the country, the project will make investments towards awareness creation, training and capacity building of milk collectors and traders to adhere to the standards laid out in the new MO on milk collection, transportation and trade. Consequently, the component is organized around three sub-components: (i) organization and capacity building of dairy farmers' cooperatives and other value chain players; (ii) investments in climate resilient milk collection, processing and marketing infrastructure; and (iii) leveraging financing for climate resilient dairy enterprise development in all segments of the value chain. Activities under this component will build on the work of HPI in Rwanda in the areas of dairy business hub development, social capital building among smallholder resource poor households and creating sustainable market linkages.

Sub Component 2.1 – Producer organization and capacity building of dairy cooperatives and other VC players (USD 7.05m)

38. To address the current low participation of dairy farmers in existing cooperatives, the project will provide support to existing dairy cooperatives in targeted areas to strengthen their internal organization, business orientation and management capacity to make them attractive partners to dairy farmers in their quest for improved access to markets. The idea will be to strengthen these farmer organizations to a level that they are able to efficiently provide services to farmers in milk collection and payments; bulk purchase and delivery of dairy farming inputs; direct (or indirect) provision of extension, AI and animal health services¹⁰; and linkages to financial services through the “Hub” model already successfully tested in the country.

39. Strong linkages will be established with activities undertaken under component 1 in mobilization of farmers into farmer field schools in a way that these L-FFS become the building blocks for membership of the cooperatives. Support will also be provided in establishment and strengthening of dairy cooperatives in project areas where none exist. Besides farmers, the project will also support the organization and capacity building of other key actors in the value chain: milk collectors and traders; dairy equipment fabricators and service providers; and other service providers. The key activities under this sub-component fall under the following three areas: (i) Organization and capacity

¹⁰ The project will seek partnerships with existing service providers where these exist.

building of dairy cooperatives; (ii) organization and capacity building of milk collectors and traders; and (iii) capacity building of service providers.

40. **Organization and capacity building of dairy cooperatives:** Under this activity the project will support: mapping and rapid assessment of all both primary and secondary dairy cooperatives in the targeted area; registration formation and establishment of governance structures for those under formation; preparation of five-year bankable enterprise development plans (EDPs) to guide investments for growth; and tailor-made capacity building of the cooperatives structured to address the specific capacity gaps identified in their EDPs (in governance, business management and technical areas). Support will also be provided in establishment of modern information communication technologies modelled along the Agriculture Infrastructure platform increasingly gaining popularity among dairy cooperatives and other farmer organizations within Eastern Africa. Support under this activity area will also target district-level cooperative unions where such are required for joint action in bulking of production, processing and marketing modelled along the successes of IAKIB.

41. **Organization and capacity building of milk collectors and traders:** In recognition of the important role played by the informal sector in the dairy value chain and the critical need for their involvement in the transformation of the milk collection, transportation and trading functions to adhere to hygiene and quality standards under the new law, the project will provide support in the following areas: mapping and rapid capacity assessment of the various categories of players in milk trade (milk collectors, transporters, wholesalers, retailers and exporters); sensitization, training and capacity building in adoption of good practices in milk handling and trade; support in establishment of suitable milk trading structures (milk kiosks and bars); and certification.

42. **Capacity building of service providers:** Under this activity, the project will provide support in appraising the status of investments in value addition and processing facilities in the country and the level of capacity utilization; and develop and implement tailor-made capacity building support to improve current capacity utilization and expansion in areas which are not adequately developed. Priority will be given to investments aligned with the productive partnership models which leverage public, private and producer investments to take advantage of the emerging opportunities in the dairy industry.

Sub-component 2.2 – Investment in milk collection and processing infrastructure (USD 5.24m)

43. The project area currently has a total of 65 MCCs which MINAGRI has already undertaken detailed analysis of their level of operation, management capacity and infrastructural development requirements. In addition, a large number of small private milk collectors and kiosk milk sellers operate in the project area, handling significant quantity of the milk marketed. Building on this as a starting point and using a demand-driven approach structured around the 4P partnerships, on one side, the project will support the expansion and capacity utilization of a milk collection infrastructure stretching from the village level (collection points), satellites (where required) and milk aggregation at MCC level that ensures food safety standards are maintained in accordance with the recently issued Ministerial Order (MO) on milk collection, transportation and trade. On the other side, the project will support upgrading the capacity of small private dairy operators who intend to comply with new food safety standards included in the above-mentioned MO. Within this sub-component, the project will promote access to low carbon energy supply to enhance and ensure a competitive and sustainable dairy value chain.

44. Activities under this sub-component will include: (i) technical and investment support to MCCs to expand outreach and improve capacity utilization (starting with existing MCCs but also with a provision for new ones where required); (ii) all weather feeder roads improvement in milk production clusters which have limited links to collection and marketing points¹¹; (iii) 4P modality partnerships in processing and improved market penetration of dairy products in the domestic and regional markets; and (iv) incentive packages to upgrade dairy collection, handling and marketing of small private dairy operators at district level.

¹¹ The aim will be to upgrade the targeted feeder roads to all weather and at the same time explore opportunities for using them for road run-off water harvesting into tanks and other facilities.

45. **Investment in expansion and improved utilization of milk collection infrastructure:** Support under this activity area will be aimed at, first and foremost, improving the utilization of already installed milk collection infrastructure and then, on a secondary basis, seek to expand similar infrastructure to underserved areas. Support to existing MCCs will be demand-driven and tailor-made to the capacity needs of the facility in line with the three categorizations of MCCs in the country. Investments will be modelled along cost-sharing principles and will include targeted refurbishment and rehabilitation of physical infrastructure to meet standards set under the new law; repair and installation of milk cooling equipment; investments in improved connectivity to reliable sources of water and electricity; and limited support in upgrading operational infrastructure for effective management. Through close partnership with subsidiary member groups dairy cooperatives, support will also be provided in establishment of satellite and Cell/village level collection site infrastructure that meet the standards of a first level milk delivery milk collection point under the new law.

46. **Feeder roads improvement:** To ensure ease of access to milk collection points and centres in all targeted districts, RDDP will liaise closely with the Feeder Roads Programme under MINAGRI to ensure that parallel resources committed by the government to support the construction and upgrading of feeder roads to MCCs are availed for the purpose. This is particularly relevant for the Gishwati rangelands in the Western Province where already 116 Kms have been identified for construction and upgrading. The aim will be to upgrade the targeted feeder roads to all weather and at the same time explore opportunities for using them for road run-off water harvesting into tanks and other facilities. For other areas not covered under the current government commitment, the project will provide limited support in spot improvement of critical points which may be constraining adequate road accessibility to collection centres. For all investments related to upgrading of road infrastructure, the project will ensure that appropriate measures are taken in the establishment of borrow pits during road construction/rehabilitation that allow capture of rainwater into tanks.

47. **Incentive-based package for upgrading of milk retail infrastructure:** Building on capacity building support to informal milk collectors and traders under sub-component 2.1, the project will provide incentive-based support for development and adoption of milk innovative models of milk kiosks, bars and zones which meet quality standards of the new law among traders. Support will target technology development for such infrastructure; training and capacity building of fabricators, and incentive-based support to traders for mass adoption of the technology.

48. **4P modality investments in expansion and improved utilization of processing infrastructure:** Under this activity, the project will provide support in appraising the status of investments in dairy value addition and processing facilities in the country and the level of capacity utilization; and develop and implement tailor-made capacity building support to improve current capacity utilization and expansion in areas which are not adequately developed. Priority will be given to investments aligned with the productive partnership models which leverage public, private and producer investments to take advantage of the emerging opportunities in the dairy industry.

Sub-component 2.3 – Leveraging financing for climate resilient dairy enterprise development (USD 16.56m)

49. To improve the accessibility of financial services at all levels of the dairy value chain, the project will link focused project investment resources to leverage private sector co-investment and borrowing from the commercial banking system. Project resources will be allocated to support the incremental costs related to business plan investments in low-carbon energy supplies and post-harvest equipment, infrastructure, climate-resilient buildings and associated training to develop the dairy hubs' capacity to establish and operate such investments and improve their efficiency and sustainability. At the level of the dairy producer, financial services activities will promote access to livestock insurance services and to formalize existing informal savings and credit services within dairy hubs and the creation of SACCO windows. Access to loans will be facilitated through financial literacy trainings as well as through improved financing to aggregators in dairy value chains. For these VC actors the project will support financial incentives to better tailor the financial services offered at present by the financial sector to them to their specific working capital and investment financing requirements.

50. RDDP will include a range of different financial services to support the requirements of actors in the dairy value chain. To this end, savings, insurance, loan and possibly also leasing facilities will be promoted as service options to dairy producers and aggregators such as MCCs, dairy processors, transporters and milk and dairy product vendors. Activities will be implemented under the overall supervision of the SPIU and contracted to one not-for profit public service provider with the required different types of financial services on offer, the Business Development Foundation (BDF). The following sequencing of activities is proposed:

- *SPIU supervision:* Agreement with SPIU on coverage of financial services activities; a separate access to finance specialist is to be recruited for supervising activities or the portfolio of one of the existing staff may be expanded.
- *BDF:* BDF will be responsible of the selection of financial institutions fulfilling the following conditions: (i) be financially and operationally sound and have outlets in reasonable proximity to RDDP target groups; (ii) have some experience in lending to RDDP target groups and in appraising the technical and financial viability of eligible investment purposes; and (iii) bear all or most of the risk of the loan and provide working capital finance if needed.
- *Fine-tuning of financial instruments at start-up:* For the different types of investments to be supported under RDDP, the types of instruments (guarantees, grant supervision, lending facility) need to be confirmed. This requires above all discussions with the central bank on their views of scope and adequacy of lease finance in the country and with BDF on number and type of financial institutions to be included in each of the different financing types.
- *Finalization of product design:* End user terms and conditions for the different types of financial services should be on the lower end of current market rates; initial partial subsidization of policy payments for the dairy cow insurance, modes of procuring services for the project (single sourcing or prequalified tender) and final design of terms and conditions for the dairy cow insurance to be worked out by IFAD selected insurance specialist.
- *Start-up workshop:* A start-up workshop will bring together financial institutions, BDF and the SPIU, with a side event organized with a half day meeting focusing specifically on financial services in the project.
- *Selection of service providers:* SPIU will oversee the selection of service providers for financial literacy trainings, preparation of bankable business proposals (to assist in EDP development for all financing requests above 50,000 USD with operating model based on the collaboration of SPs with SPIU for PASP), capacity development of financial institutions in dairy business, and a third service provider to undertake specialized product development for financial institutions. If the insurance expert at start-up recommends to tender for the services of the insurance pilot, then this should also be managed directly by the SPIU.
- *Selection of partner financial institutions:* BDF will be responsible for this and sign MoUs with potential partners for implementing guarantees in the project and a lending facility.
- *Direct implementation through BDF:* this is proposed for the management of equity placements in the project and for grants associated with climate smart investments.
- *Eligibility criteria for retail financial institutions:* These criteria will form the basis for collaboration between BDF and financial institutions such as microfinance institutions (for wholesale loans from BRD Development) or other banks and SACCOs to be developed by BDF in close coordination with the Access to Finance specialist in the SPIU.

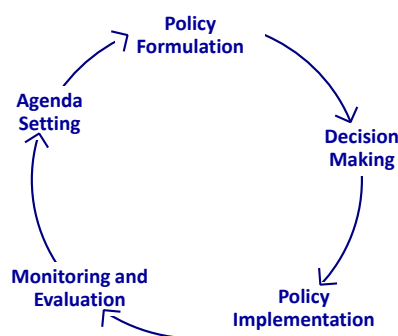
- *Finalization of financial instruments based implementation schedule:* SPIU and BDF will draw up the final implementation schedule for financial services based on the results of the aggregator inventory and decisions made on the type of financing instrument to be associated to each of the financing requirements under RDDP.
- *Flow of funds for external lines of credit* through BDF to retail financial institutions, or from BDF through BRD Development to retail financial institutions
- *Focusing of partner institutions:* In case of a financing facility through BRD Development a pool of a maximum of three retail MFIs are proposed. Where BDF itself acts as a wholesale financing agency, larger SACCOs are proposed to be included and 3 to a maximum of 5 other financial institutions, this with a view to focus efforts and capacity development measures for financial institutions
- *Service provider for financial literacy programmes:* This service provider is proposed to be a financial institution. FAO has pointed to experience in Kenya with Equity Bank being included as trainers in financial literacy training in farmer field schools and similar arrangements for RDDP should be sought.
- *Capacity development training for banks:* RDDP success will depend on its ability to leverage the commercial lending resources that are needed to finance and co-finance the viable EDPs facilitated together with RDDP target groups. As this commercial lending will depend on the risk appetite of financial institutions and their interest/experience in financing these investments, there will be a need to provide technical assistance to the financial institutions that are partnering with BDF. These trainings should be focused only on the partner financial institutions and trainees should be pulled together from different institutions towards joint training sessions to make better use of limited resources.
- *Transfer of funds to BDF:* RDDP will transfer the amount to BDF to (i) support the extension of guarantees for Agri-business services providers; (ii) support participating banks lending exposure to RDDP target group for those banks such as BRD Development without their own deposit mobilization activities; (iii) grant payments for innovative and climate initiatives; and (iv) for equity placements in larger scale investment operations.
- *Annual review of overall performance of BDF:* Following the agreed procedure in PASP, there will be an annual review of the overall performance of BDF with regards to its activity under RDDP. This review will be carried out jointly by SPIU and BDF during a participative workshop to identify BDF's weaknesses and strengths. Based on this identification, BDF and the SPIU / RDDP will agree on measures to be taken to improve performance or to replicate successful operations in other zones. If the performance assessment is below the required quota (below 70% of the total evaluation scores), appropriate measures will be considered and agreed by the SPIU/ PASP, the MINAGRI and the International donors all together.
- *Reporting:* For activities managed by BDF, the Foundation shall submit quarterly activity and financial reports not later than 15 days after the end of the quarter. The quarterly report formats will be communicated by the Head of Management Information System of the SPIU. All other service providers are likewise requested to report quarterly to SPIU as an input into the SPIU consolidated progress and financial reports.

51. **Implementation arrangements.** This component will be implemented by MINAGRI in close collaboration with HPI in areas relating to development of the Hub model. Within the MINAGRI SPIU an Agribusiness and Farmer Institutions Officer will be recruited to complement the capacity of the Marketing Support Officer already providing marketing support to ongoing IFAD-funded projects. For organization and capacity building of farmer cooperatives, a working relationship will be forged with the RCA both at national and district levels. Management of the financial services activities will be carried out in collaboration with the BDF building on structures and mechanisms already established for administration of similar funds under other IFAD funded projects in Rwanda.

Component 3: Institutional and policy development (USD 1.80m)

52. While policy making and policy implementation is a complex and non-linear process, a common way of portraying the process is a cycle, in which policies are constantly being revised and renegotiated based on experience, evidence and influence during formulation and implementation. This manner of visualizing the policy process is presented below in Figure 1, which shows a cycle in which policy formulation is followed by implementation, M&E, and agenda setting; which leads to the re-formulation of policy.

Figure 1: The Stylized Policy Cycle



Source: Overseas Development Institute, RAPID

53. Most often IFAD prefers to work across the policy cycle rather than focusing exclusively on formulation (see working paper for additional details on IFAD's vision of policy engagement). As such, component 3 will support all three phases of the policy making process: (i) the process of policy formulation, including the important aspect of consulting with a broad array of stakeholders when drafting and formulating policies; (ii) the process of policy implementation, including providing support for the roll out of policies in the project area; and (iii) policy analysis and technical assistance to improve knowledge about the success and failures of new and existing policies, and provide guidance on how policies may need to be adjusted, improved or scaled-up.

54. The objective of this component is to facilitate the consolidation of an evidence-based, inclusive policy framework and institutional structure for the Rwandan dairy sector, in order to contribute to the core objective of the project. The core principles of the component are: (i) to work with partners, learn from previous projects and avoid duplication / look for synergies; (ii) to integrate with national policy processes and existing governance structures in order to enhance the likelihood that the component's interventions are sustainable; (iii) to be inclusive of farmers preferences, knowledge and experience, as well as other private and public sector actors; and (iv) to be as evidence based as possible, and contribute to the evidence base throughout the component.

55. The component is structured around three sub-components, which map to the policy cycle illustrated above: (i) policy formulation; (ii) policy implementation and institutional strengthening; and (iii) policy related analysis and technical assistance. The component activities and sub-components are described in detail below.

Sub-component 3.1 -- Policy formulation (USD 0.32m)

56. The core concept for the project's policy intervention is to help shape the policy framework so that it is suited to purpose for advancing the needs of the dairy industry. A number of missing pieces to the above described policy framework have been identified, and the government and other relevant actors in the dairy value chain expressed an interest in seeing specific elements of the policy framework developed, updated or codified as an output of this project. As such, the sub-component has identified some priority issues to be addressed, but will leave a certain degree of flexibility in the

exact laws and regulations the project will help facilitate and formulate as there is the chance that consultation at the time of implementation will find that progress has already been made on some issues, or that the priorities of actors has shifted towards the development of different pieces of specific legislation.

57. Overall, policy formulation should be led by government and should build consensus and enjoys deep support across the public and private sector. Policies cannot be formulated by IFAD or the SPIU but must instead be led by government and facilitated by the project and national consultants/advisers hired to manage and track the process. This is critical not only because the political process of approval requires the buy-in of government, but also because it is the government and other actors in the dairy industry who are best placed to understand the likelihood that specific interventions will be applied effectively, and that sufficient state resources will be made available to implement and monitor policies, laws and regulations. As such, the model of policy engagement will closely follow the previously successful model utilized by Land O'Lakes / USAID and the government to garner consensus on the National Dairy Strategy, and will follow national policy formulation processes as set out in the Cabinet Manual of the Office of the Prime Minister.

58. There are two core objectives of the policy formulation element of the programme, both with the explicit objective of moving beyond the existing national dairy strategy and formalizing the strategy into specific law and regulations which can provide incentives to structure the growth of the industry. The first is the formulate a comprehensive Dairy Policy / Dairy Law, which will take the NDS as a base, and work to identify the specific issues which require codification in law and the allocation of budgetary resources to be implemented. As such, a new NDP would replace the colonial area policy, and help to codify in a single place the web of regulations, laws and strategies currently in place (see related working paper for more details).

59. To complement this effort, additional laws, regulations and by-laws will need to be drafted to encourage the development of the sector on input markets, e.g. animal health and animal feed. The project budget is intended to cover the process of crafting five such laws or regulations. The laws and regulations that have been identified as possible targets for the project financing are related to: the development of the regulatory framework to implement the concept of Authorized Agents for Artificial Insemination, a broader set of regulations and laws on animal breeding, animal feed standards, community purchase programmes for milk products and the identification of key conditions for successful privatization of veterinary services and a roadmap for its implementation.

60. For both the process of agreeing on the NDP and the underlying laws and regulations needed to harmonize and formalize the sector, the process imagined is similar. It should be led by the government, be coordinated by apex organizations such as the Rwanda National Dairy Platform (RNDP) and the Rwandan Council of Veterinary Doctors (RCVD), and should actively involve the participation of smallholders and other national actors involved in the production and sale of dairy products. The policy officer dedicated to RDDP within MINGAGRI, together with SPIU staff, will lead a process of hiring consultants who are expected to help not only draft the policies with the government and apex organizations, but also facilitate wide consultation with an array of private and public sector actors at the national and sub-national level.

61. The role of the policy officer will be to oversee the process, review drafts, provide advice about the ways to ensure the process is aligned with existing national policy processes and follow the process of the policies formalization once the consultant's formal work is finished (ToRs for this and other activities have been included as an appendix to the associated working paper). In the case of the national dairy policy, it is imagined that two international consultants will be involved. In the case of the smaller regulations and laws, the process should be facilitated by national consultants, who have a strong degree of familiarity with the government, its processes and the sector.

62. In all cases, it will be necessary to undertake a further and more specific review of existing laws and regulations, consider regional practice and other evidence from national, regional and international policy advisors, and ensure that the views and opinions of smallholder dairy farmers are included. Legal and financial reviews will be necessary to comply with government processes. Sub-component 3.2 will seek to strengthen the capacity of dairy cooperatives to participate in policy

processes, both on a stand-alone basis and as part of the Rwanda National Dairy Platform (who will simultaneously be capacitated to participate fully in policy processes and channel the preferences of their membership through wide consultation), which should facilitate the leading role for these organizations envisioned in sub-component 3.1.

63. In sum, outputs for sub-component 3.1 will include preparatory studies, workshops and consultations both in Kigali and in a number of districts, draft policy documents and finalized policy documents. The outcome will be the facilitation of a dairy policy framework in an inclusive and nationally led process, and accompanying laws and regulations needed to strengthen the performance and competitiveness of the dairy sector.

Sub-component 3.2: Policy implementation and institutional strengthening (USD 1.16m)

64. Three quite distinct sets of tasks are included in this second sub-component. The first is providing support for the implementation of a new and important policy related to the regulation of the sector. Secondly, the sub-component will provide support for a multi-faceted campaign related to milk and nutrition. The third is providing institutional strengthening via capacity building for policy making at the top and bottom of the policy making pyramid – that is to say at the level of the secretariat for the RNDP, for the Rwanda Vet Council, and at the grass-roots, at the level of farmers' organizations to participate in policy processes.

65. First, the project aims to facilitate the implementation of a new and important piece of government policy, in order to support the development of safe and diversified market for milk and other dairy products. The ministerial order on milk and milk selling provides specific regulations on the conditions under which milk should be collected and sold, and requires significant effort to ensure that the government is able to adequately control and audit milk collection and sales, and significant investment to ensure that actors operating in both the formal and informal markets for milk can comply with the order. While component 3 will not provide financing for sellers attempting to upgrade their sales and collection points to comply, it will provide support through the business plans in component 2. Component 3 will provide support for the identification of MCCs and kiosks to target for the application of the policy, training of beneficiaries, pre-audits based on ministerial instructions, full audits, sampling and testing.

66. Secondly, significant efforts have been made to increase awareness about the health benefits of drinking safe milk during previous projects focused on the dairy industry. This sub-component will fund a national campaign on nutrition and milk, to serve as an expansion of the successful campaign funded by Land O' Lakes, the government and the RNDP (with in kind private sector support) on milk drinking. The RDDP project will continue to build upon this work in order to broaden out the nutrition message being delivered, as well as the mechanisms for working on nutrition (beyond a publicity campaign and working at the level of public institutions and households). The estimated costs of this campaign, and the mechanisms for undertaking it, are largely drawn from this successful example. More details are provided in the working paper on nutrition.

67. With regards to institutional strengthening, the project will help the RNDP to strengthen, at the apex level, its capacity to undertake critical policy analysis, to communicate with and receive communication from members, and contribute to the drafting of relevant laws, regulations and policies. At the grassroots level, the project will strengthen the capacity of farmers' organizations and other service providers in the dairy industry to effectively participate in the policy process organized through RNDP. The activities included will be the creation of training materials, the hiring of consultants to provide training, and a series of training workshops, held nationally for the APEX organizations and on a decentralized basis for leaders of dairy cooperative to familiarize them with policy issues and policy processes, and encourage the emergence of governance and representation structures which reflect and convey the interests of smallholder dairy farmers. Support will also be provided for the RNVC in order to continue to enhance its capacity to train, certify and monitor the provision of veterinary services in the country. A budget and set of activities linked to training and monitoring and evaluation has been selected.

Sub-component 3.3 - Policy related analysis and technical assistance (USD 0.31m)

68. Overall the tasks in sub-component 3.3 are intended to support with analysis and therefore contribute evidence to Rwandan government policies. A number of activities are imagined, which help not only gather evidence about specific dairy policies, but also the contribution of the project and the dairy industry to broader government policies and strategies.

69. First and most importantly, this sub-component aims at supporting the government in cooperation with development partners, to test distribution models for delivery of the "One Cup per child per day" milk programme, with a strong emphasis on the cost and efficiency gains to be made by encouraging the growth of an institutional market for milk via local / community purchase. While sub-component 3.1 will consider supporting the creation of laws and strategies around community purchase programmes and component 2 will strengthen the milk processing capacity on a decentralized basis throughout the country, this component intends to test local procurement of milk, as well as other distribution methods, to determine the most efficient and effective way to meet government objectives of making milk available to all primary school children. Part of this pilot will attempt to foster greater cooperation between the three line ministries responsible for this policy.

70. Secondly, a number of policy analyses and technical assistance is expected. First and most centrally, in order to enhance systems for collection, compilation and reporting of quality data in the dairy sector, the project will work with FAO's MAFAP programme, which already has presence in the country and a relationship with MINAGRI, on collecting information on liquid milk / dairy products, as well as finance more in depth studies on the dairy value chain and dairy products through direct collaboration with FAO's MAFAP programme.

71. Additionally, the project will coordinate analysis on MINAGRI's progress towards achieving its Agriculture Gender Strategy by drafting a number of studies and hiring consultants to undertake a review. This should complement national systems on ensuring gender outcomes in project and other ministerial work (i.e. the performance contract system). A similar mechanism is in place to determine the contribution of the project / dairy industry and lessons learned for the Community and Local Economic Development strategy. A study to analyse the project lessons on how to improve the climate sustainability of the *Girinka* programme is envisioned.

72. **Implementation arrangements.** Activities under this component will be coordinated by a dedicated Policy Officer in MINAGRI, who will be responsible for following all identified laws, regulations and policies through the national policy process, facilitating the implementation of pilots and managing policy related knowledge management together with the M&E specialist. The Ministerial Order on preservation, collection, transport and selling of milk will be implemented by RALIS staff. Some studies will be implemented by external consultants (national and international), whereas FAO staff involved with the MAFAP programme in coordination with MINAGRI will work on data collection and specific studies related to the dairy value chain.

Appendix 5: Institutional aspects and implementation arrangements

Approach

1. RDDP will take as its starting point the value chain for milk and milk products; and it will focus particularly on supporting the production, marketing and processing of milk. In doing so, it will support public and private production service providers – extension, input suppliers, AI and veterinary services; smallholder dairy farmers and their organizations; informal traders/transporters, small private dairy operators and milk collection centre operators; and milk processors. The project will support the emergence of a diversity of sub-sector value chains, offering different products to different markets: in all cases the emphasis will be on increasing the quantity of milk marketed and processed; promoting efficiency in the value chains; and ensuring the quality and safety of the final product.

2. The implications of the project design for the implementation arrangements to be established include the following:

- As a project that will look to engage with the private sector and catalyse private sector investment (from the farmer to the medium-scale processor), ensuring that the project activities reflect and respond to the issues that they confront will be critical: this will require involving them substantively in the project planning, implementation and oversight.
- There are opportunities to draw on the lessons from, and build on, other initiatives in the dairy sector in Rwanda. The RDDP implementation approach will need to be sufficiently flexible to ensure complementarity and build synergies between the initiatives.
- It is recognised that because individual regions, and indeed districts, are at different stages of development of the dairy sector and face different constraints and opportunities for further growth, the project will need to tailor the activities it supports to the specific requirements of individual districts, building on their relative starting points and opportunities.
- The relatively limited project implementation period (6 years) demands that project activities start up as quickly as possible.

3. **Alignment with SWAp principles.** The lead agency in implementation of RDDP will be the Ministry of Agriculture and Animal Resources (MINAGRI). Within the ministry, the project's day-to-day operations will be managed by the Single Project Implementation Unit (SPIU) mainstreamed in MINAGRI which currently implements the other ongoing IFAD-supported projects in Rwanda: PRICE, PASP and KWAMP. In line with SWAp principles and to mainstream project implementation within the government agencies responsible for dairy development, RAB, RVDC and RCA will be responsible for supporting implementation of core project activities. As RDDP implementation partners, these agencies will deliver the specialised facilitation and technical services within their mandated roles to support successful project implementation and incorporate assessment and mitigation of short- and long-term climate risks in their services. In addition, the dairy sector stakeholder associations: the RNDP, NCCR, RNDP and RCA, where appropriate, will be retained on a fee for service basis to provide necessary capacity building and support services to targeted dairy cooperatives and other grassroots sector associations.

Organizational framework

4. **Project oversight.** In line with the practice for other IFAD-funded projects in Rwanda, MINAGRI will constitute a Project Steering Committee chaired by the PS, MINAGRI to provide policy direction of the project; approve AWPBs; and provide oversight to the programme management team to ensure effectiveness. Membership of the PSC will include: DG RAB (Vice Chairman), DG Livestock (MINAGRI), representative of MINECOFIN, DG Planning MINALOC, SPIU Coordinator, RDDP

Manager (Secretary), Head of Livestock Department in RAB, RCA, and MINICOMHPI. The PSC will meet at least twice a year.

5. The PSC will meet twice a year to provide strategic direction to project implementation and monitor implementation progress. It will be particularly responsible for: (i) Coordination of the public-private sectors' initiatives at the ministerial level; (ii) review and approval of the annual work plan and budget (AWPB) and the initial procurement plan; (iii) review of the project implementation manual (PIM) and its subsequent revisions; (iv) ensure full transparency and accountability in project management; (v) review and follow-up of supervision and audit recommendations; (vi) promote cooperation with all development partners; and (vii) lead in studies and review of dairy sub-sector policies and strategies and identification of policy issues for Government follow-up

6. **Project management.** The SPIU will recruit a Program Manager for the RDDP and additional professional and support staff to oversee the day-to-day operations of the project. In addition to subject-matter specialists identified under each of the components, the new staff will include officers for Nutrition, Gender, Targeting and community mobilization, and M&E, learning and knowledge management. At district level, MINAGRI will appoint a Project Coordinator for each targeted district other than those served by the PASP project which already has a Coordinator partly responsible for dairy value chain related activities. Attachment 3 provides draft job descriptions for the SPIU technical staff.

7. The SPIU will be responsible for the overall planning of project activities; guiding, supporting and supervising project implementation; procuring goods and services; financial management of the project resources; and monitoring and reporting on implementation and financial progress. It will work with MINAGRI and other line ministries and government services; and through RAB will collaborate with smallholder dairy farmers, dairy processors and other value chain actors, service providers and relevant development initiatives. It will play a leadership role in terms of the project's private sector orientation and will be an advocate for a more private sector-friendly investment climate; it will ensure the project's commitment to poverty targeting, and – in particular – to involving women and youth in project activities; and it will also support climate-smart approaches for dairy development.

8. At an operational level, the SPIU will: (i) take overall responsibility for the planning, management and supervision of all three project components and the activities under them; (ii) assist the districts to prepare AWPBs for the project, consolidate these and submit the project AWPB to MINAGRI and IFAD for comment and approval; (iii) conduct project-level procurement of good and services, and support district-level procurement as appropriate; (iv) in collaboration with participating districts, disburse and control the flow of funds for various contractual and partnership agreements, and ensure timely submission of supporting documentation; (v) manage relationships with, and backstop implementation by, the districts and with other partners e.g. research and training institutions, and service providers; (vi) develop and implement a communication and knowledge management strategy to manage relations with the public, project partners, civil society and farmers; (vii) establish arrangements for actively collaborating with other relevant development initiatives in the dairy sector; and (viii) prepare implementation progress reports, based on a participatory monitoring and evaluation (M&E) system and a synthesis of all district reports, and submit these and financial reports to local governments, MINAGRI and IFAD in a timely manner.

9. **Performance-based contracts in project implementation.** The implementation of the RDDP will be structured around performance-based MoUs with key government agencies, partnership agreement with key partners (FAO and HPI) and service contracts with recruited service providers. To ensure uninterrupted service delivery during project implementation, MINAGRI will draw multi-year agreements with the key government implementing partners and HPI but provide for annual reviews to ensure strict adherence to achievement of results. All other service contracts requiring multi-year engagement will be issued on an annual basis, renewable only upon achievement of clearly set performance thresholds.

10. **Implementation start-up.** At the SPIU level an implementation manual for the project will be prepared (Attachment 1 presents the draft outline of the project implementation manual); however at

District level, short elaborated user friendly guidelines will be prepared for each component. It makes sense to have separate guidelines for component 1 of climate-smart dairy production intensification and component 2 on producer organization and value chain development so that SPIU staff have clear information to give to service providers on procedures and a transparent framework for personnel management. It is expected that the component guidelines will include: a description of activities to be financed; implementation arrangements, including the roles and responsibilities of partners; criteria for selecting farmers and farmer groups; targeting mechanisms to be used; cross-cutting themes to be addressed (gender, youth, nutrition and HIV/AIDS); and general information about the SPIU financial and physical reporting requirements for implementing partners and contractors. The guidelines to be prepared are: (i) guidelines on agribusiness development including MCC as small and medium enterprises; (ii) guidelines for increase in production and productivity of smallholder dairy farmers; and (ii) programme operations manual and financial management manual. For efficiency and consistency the two component guidelines may at the same time form a basis for the training material to be developed for capacity building as well as the communication material produced. For component 3 guidelines will be broken down into the three sub-components for implementation which takes place at different levels.

11. **Partnerships with ongoing initiatives.** Project investments will be integrated with on-going and planned initiatives/projects related to livestock/dairy development and rural infrastructure development, supported by IFAD and/or partner financial institutions and the Government. In particular, lessons will be learned from, and synergies established with, the following projects:

- *IFAD-funded “Climate Resilient Post-Harvest and Agribusiness Support Project” (PASP)* which includes a blended ASAP grant. RDDP will be implemented in six of the PASP targeted zones. PASP has a number of activities in the dairy sector such as improved access to MCCs, capacity building of existing cooperatives, and support from business development service providers. Since both projects are complementary, efforts will be made to ensure adequate synergies.
- *IFAD-funded regional grant “Dairy Hub model Integration into IFAD-funded projects” (DHI)* to Heifer International that has recently been approved will support dairy development activities in selected areas in Rwanda and Tanzania. Within Rwanda it will be implemented in two districts one of which overlaps with RDDP. The DHI project will provide valuable lessons on the implementation of the dairy hub development model.
- *IFAD-funded regional grant “Greening livestock: Incentive-based CSA interventions for reducing the climate impact of livestock in East Africa”* implemented by the International Livestock Research Institute (ILRI), will enhance RDDP’s capacity to ensure climate resilience of dairy development activities.
- *World Bank- and Netherlands-funded Rural Feeder Roads Programme* that is supporting road development in rural areas will support the construction and upgrading of rural access roads linking milk production areas and MCCs and therefore facilitate milk movement from farms to MCCs as well as the marketing of dairy products.
- *AfDB-funded Livestock Infrastructure Support Project (LISP)* that supports infrastructure such as livestock watering systems and MCCs will be also instrumental for improving delivery of milk to MCCs as well as small scale processing plants.
- *USAID-funded Rwanda Dairy Competiveness Program II (RDCP II)* that supports cooperatives with milk equipment, transportation of milk to MCCs and promotional campaigns for development of the dairy market will also be a key partner in the implementation of the RDDP.
- *Livestock Intensification Project (LIP)*, funded by the Government of Rwanda, has components that are synergetic with the proposed RDDP and aim at genetic improvement of local breeds, animal feeding and veterinary service delivery.
- *Government of Netherlands dairy sector support initiatives* targeting capacity building and training activities in the dairy sector will be also an important collaborating partner, particularly with respect to two model farms owned by private investors which are being developed to serve as centres for capacity building of smallholder farmers.

- *FAO supported Modernization of Agriculture project*: FAO is implementing a food security programme in cross-border districts of Rwanda, Burundi, DRC and Uganda, in support of the Modernization of Agriculture under NEPAD and CAADP Frameworks which are relevant to the RDDP. The project is being implemented in Gicumbi District to provide dairy farmers with reliable access to quality inputs and profitable and sustainable markets. It has also supported milk collectors and processors on milk preservation, hygiene and value addition. It provides support to IAKIB cooperative in Gicumbi District which is a successful model that RDDP will seek to replicate in its areas of intervention.
- *MINAGRI's "Twigire Muhinzi" extension programme* that was successfully implemented by the RAB in collaboration with the Belgian Technical Cooperation provides a good model for the establishment of FFSs.
- *BMDf-funded East Africa Dairy Development Programme* that was implemented in Rwanda by Heifer International (2008/2013) will be as used as a model for the establishment and strengthening of dairy hubs in RDDP's areas of interventions.
- Under the ongoing *FAO, IFAD WFP and UN Women Joint Programme on "Accelerating progress towards rural women economic empowerment"*, IFAD is specifically supporting: (i) women's associations to upgrade into cooperatives, and (ii) the introduction and implementation of GALS. The latter includes developing a network of national master GALS trainers and manuals and tools. These resource persons and materials will support the promotion of GALS in RDDP activities.
- The ongoing IFAD-supported grant with Oxfam Novib *Integrating household methodologies in agricultural extension, value chains and rural finance initiatives in Rwanda, DR Congo and Burundi* will also build significant capacity in Rwandan NGOs and civil society to design and implement GALS at group and household levels in connection to the RDDP

12. The following agencies will be responsible for supporting implementation of core project activities as RDDP implementation partners. Roles and responsibilities for these institutions are described and summarized below, including their mandates in relation to the RDDP and their instruments of engagement with the project.

The Rwanda Agricultural Board

1. RAB was established in 2011 from the merging of the agriculture extension and research institutions: Rwanda Agricultural Development Authority (RADA), the Rwanda Animal Resources Development Authority (RARDA) in charge of vet services and the Rwanda Research Center Institute des Sciences Agronomiques du Rwanda (ISAR). RAB has a department of animal resources extension that will guide and monitor the vet services which will be delivered by the Rwanda Veterinary Council. The "Twigire" (Self-reliant) extension model approach will be revisited for the special cattle keeping to making a necessary harmonization with the national adopted extension model, a home grown solution to the Rwandan context. The livestock research will implement the research component that will be detailed in the implementation manual. RAB organizational chart is attached at the end of this Appendix with the RDDP added as a new project. The new Gazetted RAB structure is also provided at the end of this Appendix.

The National Agricultural Export Development Board

2. NAEB was created through the merger of the Rwanda tea Authority (OCIR THE), the Rwanda Coffee Authority (OCIR CAFE) and the Rwanda Horticulture (RHODA). Law n° 39/2010 of 25.11.2010, which established NAEB, clearly recognizes a pivotal role of this public institution in elaborating and implementing policies aimed at developing exports of agricultural and livestock products; collaborate with other institutions to identify places where to install factories processing agricultural and livestock products for export and to grant them authorization; set quality standards for agricultural and livestock products and release the relevant certificates; train private operators and cooperatives involved in agricultural and livestock production for export; contribute to increase investments in Industry and infrastructure for adding value to agricultural and livestock products for export; and promote and coordinate the activities of the actors involved in developing exports of agricultural and livestock products. As for RAB, also NAEB can facilitate the implementation of RDDP,

especially facilitating market access for the targeted dairy products. Accordingly, the implementation strategy of RDDP will be closely coordinated with this public institution. NAEB is being corporatized for more effective support to the private sector.

The Rwanda Agriculture and Livestock Inspection Services

3. RALIS is responsible of the overall coordination of all the functions that the National Plant Protection Services (NPPS) is expected to fulfil such as the enforcement of the Rwanda Plant Health Law and regulations for phytosanitary measures necessary for trade, Plant pest/disease monitoring, surveillance and diagnosis, conducting Pest Risk Analysis, and inspection and certification. It also delivers animal products certification services including enforcement of sanitary laws, monitoring and surveillance of animal diseases, and animal inspection and certification.

The Rwanda Governance Board

4. RGB was created to promote the decentralization policy, which is the basis of both the long and mid-term aims set by the Government of Rwanda. RGB was established through Law n° 41/2011 of 30.09.2011 which determined a merge of the Rwanda Governance Advisory Council (RGAC) and the National Decentralization Implementation Secretariat (NDIS). The RGB is a Public Agency with legal personality, administrative and financial autonomy. It is managed in accordance with Organic Law n° 06/2009 of 21.12.2009 which contains general provisions governing public institutions functioning and administration. The mission of RGB is to promote the principles of good governance and decentralization, monitor the practices of good governance in public and private institutions and conduct research related to governance in order to achieve good service delivery, and sustainable development and prosperity. In line with the RGB Strategic Plan 2013-2018, the Government is promoting the involvement of all stakeholders in the realization of good governance, which is the first pillar of Rwanda Vision 2020. The realization of this aim is strongly connected with the decentralization process, which will allow local communities, including cooperatives and SMEs, to take part in those decision that affect them. A further advantage offered by RGB to Cooperatives and SMEs is the provision of a service charter showing the minimum generic standards of service that can be expected and a time-frame for its provision. This service will support the implementation of sub-component 1.2 of RDDP, ensuring a sustainable access to public and private livestock services. The realization of the decentralization process is promoted at district level by the established Joint Action Development Forum (JADF).

The District as local government implementing institution

5. In supporting the decentralisation a JADF is in place and plays a pivotal role in the implementation of the decentralization strategy set by the Government. The idea that districts are at the basis of a sustainable community development is recognized in the Prime Minister's Instructions n° 003/03 of 03.07.2015 that created JADF, and is in line with the third strategic objective of the country opportunities strategic programme (COSOP) agreed between IFAD and the Government of Rwanda: improved participation of rural poor in economic transformation. The JADF was created to ensure at district level a common forum of dialogue for all development stakeholders. To support the decentralization process, JADF facilitates the coordination and cooperation among stakeholder's partners to guarantee joint integrated planning and monitoring of development initiatives adopted at district level. JADF operates in all 30 Districts through a Permanent Officer in charge of day to day operations. As for RGB the crucial role played by JADF in the decentralization strategy will facilitate the implementation of RDDP through a sector-based coordination of all stakeholders involved in the dairy sector. This is recognized as an agricultural committee in the JADF. It will be linked to the Agricultural sector working group that has a sub working group in charge of livestock.

The Rwanda Cooperative Agency

6. RCA promotes, regulates and supervises the grouping of a large number of smallholders into more effective market-oriented cooperative organizations. RCA was created through Law n° 16/2008 of 11.06.2008 which is strongly related with Law n° 50/2007 of 18.09.2007 adopted by the Parliament to determine the establishment, organization and functioning of Cooperative Organizations in

Rwanda. As for RGB also RCA has legal personality, administrative and financial autonomy and is governed in accordance with the laws applicable to organs of Public Service. RCA is in charge of several activities connected with the creation and supervision of cooperatives including: registering, regulating and supervising cooperatives; setting standards and formulating professional ethics for prudent management; assisting with capacity building through training and seminars; encouraging the cooperative movement to take advantage of investment opportunities at national, regional and international levels; carrying out research and studies; advising the Government; and developing good relations and collaborating with other agencies carrying out similar missions. RCA plays a critical role in providing capacity building to producer cooperatives through all the activities listed above. One of the objectives of the RCA is to organize all dairy district cooperatives into a union. A Dairy federation is already operational and has a representation in the PSF chamber of Agriculture. RCA operates at close contact with the National Cooperative Confederations of Rwanda (NCCR), which is recognized as the apex group for the cooperative system. It works as a network of cooperatives, ensuring a stable channel of communication and information exchange from the village level to the national level.

The Local Administrative Entities Development Agency

7. LODA is actively working to ensure the necessary financing for local administrative entities with legal personality. Its creation was approved by the Parliament through Law n° 62/2013 of 27.08.2013 which recognized its status of public institution. LODA not only provides direct financing to local entities, but works also as a connection point between these entities and existing donors. It supervises the activities of local entities and provides the necessary assistance when required. To increase the level of success of these local entities, LODA is deploying a public awareness campaign whose purpose is to sensitize the population and build their capacity to analyse problems, develop local activities, make savings and use the services of banks and micro-finance institutions. The aim of promoting stronger connections between local entities and donors will be ensured by LODA through a National Local Economic Development (LED) Strategy which is currently in the implementation stage.

The Rwandan Standards Board

8. RSB is a national standard body whose task is to develop and publish national standards, carry out research in the area of standardization and work as an information centre for standard assessments and relevant procedures. Established as a public institution through Law n° 50/2013 of 28.06.2013, this agency is playing a prominent role in the Rwandan economy raising awareness and promoting the importance of standards and quality as tools to improve market access, technology transfer and sustainable development. The RSB provides its customers with several certifications which are proved to be very useful both for Cooperatives and SMEs operating outside the cooperative systems. The services offered by RSB include: the provision of quality service certifications; legal, scientific and industrial metrology services; the conduction of tests; and the organization of training programs in the areas of standardization, metrology and conformity assessment. RDDP targeted dairy sector stakeholders will certainly benefit from the certificates released by the RSB, which will allow MCCs as well as SPs involved in the provision of dairy services, to certify the quality of the dairy products increasing the income obtained by the dairy sector stakeholders and improving the penetration of milk products both in the national and regional markets.

The Private Sector Federation

9. PSF is a professional organization established in December 1999 to replace the former Rwanda Chamber of Commerce and Industry. It is tasked with the promotion and representation of the interests of the Rwandan Business Community. The idea of transforming the Rwandan economy into a private-sector-led system is at the basis of the Strategic Plan for the Transformation of Agriculture (PSTA III), the Economic Development and Poverty Reduction Strategy (EDPRS II) as well as Rwanda's Vision 2020. The overall goal of the Federation is to promote the creation of profitable businesses through a strong and pro-active advocacy platform. PSF acts as an umbrella federation which reunites the following Professional Chambers: Agriculture; ICT; Women Entrepreneurs; Commerce; Industry; Young Entrepreneurs; Art & Crafts; Liberal Profession; Finance and Tourism. RDDP will be deployed in close coordination with the Chamber of Agriculture as well as the Rwanda National Dairy Platform (RNDP), a Private Public Partnership (PPP) between an alliance

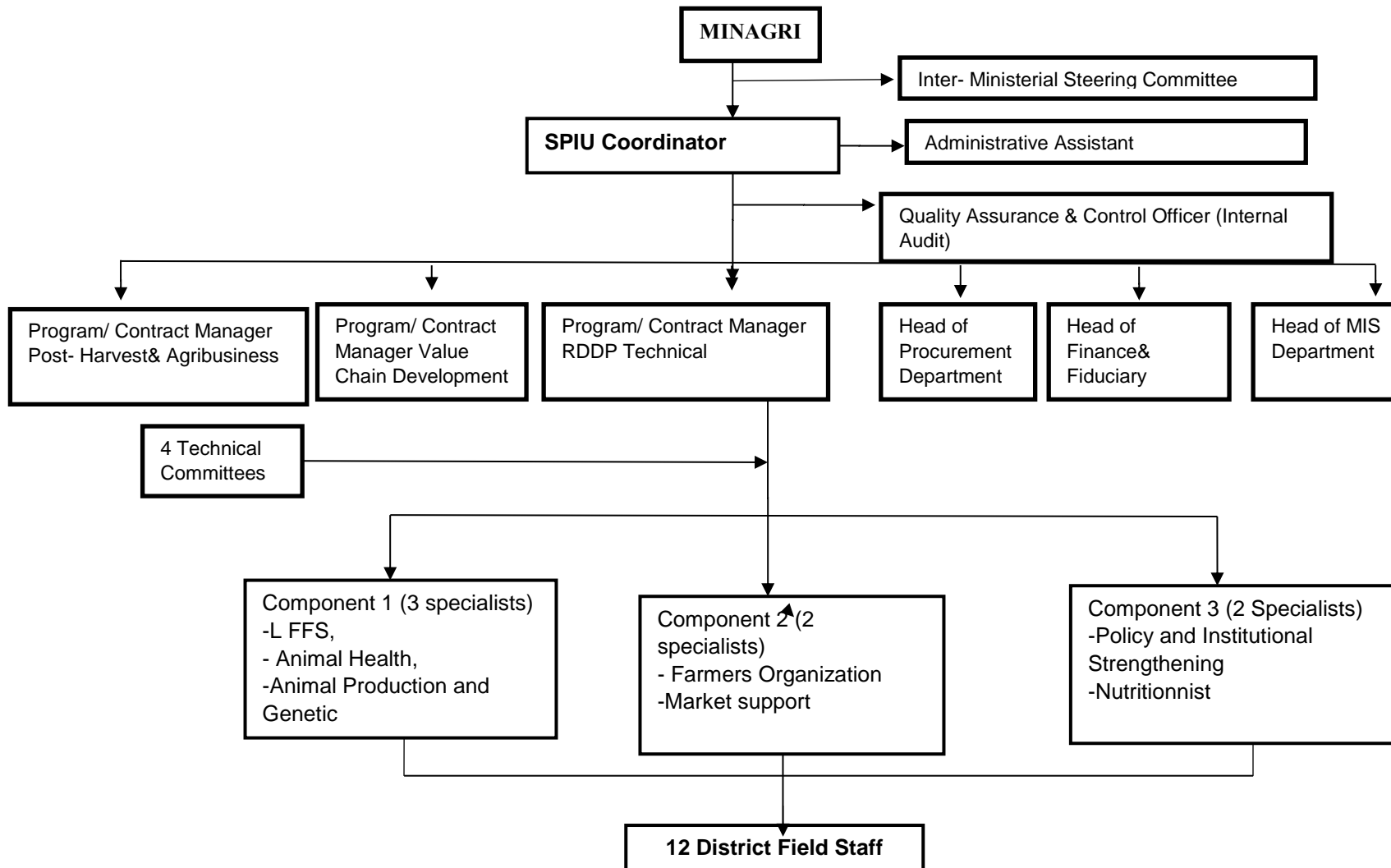
of dairy sector stakeholders and the GoR. Stakeholders of the RNDP include the entrepreneurs and businesses engaged in production, processing and marketing of milk and dairy products. To support the development of the private sector, PSF articulated a National Business Development Strategy (BDS) Development Plan; developed a capacity building plan for SMEs and cooperatives; opened several BDS centres; and conducted a first ever business operators' census. PSF is also acting to remove non-service based fees; promoting intra-regional trade through the reductions of barriers to trade that includes non-tariff barriers (NTBs); strengthening the existing commercial relationship with regional and international partners, participating to negotiation of Economic Partnership Agreements (EPAs) with the European Union or US (AGOA), as well as agreements with members of the East African Community (EAC) and the Common Market for Eastern and Southern Africa (COMESA).

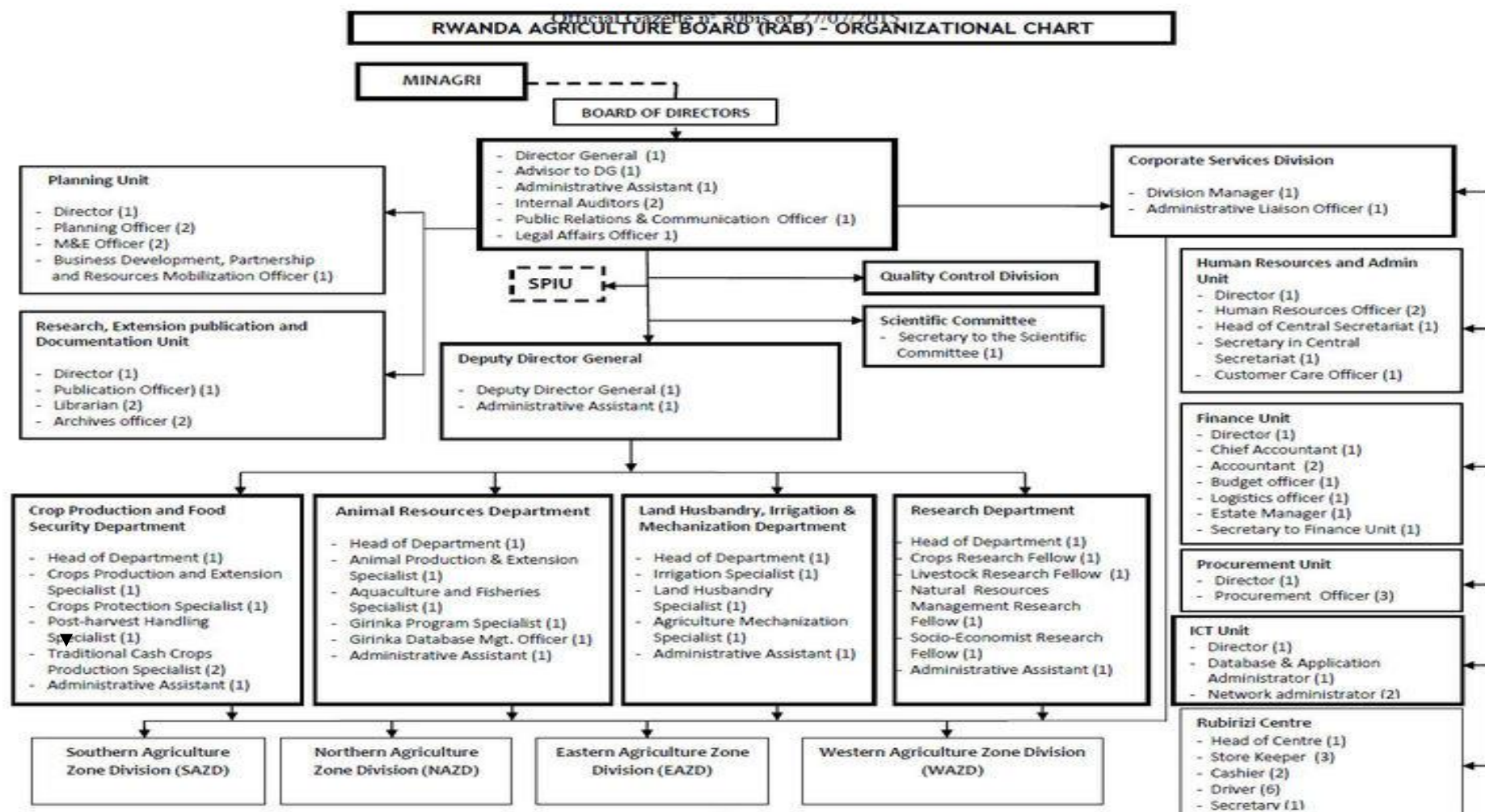
Rwanda Veterinary Council

10. The RCV is established through the law n°56/2013 of 09.08.2013, the general mission of this Public Agency is to ensure that its members provide quality and reliable services as far as the veterinary profession is concerned. The practice of veterinary profession is well regulated and described in the "Practice of the Veterinary Profession". Art 34 determines the Right to practise and only registered veterinaries are allowed to practise in the country. The requirements for registration are detailed in Art 35. Article 43 relates to the relationship between the Government of Rwanda and the Rwanda Veterinary Council. The Government may entrust some of the veterinary activities to the Rwanda Veterinary Council as services to the cattle keepers. To that effect the RVC would work with dairy farmer organizations on a performance-based approach for a better service delivery. The latter has already proven that it is the best way to achieve accountability of the public and private servants.

Eastern African Farmers' Federation

11. In the East African Community region great attention is dedicated to the development of the dairy sector. EAFF is working actively with Kenyan, Tanzanian and Djiboutian agro-pastoralists cooperatives. At the moment, EAFF is updating manuals on dairy management (feeding, breeding, housing, calf management) for Kenya and Tanzania and intend to support Rwanda accordingly.





Involved Institution	Mandate in relation to RDDP	Benefits for the project	Instrument of engagement
Rwanda Agricultural Board (RAB)	<ul style="list-style-type: none"> • Support the prevention and the fight against animal diseases; • Support animal husbandry cooperatives towards a better service delivery; • Conduct surveys and research on animal husbandry which can be used during the project to facilitate its implementation; • Promote animal husbandry mechanization and the development of necessary infrastructures; • Issue certificates of standard for animal husbandry products; • Ensure partnership and coordinate activities with other national and international actors involved in animal husbandry programmes. 	<ul style="list-style-type: none"> • Facilitate the diffusion of extension services among the cooperatives operating in the Dairy value chain, in line with Sub-Component 1.2 • Promote the creation of appropriate infrastructures, facilitating the completion of Sub-Component 1.3. • Support the completion of Component 3 of RDDP, strengthening the institutional structure for the Rwandan dairy sector. The surveys and researches undertaken by RAB will facilitate both the drafting of the National Dairy Law, described within Sub-Component 3.1, as well as their implementation as for Sub-Component 3.2. 	<ul style="list-style-type: none"> • Memorandum of Understanding (MOU).
National Agricultural Export Development Board (NAEB)	<ul style="list-style-type: none"> • Collaborate with other institutions to identify places where to install factories processing livestock products for export and grant them authorization; • Set quality standards for livestock products and release the relevant certificates; • Train private operators and cooperatives involved in agricultural and livestock production for export; • Contribute to increase investments in Industry and infrastructure meant for adding value to agricultural and livestock products for export; 	<ul style="list-style-type: none"> • Support the implementation of Sub-Component 1.1 of RDDP, through the trainings offered to cooperatives involved in the export of livestock products. • Facilitate the realization of Sub-Component 2.1, strengthening the connections existing between the various actors operating in the dairy value chain. 	<ul style="list-style-type: none"> • Memorandum of Understanding (MOU)

	Promote and coordinated the activities of the actors involved in developing exports of livestock products.		
Rwanda Agriculture and Livestock Inspection Service (RALIS)	<ul style="list-style-type: none"> • Ensure the compliance of imported and exported dairy products with all regional and international regulations. 	<ul style="list-style-type: none"> • This support with the identification and fulfilment of the standards set for exported dairy products, will be considered as a livestock service, which is aligned with Sub-Component 1.2. The services offered by RALIS will increase the quality of the products sold by the actors operating within the dairy value chain, de facto contributing to the target set by Component 1: “sustainably increase smallholder farmers’ capacity to produce and supply quality milk to the dairy market”. 	<ul style="list-style-type: none"> • Memorandum of Understanding (MOU)
Rwanda Cooperative Agency (RCA)	<ul style="list-style-type: none"> • Registering, regulating and supervising cooperatives; • Setting standards and formulating professional ethics for prudent management; • Assisting with capacity building through training and seminars; • Encouraging the cooperative movement to take advantage of investment opportunities at national, regional and international levels; • Developing good relations and collaborating with other agencies. 	<ul style="list-style-type: none"> • RCA plays a critical role in providing capacity building to producer cooperatives through all the activities listed in the central column. These activities will facilitate the completion of Sub-Component 1.1. • This support will certainly increase the capacity of smallholders to produce and supply high-quality milk to the dairy market, which is perfectly aligned with the aim of Sub-Component 1.2. 	<ul style="list-style-type: none"> • Memorandum of Understanding (MOU)
The Rwandan Standards Board (RSB)	<ul style="list-style-type: none"> • Provision of quality service certifications; • Conduction of tests; • Organization of training programs in the areas of standardization, metrology and conformity assessments. 	<ul style="list-style-type: none"> • RDDP targeted dairy sector stakeholders will benefit from the certificates released by the RSB, which will allow MCCs involved in the provision of dairy services, to certify the quality of the dairy products increasing the income obtained and improving the penetration of milk products both in the national and regional markets. This service will contribute to build 	<ul style="list-style-type: none"> • Memorandum of Understanding (MOU)

		the capacity of cooperatives, as for Sub-Component 2.1. and increase the capacity of smallholder farmers to produce and supply quality milk to the dairy market as for Component 1.	
National Cooperatives Confederation of Rwanda (NCCR)	<ul style="list-style-type: none"> • Work as a network of cooperatives, ensuring a stable channel of communication and information exchange from the village level to the national level. 	<ul style="list-style-type: none"> • NCCR will promote the creation of proper governance structures at cooperative, union and federation level, promoting capacity building of both the cooperatives and the other actors operating in the targeted value chain, as for Sub-Component 2.1. • The NCCR can also facilitate cooperatives to create employment and expand access to income-generating activities, increasing their capacity to produce and supply quality milk to the dairy market as for Component 1. 	<ul style="list-style-type: none"> • Same contract on activity basis signed with the Private Sector Federation (PSF) and the Rwanda National Dairy Platform (RNDP)
The Rwanda Governance Board (RGB)	<ul style="list-style-type: none"> • Promote the principles of good governance and decentralization; • Monitor the practices of good governance in public and private institutions; • Conduct research related to governance in order to achieve good service delivery, sustainable development and prosperity. 	<ul style="list-style-type: none"> • RGB will facilitate the deployment of RDDP at local level, allowing a closer contact between those Governmental institutions that are partners of IFAD in the deployment of RDDB, and the targeted dairy sector stakeholders. This is in line with the idea of supporting the actors operating in the targeted value chain, as for Sub-Component 2.1. • A further advantage is the provision of a service charter showing the minimum generic standards of service that can be expected and a time-frame for its provision. This service will support the implementation of Sub-Component 1.2, ensuring a sustainable access to public and private livestock services. • RGB will also facilitate the decentralization of policies related to animal health and welfare, as for Sub-Component 3.2. 	<ul style="list-style-type: none"> • Memorandum of Understanding (MOU)
The Joint Action Development Forum	<ul style="list-style-type: none"> • Support the decentralization process through the coordination and cooperation among stakeholder's partners to 	<ul style="list-style-type: none"> • As for RGB the crucial role played by JADF in the decentralization strategy will facilitate the implementation of RDDB through a sector-based 	<ul style="list-style-type: none"> • District Memorandum of Understanding (MOU)

(JADF)	guarantee joint integrated planning and monitoring of development initiatives adopted at district level.	coordination of all stakeholders involved in the dairy sector, promoting the realization of Component 3.	
Private Sector Federation (PSF) through the Rwanda National Dairy Platform (RNDP)	<ul style="list-style-type: none"> Develop a capacity building plan for SMEs and cooperatives; Advocate for the removal of non-service based fees. 	<ul style="list-style-type: none"> Through the activities performed within PFS by the Chamber of Agriculture as well as the Rwanda National Dairy Platform (RNDP), PSF will strengthen the existing commercial relationship with regional and international partners, and participate to negotiation of Economic Partnership Agreements (EPAs), providing those services described in Components 1.2 and 2.1. 	<ul style="list-style-type: none"> Same contract on activity basis signed with the National Cooperatives Confederation of Rwanda (NCCR)
Council of Veterinary Doctors (RCVD)	<ul style="list-style-type: none"> Provide veterinary services, which will contribute to the development of the livestock sector. 	<ul style="list-style-type: none"> The services offered by the RCVD fall within Sub-Component 1.2. As for the National Dairy Platform, also the Council of Veterinary Doctors is explicitly cited among the implementation partners. 	<ul style="list-style-type: none"> Contract on activity basis
National Dairy Farmers Federation of Rwanda (NDDFR)	<ul style="list-style-type: none"> As for the National Cooperatives Confederation of Rwanda (NCCR), NDDFR will facilitate the exchange of information/good practices among the unions and primary cooperatives operating within the targeted value chain. 	<ul style="list-style-type: none"> This stable channel of communication will support the realization of Sub-Component 2.1. 	<ul style="list-style-type: none"> Same contract on activity basis signed with the Private Sector Federation (PSF) the Rwanda National Dairy Platform (RNDP) and the National Cooperatives Confederation of Rwanda (NCCR)
Eastern African Farmers' Federation (EAFF)	<ul style="list-style-type: none"> EAFF is working actively with Kenyan, Tanzanian and <i>Djibutian</i> agro-pastoralists cooperatives. 	<ul style="list-style-type: none"> Manuals on dairy management (feeding, breeding, housing, calf management) completed. It will facilitate the realization of all components. 	

Attachment 1. Draft outline project implementation manual

Annotated table of contents

	Section and Sub-Section	Notes
Part 1: Introduction, Purpose, Strategy And Cross-Cutting Issues		
1	Introduction	
	Introduction to RDDP	
	Introduction to the PIM	
	Intended users of the PIM	
2	Purpose of RDDP	
	Reason for RDDP	Brief summary of the diagnosis that lead to the design of RDDP
	Expected results	Description of the expected results of RDDP with reference to the Results Framework (which will be a an annex)
3	Implementation Strategy	Describes key elements of the DRRP approach, how these elements work together, the assignment of roles, the approach to implementation in different Districts
4	Principles and Approach	
	Market-driven	Define how the market orientation of RDDP will be mainstreamed in all activities
	Private sector-led	Define how private actors (farmers, businesses, processors etc) will lead the investment prioritization and project activities.
	Inclusiveness	Defines core principles of RDDP for inclusive dialogue and participation at all levels
	Gender Mainstreaming	Defines core principles for mainstreaming gender in RDDP
	Nutrition Mainstreaming	Defines core principles for nutrition mainstreaming in RDDP
	Mainstreaming Climate Smart / Resilience	Defines how Climate Smart / climate resilience is mainstreamed in all parts of RDDP
Part 2: Components, Outputs And Activities		
5	Component 1: Climate-smart dairy production intensification	
	Training and capacity building of smallholder dairy farmers	Defines how the Milk collection/ transportation systems will be expanded and strengthened, increasing supplies and reducing losses in the VC
	Sustainable access to public and private livestock services	Describes how the increased capacity for milk processing under improved sanitary conditions will develop and meet demand
	Asset building and climate-smart productivity	Shows how demand can be increased with new products, education and improved distribution and sales of affordable milk and milk products
6	Component 2: Producer organization and value chain development	
	Organization and capacity building of farmer cooperatives and other VC players	
	Investment on milk collection and processing infrastructure	
	Leveraging financing for climate resilient dairy enterprise development	
7	Component 3: Institutional and policy development	
	Policy formulation	
	Policy implementation and institutional strengthening	
	Policy related knowledge management	

Part 3: Implementation arrangements		
8	Roles And Responsibilities	
	The RDDP Steering Committee	Include Terms of Reference for Steering committee and Code of Conduct for SC Members
	MINAGRI	As Executing Agency Including relative roles, mandates and responsibilities
	SPIU	Include roles, responsibilities and also organizational arrangements Describe how the participation of the private sector and farmers will be achieved
	District Project Implementation Units	Relative roles, responsibilities and engagement with SPIU and RAB
9	Planning, budgeting	
	Results based planning and resource allocation	
	Preparation and consolidation of the AWPB	
	Key approval and reporting instruments	
10	Monitoring, Evaluation And Reporting	
	Overview	
	DCED Standard and RIMS+	Describe how these work together as a single unified M&E framework and system
	Results chains	Describe their purpose and how they should be prepared. Describe how they are to be used communicating the project, identifying intervention points and tracking key indicators of change in the VC
	M&E Matrix	Provide template and guidance for preparing a practical M&E Matrix to guide development of MIS and other M&E activities.
	MIS	Describe main elements of MIS and process to develop, test and use it. Describe main audience and users of expected information, reports and analysis.
	Major Impact Survey	Describe main required surveys
	Other Surveys	Outline expect requirements for other surveys, including annual outcome survey
	Reporting	
	10	Knowledge management and communication
KMC Strategy		Outline purpose and process for preparation
KM Themes		Outline initial set of KM theme and KM product deliverable over first 24 months
Communications		Describe purpose and types of communication. Describe roles, responsibilities and resources for communication at each level in the project
11	Financial Management, Procurement And Administration	
	Financial Management	Describe detailed practices and procedures.
	Procurement	
	Administration	
12	Implementation Work Plan	
	Work Plan	Presents a consolidated, Gantt-Chart format implementation plan including highlighting of critical path and cross-linkages between components

Attachment 2. Responsibilities and composition of the Technical Committees

Four committees will be put in place for technical advice: L-FFS Committee, Animal health committee, Animal nutrition and genetics committee, and Dairy research committee.

1. Coordination and Technical committee for L FFS

The L-FFS Technical committee will be the governing body of the L-FSS and will provide strategic leadership and governance oversight. The L-FFS Technical committee will have the delegated power from the various stakeholders involved in L-FFS to make decisions that are in accordance with the objectives, approach and scope of L-FFS as set out in the Project Support Document.

The L-FFS Technical committee is expected to make key decisions, guide the responsible parties in the execution of the L-FFS, ensure effective oversight through report review and approval, oversee that all interventions are in line with the Project Support Document, prepare the annual work plan and budget related, ensure that resources are deployed to their most productive use, and if necessary, advise the Project management Unit of possible changes of the staff interventions that would make L-FFS more effective in service delivery.

The L-FFS Technical committee is composed of the following:

- Chair: Head of animal resources in RAB
- Co-Chair: DG livestock in Minagri
- Members:
 - RAB: Animal resources production and extension Specialist
 - RAB: Director of livestock in zones (Eastern, Southern, Northern, and Western)
 - MINAGRI: Livestock specialist
 - RNDP: Chairperson
 - L-FFS Specialist (Secretary)

2. Scientific Committee for Dairy Research

The primary goal of the Scientific Committee is to help plan and ensure a rigorous and quality implementation of research plans under RDDP project. The Scientific Committee will provide advice on the strategic directions and methods to effectively reach the targeted outcomes.

In accordance with the RDDP project document, a Scientific Committee for dairy research is responsible of coordinating the implementation of all subcomponent activities, monitoring progress in project execution, providing strategic directions, guidance on innovations, technologies and dairy research, and preparing and approving work plans. . The SCDR shall be established under the chairmanship of the Head of Research Department in RAB and its secretariat ensured by the SPIU.

The Scientific Committee for Dairy Research will also oversee the implementation of research activities in accordance with the Rwanda Dairy Development Project (RDDP). Specifically, the SCDR shall:

- Organize the selection of research projects to be financed;
- Provide guidance and supervise the implementation of the research projects;
- Contribute in the development of and endorse the annual work plan of research activities under RDDP;
- Ensure the linkage between the results of research and their subsequent dissemination to smallholder dairy farmers' through the L-FFS;
- Coordinate the identification and consolidation of best practices in Climate-Smart Livestock;
- Provide critical review of research protocols including review of feasibility, relevance and sustainability when requested by the SPIU;
- In accordance with RDDP's objectives and priorities, provide advice and guidance to the SPIU and implementing institutions regarding relevant research activities that could be added in plans;
- Provide analysis of what can be achieved by the project as regards to dairy research;

- Provide guidance on priority research topics and modalities on how to be tackled and collaborating institutions;
- Endorse selected students to carry out research and studies on priority topics of the RDDP;
- Contribute on development and approval of innovations and technologies to be disseminated.

The Scientific Committee will consist of experts in livestock research and development from relevant local institutions, including RAB, NAEB, UR-CAVM, Private Universities, NIRDA, and NCST. It is suggested that in addition to its chairperson, six experts in livestock research will be selected from the above institutions. A detailed composition and mandate of the SCDR's will be defined in the implementation manual. The concerned experts from the SPIU will participate to meetings in quality of adviser and constitute the secretariat of the Committee (organize meetings, retreats, prepare minutes of the meetings; prepare Terms of Reference, etc.).

3. Technical Committee for Animal nutrition and Genetics

The overall objective of the Technical Committee for Animal Nutrition and Animal Genetics is to guide and support the project meeting its objectives as regards the implementation of animal nutrition and genetic resource improvements.

In accordance with the RDDP project document, a Technical Committee for Animal Nutrition and Animal Genetics is to be established to provide overall coordination and guidance on planning, implementation, monitoring and evaluation of all activities related to improved animal nutrition, access to quality animal feed and improved sustainable access to appropriate animal genetic resources. The TC/ANAG shall be established under the chairmanship of the Head of the Animal Resources department in RAB and its secretariat ensured by the SPIU.

The TC/ANAG shall specifically:

- Review the implementing document related to animal nutrition and animal genetic resources management (Annual Work Plan and Budget [APWB], ToRs, reports, etc.);
- Provide guidance and supervise the implementation of the project's activities related to animal nutrition and animal genetic resources management;
- Interventions and awareness campaign packages to be given in FFS, especially as regards to animal nutrition and AnGR;
- Endorse the annual project budget proposal;
- Provide advice and guidance on technical issues facing the project as regards the specific subcomponent;
- Use influence and authority to assist the project in achieving its outcomes and effective use of these outputs and results;
- Review and approve final project subcomponent deliverables;
- Facilitate the subcomponent implementation through Monitoring and Evaluation and by providing advice on strategic approaches to enhance desired impact and sustainability;
- Provide guidelines for dissemination of information generated by the Project to the beneficiaries, implementing partners and other relevant stakeholders;
- Facilitate liaison with non-partner organizations and bodies to promote synergies and avoid duplication of efforts;
- Advise on the Visibility and Communication plan.

In addition to its chairperson, it is suggested that the TC/ANAG be comprised of a maximum of 8 high level experts from important institutions having livestock improvement in their mandate. Members include, but not limited to livestock experts from MINAGRI, RAB, UR-CAVM, Private University, private sector/RNDP/RNDFF and animal feeds factories, MINALOC, etc. In addition, the animal production and genetic management expert and the L-FFS expert from the SPIU will participate to the meetings in quality of advisers and constitute the secretariat of the Committee (organize meetings, retreats, prepare minutes of the meetings; prepare Terms of Reference, etc.). The TC/ANAG shall meet twice a year. Additional meetings could be called upon by the Chairperson of the TC when needs arise.

4. Technical Committee on Animal health

The Ministry of Agriculture and Animal Resources is currently building up a project aimed at improving the milk production and organise the dairy value chain. In accordance of this, the disease control is crucial to have healthy animals in a suitable environment. Recent animal distribution records in the country indicate that there is a proliferation of some important livestock diseases with a wider regional spread. Such animal diseases include Foot and Mouth disease, CBPP, Bovine Tuberculosis, Bovine brucellosis which need a special control.

Rwanda has a long pastoral history where livestock plays a major role in the economic and socio-cultural life of the people. The recent livestock population from the National data is presented as follows: cattle 1,349,749; goats 2,706,382; sheep 716,309; pigs 1,492,506, poultry 4,837,794. With the government's ambition to significantly improve and maximise the productivity of the livestock sector, it becomes necessary that mechanisms have to be instituted to identify and determine the extent of the spread of such diseases that affect livestock development countrywide. These mechanisms will further be buttressed by the establishment of a functional network of animal disease reporting system countrywide.

Establishing the above mechanisms will foresee a development of a scheme of effective checks on internal and international spread of livestock diseases and help institute proper preventive and control measures against incidental outbreaks. In realisation of the above, the project intends to put in place an animal health steering committee to:

- Recruit a specialist in veterinary epidemiology to bring into effect the early warning device to the livestock industry in Rwanda;
- Validate the strategy for the development of an animal disease reporting system in the country and standards for the report formats, frequency, data structures and implementation of data quality checks countrywide,
- Exchange on the animal disease reports and advise on how the national livestock disease database and the national geographic information system (GIS) will be kept,
- Advise on the design of survey programmes and give orientation in preparing and maintaining the national contingency plans for livestock diseases in the country,
- In collaboration with the veterinary services directorate, validate livestock disease information and data emanating from the satellite laboratories and provincial veterinary services before dissemination of the bulletin on prominent livestock diseases,
- Assist in formulation strategies for control and eventual eradication of specific zoonoses (Tuberculosis, Brucellosis, Cysticercosis, etc.) using pathogen baseline data and microbiological profiles of samples from slaughter houses countrywide;
- Assist and validate the manuals of standards for diagnostic procedures for livestock diseases of public health importance and where possible produce suitable alternative diagnostic procedures of practical value in local situations.

The proposed Composition of the Technical Committee is as follows:

- The Director of Veterinary and Laboratory Services: Chair
- The Project Animal Health Specialist: Secretary
- The Director of Veterinary Inspection/RAB: Member
- The Head of Infection and Epidemic Diseases Division/RBC: Member
- The Director of Veterinary Unit/RDB: Member
- The Representative of RCDV: Member
- The Representative of UR- CVM/Nyagatare Campus: Member
- The Representative of UR-CHS/School of Public Health: Member
- The Representative of Service Provider/HPI,etc: Member

Attachment 3: Draft job descriptions for the SPIU technical staff

1. Project Operations Manager

Duration: 2 years renewable performance based contract with a 6 month probation period

Main Duties and Responsibilities:

Under the authority of the SPIU coordinator, the RDDP Operational Manager is in charge of the RDDP management of daily activities according to the financing agreement signed between the Government of Rwanda and IFAD. He (She) will respect all documented agreement related to the management of the project (aide memoire, back to office report, audit report, evaluation reports, midterm review, and completion report). He (She) is responsible of the subsidiary agreements between the Project and different service providers. S/he will report to the SPIU Coordinator and RAB DG especially ensuring timely physical progress report and financial statements in the required format.

Specific duties:

Project development:

- Provide orientations for the project strategy and methodology
- Guide the project performance in accordance to the Rwandan policies on *Imihigo* in line with the financing agreements
- Coordinating the project team and creating team spirit with SPIU project staff, RAB, partners and district staff
- Ensure synergies between project components to maximize the project impact

Project implementation:

- Supervise the project planning and implementation including the supervision of the implementation of project activities according to the financing agreement, the recommendations of the steering committee as well as the recommendations of the supervision mission
- Timely prepare the annual work plan and budget and progress thematic report
- Supervise the preparation and negotiation of the MoUs, contracts and other agreements with partners and service providers
- Execute the approved plan and budget and ensure payments
- Identify areas which require external support and recruit suitable consultants
- Guide the consultant, experts and contractors toward the realization of planned project outputs and evaluate their performance.
- Provide the overall leadership for the 3 technical components and the 4 technical committees in close collaboration with the DG of RAB and the DG Livestock
- Monitor the project implementation progress
- Support the implementation support missions and the follow up missions

Expected outputs:

- Project general objective, specific objectives and activities timely reached within the frame of the financial agreement.
- Project planning and budgeting processes implemented timely with the full participation of key partners in a participation approach
- Project physical and financial report timely submitted to the relevant authorities in accordance to the provision of the financial agreement
- Respect the disbursement procedures in accordance to the project design report
- The Project impact data updated regularly and disseminated to project partners for measuring the results across all project components

- Excellent relations with line ministries, ministries implementing agencies, project beneficiaries and development partners
- Capacity of communication with all partners including stakeholders in the decentralised entities

Qualification:

The Operational Manager must have the following minimum qualifications and experience:

- Masters holder in Food Science and Technology, Animal Production with 5 years working experience in the dairy sector or Bachelor's degree with 10 years working experience in the dairy sector in Rwanda.

Key competences

- Fluent in Kinyarwanda, English or French
- Computer skills
- Good communication skills
- Working experience with IFAD funded project is an advantage

2. Livestock Farmer Field School (L-FFS) Specialist

Duration: 2 years renewable performance based contract with 6 months of probation period

Duties and Responsibilities:

The position of L- FFS Specialist is to work L FFS facilitators, farmer groups, and help them discover important concepts in milk productivity and quality through practical learning. The facilitators will reside in the same area as the farmers and meet with their groups daily. The main objective of the L- FFS sessions will be to improve smallholders' dairy farmers' capacity to sustainably increase the milk productivity and improve the quality of the milk to reduce both milk rejection at collection and risks related to food safety. The LFFS specialist must be able to manage the time in the field independently.

Under the overall guidance of the Project Coordinator, the Livestock-FFS Specialist will be responsible to perform the following tasks and duties:

- Prepare guidelines for the selection of FFS participants/trainees
- Review villages and participants selected for the L-FFS establishment
- Provide backstop support and monitoring of ongoing activities of L-FFS in the project areas.
- Prepare and compile relevant education materials for L-FFS
- Collect and compile all the information related to L-FFS established in the Project areas.
- Frequent field visits of the project area for recommendation of dairy interventions appropriate for the project area for establishment of L-FFS groups.
- Support leaders of farmer groups to become experts in specific topics related to milk productivity and quality
- Identify the need for additional assistance, and call on project coordinator for the appropriate resources
- Ensure the submission of L-FFS monthly work plan, monthly, quarterly, Annual and final progress reports to the concerned.
- Perform any other associated duties as required by the Supervisor

Qualification

- University Degree in animal production, dairy or veterinary sciences

Requirements and Experience

- Masters holder with 5 years working experience in the dairy sector and with farmers
- Bachelors' holder with 10 years working experience in the domain in dairy sector and with farmers

- L FFS Master trainer with a minimum of 2 years-experience
- Fluent in Kinyarwanda ,English / or French

Skills

- Practical knowledge of social mobilization process and community organization skills
- Proficient in basic computer skills
- Good interpersonal & communication skills
- Good drafting and report writing skills
- Analytical, communication and presentation skills
- Good networking and advocacy skills
- Ability of working in multi-cultural and rural communities.
- Have the following qualities:
 - Fast learner – He/she will be required to perform well after limited training
 - Motivated – This position is only for those who want to gain personal development from this experience, not those just looking for a job.
 - Humble – He/she will be required to let go of what you think you know and be open to new information and ways of doing things
 - Friendly – A facilitator must be respected and liked by the community
 - Good Communicator – Strong reporting and communication skills are critical for this position

3. Animal Health Specialist

Duration: 2 years renewable upon performance contract evaluation satisfaction. 6 month of probation period

Duties and Responsibilities:

- Carries out planning, organizing and coordinating professional veterinary work in prevention control and eradication of animal diseases; Effectively plan and implement
- Develop and oversee the implementation of national disease reporting system for efficient information flow and timely interventions
- Gather, monitor, compile and maintain information and records on disease surveillance, monitoring activities, and herd certification/disease classification records for bovine disease programs including, but not limited to, TBDs, TADs, zoonosis (brucellosis, TB) and mastitis
- Develop new or improved measures to control and/or eradicate animal diseases;
- Supervise the monitoring, evaluation and reporting on impact assessment of animal disease control programs
- Participate in scheduled animal disease surveillance; diagnostics, control, impact assessment and reporting in accordance with Codes of conduct under OIE-World Organization for Animal Health;
- Timely respond to reports of emerging diseases incidences at farmer and community levels
- Train and build capacity of farmers in disease diagnosis, control and prevention of common diseases pathogens and vectors
- Participate in the development of novel disease diagnostic methods in collaboration with public and private institutions at national, regional and international research institutions
- Mentor young veterinarians in the skills, attitudes and ethics of veterinary profession
- Establish strategic partnership with pertinent public institutions, private sector, civil society organizations for enhancing effectiveness, and efficiency in veterinary service delivery
- Participate in policy design, implementation and dissemination on matters relating to animal production.

Key competences

- Knowledge of principles and techniques of veterinary medicine as applied to food-producing animals;
- Knowledge of equipment and technical methods used in the field of diagnosing, testing, and controlling the diseases and parasites of animals;
- Knowledge of diagnostic characteristics, modes of transmission, distribution and frequency of occurrence of animal disease and parasites;
- Aware and informed on literature of veterinary medicine.
- Having worked successfully with an IFAD funded project is an advantage

Qualification and Experiences:

- MSc in veterinary medicine from an a reputable institution with 5 years of experience in veterinary medicine
- Bsc in Veterinary medicine from a reputable university with 8 years of working experience in veterinary medicine
- BSc in veterinary medicine with 6 years of experience in veterinary medicine involving animal disease prevention control and eradication, 4 years of which shall have been in field work in animal disease regulatory work and 1 year performing professional veterinary duties of a class with a level of responsibility;

4. Farmers Organisation Specialist

Duration: 2 years renewable performance based contract with a probation period of 6 months

Duties and Responsibilities:

Under the direct supervision and authority of Program/Contract Manager of RDDP, the Farmers Organization Specialist is responsible for coordinating and supporting all activities relating to farmers and apex institutions organization. He/she works in close collaboration with the Marketing Support Specialist already providing marketing support to ongoing IFAD funded projects and service providers in financial services activities. More specifically he/she is responsible for:

- Review and Establish contracts and agreements with service providers and monitoring their implementation,
- Cooperatives capacity organization and assessments
- In collaboration with Business Development Fund (BDF), Rwanda Cooperative Agency and project service providers, strengthening the farmer organizations to a level that they are able to efficiently provide services to farmers in milk value chain; bulk purchase and delivery of dairy farming inputs; direct (or indirect) provision of extension, AI and animal health services; and linkages to financial services through the “Hub” model already successfully tested in the country,
- Helping to ensure that the rural poor, including women and young, have sustainable access to financial services,
- Strengthening women and men management skills as individual Farmers and cooperatives in order to enable them to transform their income generating activities into sustainable micro-enterprises along the selected RDDP commodity chain.
- Identifying institution-building needs of MFIs and other partners as appropriate and organizing the provision of related support,
- Providing overall guidance and support the implementation of group enterprises and market-based initiatives, in close collaboration with financial institutions working with the project .This includes setting up a financial facility to finance activities under this sub-component;
- In collaboration with other RDDP specialists, preparing the annual work plan, budget and reports.
- In collaboration with the M&E specialist, monitoring the implementation and impact of Project activities in his/her area of specialization.
- Monitoring the indicators of participating financial institutions related to volume of activities, portfolio quality and overall performance. This includes the outreach assessment to ensure HUB's mainstreaming, (ii) Number of HUBs in portfolio and financed; (iii) volume of credit and saving

activities; (iv) penetration rate; (v) repayment, portfolio at risk and arrears rates; (vi) operational self-sufficiency;

- Preparing progress reports on the project rural finance activities and participate in supervision missions.
- Undertaking any other assignments or relevant duties in the field of his/her competences as may be assigned by his direct supervisor.

Qualifications:

- Master or bachelor's degree in Cooperatives Management, Development studies, Rural development, Agricultural Economics, Agribusiness, Rural Finances or related areas.

Key competencies:

- Five years of experience in the implementation of Rural Development Programmes and Projects.
- Having worked with IFAD projects is an added advantage
- Extensive experience of relationship with government institutions and international co-operation agencies.
- Experience rural finances in Rwanda,
- Capacity to organize work at different levels of participation.
- Good skills in coordinating and working in teams.
- Good writing skills and proven competence in the use of computer software applications
- Fluency (written and spoken) in Kinyarwanda and English / or French .

5. Animal production and genetics specialist

Duration: 2 years renewable performance based contract with a probation period of 6 months

Duties and Responsibilities:

- Coordinating and facilitating planning, implementation and reporting on projects and programs for improved animal genetic resource and nutrition in the project area;
- Coordinating the multiplication and dissemination of improved animal breeds, feeds and management practices;
- Overseeing the compliance of the private sector to commercial feed standards in collaboration with RSB
- Establishing partnership with relevant stakeholders in multiplication and distribution of improved animal breeds and forage species
- Establishing, updating and implementing capacity development programs for multiplication and management of improved animal genetic resources
- Establishing strategic partnership with pertinent public institutions, private sector, national and regional civil society organizations for enhancing effectiveness, and efficiency in veterinary service delivery
- Participating and contributing in policy design, implementation and dissemination on matters relating to animal production

Qualification:

- Bachelor's holder in Animal Sciences or Veterinary Medicine with 8 years of working experience in Animal Resources or Master's Degree in Animal sciences, Animal Husbandry and Veterinary sciences with 4 year of working experience

Key competences:

- Knowledge of principles and techniques of animal husbandry as applied to food-producing animals;

- Knowledge of equipment and technical methods used in the field of genetic improvement, animal feed resources, and livestock extension;
- Knowledge of Livestock farm field school,
- Aware and informed on literature of genetic improvement
- Experience in an IFAD funded project is an advantage

6. Nutritionist Specialist

Duration: 2 years contract renewable upon an annual performance evaluation. 6 months of probation period

Duties and Responsibilities:

The Nutrition Specialist will monitor the nutrition situation in selected working areas and provide, in collaboration with the technical team, guidance on priority actions to be taken. In addition, the Nutrition Specialist will support the team in providing direct technical support to project in the development and preparation of action plans, as appropriate.

The Nutrition Specialist will support the project with the development of materials for nutrition in emergencies, with a focus on nutrition information, program monitoring and evaluation when needs arise. In addition, the Nutrition Specialist will support the development of technical capacity of RDDP staff through training and mentoring activities in this area.

The Nutrition Specialist will draft technical notes for specific products when needs arise.

The Nutrition Specialist will monitor the implementation of specific activities under existing partnerships for nutrition information to ensure that activities and deliverables are met on time and as per the set standards.

The Nutrition Specialist will be responsible for ensuring the timely completion of all deliverables meeting defined and agreed quality standards.

Expected outputs:

Enforcement of the Ministerial order on milk collection, transport, standard and distribution.

Pilot a community based supply milk to one cup program

Farmers beneficiaries Milk consumption increased

District nutrition awareness campaign in close collaboration with the Nutrition Secretariat under MINALOC

Qualifications of Successful Candidate:

At least a bachelor's degree in health, nutrition, Food science and Technology, or social sciences with expertise in food policy or nutrition issues.

3 years working experience. Having worked with an IFAD project is an advantage

Languages:

Fluency in Kinyarwanda, English or French

Competencies of successful candidate:

Communicates effectively to varied audiences, including during formal public speaking; Able to work effectively in a multi-cultural environment; Sets high standards for quality of work and consistently achieves project goals; Translates strategic direction into plans and objectives. Analyzes and integrates diverse and complex quantitative and qualitative data from a wide range of sources. Quickly builds rapport with individuals and groups; Identifies urgent and potentially difficult decisions

and acts on them promptly; Demonstrates, applies and shares expert technical knowledge across the project.

Application Qualified candidates: to submit a motivation letter, CV, Degree's copy, certificates of services rendered.

7. Policy Specialist

Duration: 2 years performance based contract with a probation period of 6 months and an annual performance evaluation

Duties and Responsibilities:

The Rwandan Dairy Development Project will work to enhance the effectiveness and sustainability of the dairy sector to supply quality milk to domestic and regional consumers through small-scale producers. The project includes a component (component 3) focusing on the policy and institutional framework for the dairy industry. The objective of that component is to facilitate the consolidation of an evidence-based, inclusive policy framework and institutional structure for the Rwandan dairy sector. Within the Single Project Implementation Unit in the government of Rwanda, the project will seek to appoint a Policy Specialist, who will be take responsibility for the successful implementation of Component 3 of the programme. The position will be located within MINAGRI and should work in conjunction with the project manager in the SPIU.

The overall role of the Specialist in Public Policy will be to manage and lead processes related to the analysis, formulation, approval, implementation and monitoring of public policies and institutions identified under the program. The **specific objectives** are:

- Identify opportunities for project action related to national level policy;
- Lead or accompany processes of formulation of public policies – which includes consultation, drafting and approval of process – and will necessitate working with a wide range of actors at the national and sub-national level;
- Facilitate the understanding of public policies in the areas of the project at the grassroots level (i.e. with dairy farmers and their organizations);
- Help to build capacity at the national level and at intermediate levels (e.g. with sector groups or sub-national government) to effectively participate in national policy process

The specific knowledge, experience and characteristics required are:

- Extensive knowledge of national politics and policy, including government development strategies;
- Experience in the implementation of public policies;
- Capacity to analyse and explain details of policies to government and non-governmental actors (including rural people's organizations);
- Capacity to propose, commission and comment on analysis and studies which will contribute to the development of knowledge about public policy, particularly related to flagship government programmes (e.g. Girinka, One Cup) and policies (e.g. the local economic development strategy);
- Ability to lead and work in multi-disciplinary teams, including managing national and international consultants;
- Ability to communicate and articulate effectively (in both writing and in speaking) the projects approach, objectives and successes.

The specific **responsibilities** of the role include:

- Ensure implementation of activities under the component and complementarity and coordination with the activities of other components to ensure that the policy framework meets the needs of producers and other members of the value chain;
- Coordinate and manage consultants charged with undertaking policy formulation and policy related knowledge management;
- Coordinate with apex organizations (RNDP, Vet Council) charged with leading processes of policy formulation;
- Coordinate with government and non-governmental stakeholders through the Agriculture Sector Working Group;
- Monitor and assist with the budgetary and administrative issues related to implementing pilots for policies on milk sanitation and community animal health workers;
- Ensure that the core principles of the project and component, including inclusiveness and partnership, are applied during all phases of implementation;
- Provide ongoing information to the M&E coordinator and to the M&E system on knowledge related to improving the quality and effectiveness of public policies;
- Support the Ministers, Permanent Secretary, DGs and Senior officials of Minagri and related agencies in developing strategy and formulation policy with particular attention to dairy sector

Required Qualifications:

- Have a Bachelor or Master degree in Economics, Agriculture Economics, Econometrics or equivalent work experience;
- Good experience in economic development policies and analysis;
- Have experience in Planning and Budgeting Methodology and Process;
- Familiarity with the statistical surveys, gathering, processing, and analysis;
- Ability to analyze results and preparing policy and decision reports;
- Good practical experience in using computer and computation skills;

8. Market support specialist

Under the supervision of the RDDP Program Manager, the Market Support Specialist is the focal point in the SPIU/RDDP for dairy market support initiatives. He (She) shall be responsible for but not limited to:

- Support the participating dairy cooperatives in developing and implementing efficient and effective internal structures, membership policies, management procedures, governance and oversight processes;
- Support the participating dairy cooperatives in establishing appropriate technical and organizational capacities;
- Support the participating cooperatives in shaping the federations and unions to represent their interests
- Support the dairy cooperatives in establishing business-oriented operations that offer high quality services and attractive producer prices to members, and regular and accurate reporting to their members, the project and RAB;
- Ensure that the hired service providers working with the participating cooperatives provide appropriate and high-quality services, as required by the cooperatives and the project;
- Support the establishment and use of functioning internal monitoring systems for the participating cooperatives;
- Support the participating cooperatives in establishing functioning relationships with private partners, including Public Private Producers Partnerships;
- Ensure that the dairy cooperatives are regularly audited by the competent authority, and that the recommendations of the audits are acted upon;
- Link the dairy cooperatives with financial institutions (SACCOs, Commercial Banks, Development Banks, and Insurance Companies).

- Coordinate the district dairy data collection, analyze and dissemination to the data users in the most appropriate format
- Train project staff at the districts on the use and dissemination of market information

9. Position: Field Coordinators(12)

Duration: 2 years performance based contract with 6 months of probation period

Duties and Responsibilities:

- The Field Coordinator is responsible for coordinating, consolidating, and ensuring smooth implementation of program and operations' activities. At the district level, the Field Coordinator represents the project authority to relevant stakeholders. Typically, the field coordinator reports to the Program Manager.
- Depending on the context and mission needs, the Field Coordinator develops and implements the project's activities in collaboration with the respective program managers and technical team. The Field Coordinator provides general support, guidance, and serves as focal point during planning, and reporting.
- The Field Coordinator represents the Project at the District level including general meetings with local authorities, stakeholders' meetings, as well as dairy sector program meetings when requested by the mission coordination. The Field Coordinator manages the visit of donors representatives / HQ visitors / other stakeholders whenever requested.
- The Field Coordinator monitors the political, economic, and social environment in the area, assesses and analyses the risks, monitors and reports the situation and develops reports and measures relevant to the context.

Qualification:

At least Bachelor's degree in Food Science and Technology, Animal Production with a proven experience of 5 years in dairy sector or Master's degree with 3 years working experience.

Location:

He/she will be based at district level

Key competences:

- Fluent in Kinyarwanda, English or French
- Computer skills
- Milk handling, storage and transport knowledge
- Excellent communication and representative skills (written, oral, cross-cultural)
- Ability to multitask and deal with stressful situations
- Having a driving licence (At least category A)

Appendix 6: Planning, M&E and learning and knowledge management

1. **Results-based management.** RDDP will be guided by a results-based management approach which aims to ensure that all processes, services and activities of implementing partners will contribute to the achievement of project targets within the framework of the project's theory of change. As part of this approach, planning, monitoring and evaluation will be results-oriented to enable an analysis of the soundness of the project's theory of change and the tracking of progress towards outputs, outcomes, impact and sustainability.

2. The project will be implemented in twelve districts with activities implemented by several different implementing partners each with their own organisational structures. Also activities will be directed at multiple stakeholders, including milk collection centre cooperatives, dairy farmers, very poor households without livestock, veterinary service providers, milk collectors and processors as well as other actors along the milk value chain. Although the project follows a hub model, interventions expand beyond hubs. This complexity affects project management and must be dealt with in an effective way to reduce bureaucracy and unduly lengthy planning and reporting processes.

3. A computerised management information system (MIS) designed to allow decentralised inputting of data and centralised analysis and storage can serve as a useful tool for managing information in a dispersed and complex project such as RDDP. The MIS processes data into information useful for the various levels of decision-making in the project, including also feeding project-specific data into the broader management information system of the Ministry of Agriculture and Animal Resources that will be operational from the 2016/2017 fiscal year.

Planning

4. Planning will be guided by the project's strategy, logframe and broader results framework which will inform the development of annual work plans oriented towards, and explicitly stating, planned results with clear identification of how planned activities are expected to lead to those results. A draft annual work plan and budget (AWPB) will be drawn up in consultation with implementing partners, including beneficiaries (e.g. cooperatives) where relevant. The SPIU will be responsible for the process and for the inclusion of and collaboration with key stakeholders in the planning process. AWPBs will be cleared by the project steering committee and sent to IFAD 60 days prior to the end of each programme year for no objection.

5. The AWPB will be informed by an assessment of current implementation progress and will describe the strategic direction of the project for the coming year along with results expected (targets) under each component and how those results will be achieved. This will be complemented by a resource plan, budget and risk analysis for each result. The AWPB will include plans for training and technical assistance, M&E and procurement for the year in question.

Monitoring & Evaluation

6. **Purpose and scope.** The Monitoring and Evaluation System will be developed as a tool to ensure the efficacy of the project in delivering results and in bringing about important learning to inform the replication and scaling-up agenda of the government and other development partners. For this purpose, the M&E system will ensure the collection, analysis and communication of information on project progress and effectiveness for results-based management as well as provide for carrying out thematic studies and evaluations of pilot initiatives that can inform decision-making and risk management at both local and national levels.

7. Reflecting the institutional implementation arrangements, the M&E system will be coordinated by the SPIU, yet decentralised and participatory in nature with beneficiaries and implementing partners collecting and analysing data at field and district levels for both outputs and outcomes to the extent possible before compilation and analysis by the SPIU. Data flows will be both upstream and

downstream with beneficiaries and implementers reporting raw data upwards (and feeding into the MINAGRI's management information system (MIS); and subsequently the SPIU sharing analysed information, results and lessons downwards all the way to the field level (see more on communication below). Dairy hubs at milk collection centres will be natural information centres for diverse data. Tangent to the continuous data flows, thematic studies and evaluations will be carried out by external experts.

8. **M&E focus and approach.** In line with IFAD's Results and Impact Management System, project results will be measured at three levels: outputs, outcomes and impact. In addition, the M&E system will collect and analyse information about project outreach, effectiveness of the targeting strategy and target group specific benefits, environmental impact and vulnerability (incl. climate risk and greenhouse gas emissions) and cost-effectiveness of implemented activities. This requires strong coordination and collaboration between the M&E unit, the Financial Management unit and the subject matter specialists at SPIU level as well as between the M&E unit and implementing partners.

9. **Impact** will be assessed on the basis of methodologically sound baseline and completion surveys which use the same approach so as to allow a meaningful before and after comparison, preferable using panel data. These impact surveys will include a comparison group so a difference-in-differences analysis can be conducted at the end of the project to strengthen the assessment of effectiveness and impact. The surveys will elicit data at the impact and outcome level according to the results framework as well as socio-demographic data and other relevant information for targeting, planning (as regards the baseline survey) and evaluation. IFAD mandatory RIMS indicators will also be included. It is essential that the baseline survey be conducted prior to commencement of project implementation in order to adequately inform project planning.

10. **Outcomes** will be monitored regularly (at least annually) to ensure the project is on track vis-à-vis results and allow timely decision-making if results are not being achieved as expected. As per the theory of change, there may be several levels of outcomes. Some can be measured by implementing partners on the ground as part of their day-to-day reporting, while other outcomes may need to be captured through annual outcome surveys. It is relevant to start outcome monitoring at the time of the baseline survey and continue on an annual basis to allow tracking of the validity of the proposed theory of change / results chain.

11. **Output monitoring** focuses on the proximal results of activities. The main tool for this is the AWPB given that it also describes the results which planned activities are expected to achieve. Concurrently, AWPB progress monitoring involves tracking implementation of activities and budget expenditure. This allows the integration of physical and financial reporting with ensuing cost-effectiveness and efficiency analyses. Each implementing partner contributes to output and AWPB progress monitoring in quarterly reports submitted to the relevant line agencies and compiled at SPIU level in line with the overall M&E framework of the Ministry of Agriculture.

12. **Outreach** will be measured as the number of people, households and groups (cooperatives) benefitting from project interventions. Primarily this will be participants of livestock farmer field schools, but additionally, a strategy must be developed for how to calculate the beneficiaries from activities directed at CAHWs, AI providers, forage producers, dairy processors, etc.

13. Project management will explore the possibility of developing a register of direct beneficiaries to avoid double counting when outreach is being assessed. Indirect beneficiaries are defined as people benefitting from project services (e.g. through improved quality of dairy value chain services) while not themselves being in direct contact with project implementers.

14. **Targeting effectiveness** will be assessed in an on-going fashion through tracking of results by sub-target groups including the different socio-economic groups (very poor households without livestock; resource-poor households with livestock; resourceful poor households with livestock) as well as women and youth. The needs and realities of these groups are different, project interventions will be different and following on this, measurement of results must be able to clarify whether benefits are accruing to all sub-target groups effectively.

15. **Environment impact and climate risk** will be closely monitored in order to mitigate the environmental and carbon footprint of the dairy sector and to provide a basis for analysing climate risk along the value chain and estimating greenhouse gas emissions with and without project interventions. This will entail thematic studies following international standards¹ to be carried out for which international expertise will be sought. Furthermore, RDDP will learn from the Technical Assistance Facility funded by DFID under MINAGRI which also covers environmental and climate change aspects (in addition to gender and MIS).

16. **Cost-effectiveness** of interventions and of the project overall will be assessed in two ways: (i) day-to-day tracking of AWPB and procurement combining physical and financial progress; (ii) as part of thematic studies of pilot interventions (e.g. for the *Girinka* programme); and finally as an end-of-project assessment of the cost of bringing people out of poverty, of increased milk productivity, of improved milk collection systems and other core aspects of the project as per the development objective and core outcomes.

Key elements of the M&E system

17. An **M&E manual** will be developed immediately upon start-up detailing the project results chain; the M&E framework; the scope, organisation and contents of the M&E system; roles and responsibilities; how data (sex- and age-disaggregated where appropriate) will be collected, analysed, reported, used and otherwise managed (tools and methods); a timeline for M&E related activities; staffing and capacity building plan; budget; etc.

18. **Annual M&E plans** will be elaborated and submitted alongside AWPBs. The annual M&E plans will describe the specific M&E related activities taking place during the year, including day-to-day monitoring, any thematic studies, annual outcome survey or other methods for assessing results, approach for extracting lessons and knowledge management activities.

19. The **project results chain** is a description of the project logic according to the theory of change which details how results are expected to derive from the implementation of project interventions. It will be developed into a results framework largely following the IFAD logframe format but being a fuller representation of the results chain. From this, the project logframe will be formulated in line with IFAD requirements.

20. The **management information system (MIS)** of the project will capture information related to business processes as well as achievement of results while acting as a database and information system for project management and other relevant stakeholders². The MIS will be digital and the IT infrastructure include a software package for collecting, storing, processing and disseminating data. Options include open access software like Open Data Kit. IT-supported data collection tools (e.g. mobile phones or tablets) will be organised to feed data automatically into the MIS. The MIS will be designed and set up by an MIS expert upon assessment of information needs for decision making at various levels.

21. A **baseline study** will be carried out immediately upon start-up in order to inform overall project planning, ensure benchmarks and realistic targets are set for outcomes and impact, determine climate risk and environment-related benchmarks. The baseline study will include a household survey to assess socio-economic level of beneficiaries and group beneficiaries in different sub-target groups. It will assess the knowledge, attitude and behaviour of dairy farmers vis-à-vis animal health, milking hygiene, nutrition, animal welfare, environment and socio-economic management as per good dairy farming practices³. The survey will be designed according to best practice for impact evaluation, including a comparison group with comparable socio-economic characteristics either from within the project districts or from districts where the project is not going to be implemented, using an appropriate sampling technique and power analysis. In addition to the household survey, the baseline

¹ See *Bulletin of the International Dairy Federation 445/2010: A common carbon footprint approach for dairy*. The IDF guide to standard lifecycle assessment methodology for the dairy sector. International Dairy Federation; Brussels 2010.

² See FAO How To Note

³ See FAO and IDF. *Guide to Good Dairy Farming Practice*. Animal Production and Health Guidelines. No. 8. Rome, 2011.

study will include a benchmarking of the state of animal health and health services, key aspects related to the functioning of milk collection centres, milk processors and sellers, feed producers, and other auxiliary services.

22. RDDP's **impact evaluation** will follow the same methodology as the baseline study to allow meaningful comparison, although the scope of the impact evaluation may be broadened to cover other aspects of project relevance, effectiveness, efficiency, impact and sustainability to adequately inform the project's **completion report**.

23. Continuous **progress monitoring** of activities and outputs according to the AWPB and in line with the results framework. Progress monitoring will start at the field level and be conducted using information technology such as tablets, mobile phones, survey software, geographic information systems, etc. Project beneficiaries and field-level implementers will be the first link in the chain of reporting, which subsequently continues to the district and national levels of implementing agencies and to the SPIU, Ministry of Agriculture and IFAD on a quarterly and semi-annual basis respectively.

24. Progress at the outcome level will similarly be monitored on a regular basis either through the quarterly and semi-annual reporting of implementing partners where relevant or through **annual outcome surveys** to be initiated after the first year of implementation. This will allow the project's **annual progress reports** to describe progress according to the results framework and logframe and thereby inform project management of the likelihood of reaching development objectives and outcomes.

25. A **midterm review** will be conducted in year three of project implementation. The review will assess the relevance (i.e. internal and external validity of project design), effectiveness (progress towards targets), and efficiency (funds disbursed vis-à-vis achievements) of the project. Any suggested changes in design, implementation approach or targets should be assessed and endorsed by IFAD.

26. **Risk assessment.** The project logframe includes a column on risks and assumptions that are highly relevant to monitor for assessing the validity of the results chain of the project and to manage risks related to project outreach, targeting, effectiveness and sustainability. At the same time, new risks may be identified in connection with AWPB preparation and should be included in the risk monitoring matrix.

27. **Thematic studies** will be carried out as per need and relevance for the evaluation of pilot initiatives, assessment of environmental footprint, targeting effectiveness, gender equality and women's empowerment etc.

28. **RIMS reporting** will be conducted in line with IFAD requirements on an annual basis. IFAD is currently revising RIMS and if possible, RDDP will align with the updated version of the system.

29. **Field visits and joint implementation review missions** will be carried out on a regular basis by project staff, IFAD supervision teams and government representatives. Qualitative data will be sought on these field visits to complement quantitative data in the performance monitoring processes. Missions will validate results reported through RIMS and in general.

30. **Human resource capacity for M&E within the project.** The main responsible for the project's M&E system will be the Head of Management Information Systems at the SPIU. He will be supported by a project-specific M&E officer also based at the SPIU who will be the day-to-day task manager for M&E. The RAB capacity for M&E will be strengthened by supporting the recruitment of an additional M&E officer to be based at RAB and responsible for all activities taking place under the auspices of RAB. The RAB M&E officer will report to the project-specific M&E officer at the SPIU.

31. Relevant training and capacity development specifically on aspects relevant to the project M&E (e.g. participatory monitoring and evaluation, use of information technology in M&E, risk monitoring, carbon footprint assessment, etc.) will be availed of as required and in line with the AWPB training plan and the capacity development plan of the M&E manual.

Learning and knowledge management

32. An integrated knowledge management (KM) and learning strategy for the dairy sector (in alignment with the broad KM and Communication strategy of MINAGRI) will be developed that builds on the three core pillars of knowledge management: people, processes and technology and will include information management, monitoring and evaluation, innovation and experimentation, internal and external communication and learning and adaptation⁴. The previously mentioned MIS and M&E system including evaluations of innovative pilots will be a core part of this strategy and will be sources of information from which key lessons need to be extracted and appropriately disseminated.

33. Similar to the overall and annual M&E plans, the project will develop knowledge management plans or incorporate KM into the M&E plans. The primary aspect will be internal knowledge management but given the proliferation of interventions related to development of the dairy sector in Rwanda, another important aspect will be liaising with other dairy sector development actors, exchanging knowledge and best practices for the enhancement of the sector overall. This might be in the form of exchange visits, bulletins, participating in thematic networks and partnerships.

34. Progress reports by reporting partners will include sections on lessons learned, challenges and best practices and these must be captured by project management, analysed across the project and communicated for improved implementation. Some vehicles for this communication will be quarterly review meetings with implementing partners, planning workshops, and newsletters, e.g. to milk collection centres and auxiliary service providers. Through this process attention will be put on ensuring that lessons are used in decision-making.

35. RDDP will draw from the expertise of and collaborate with The Agricultural Information and Communication Centre (CICA) under MINAGRI for the production of relevant knowledge products and communication materials, including press releases, extension materials, and radio spots.

⁴ See IFAD Africa publications

Appendix 7: Financial management and governance

1. A Financial Management Assessment (FMA) has been undertaken as part of project design in line with IFAD guidelines on designs. The objective of FMA is to provide assurance that the RDDP will be implemented based on sound financial management practices, with timely and efficient accounting systems combined with punctual professional reviews, both internally (internal audit) and externally (external audit). Sound financial management for IFAD funded projects is critical for project implementation and achievement of project development objectives. The FMA involves assessing: (i) the inherent risk at country level; and (ii) the project specific risk.

2. **The project specific risk.** Currently, there are three ongoing IFAD funded projects (KWAMP, PRICE and PASP) in Rwanda. The projects are managed and supervised under one umbrella country portfolio implementation unit known as the 'Single Project Implementation Unit (SPIU). This arrangement is the first within the IFAD Eastern and Southern Africa portfolio. It has been in place for over five years now and has worked well with recorded success in timely delivery and implementation of the projects as well as cost efficiencies, earning the country portfolio as a whole, a consistent favorable financial management rating of highly satisfactory. Some of the specific advantages include:

- Established financial management systems and structures in place have always benefited new projects coming on board, enabling quick start-up and take-off of the project with limited or no financial management challenges;
- Existing staff experienced in IFAD financing management procedures facilitate knowledge and skills-sharing with any new staff joining the SPIU;
- Improved efficiency, lean staffing structures hence saving costs – e.g. there is only one Director of Finance and Chief Accountant for all the projects, however each project has a specific Accountant recruited for day to day tasks; and
- Uniformity of approaches and processes, faster implementation, quicker leverage of lessons learned, and improved accountability.

3. Based on these factors, the fiduciary risk assessment at design is rated Low, and it is recommended that the RDDP be also implemented under the MINAGRI/SPIU arrangement.

4. **Country context and inherent risk.** Rwanda as a country has been quoted and ranked highly in terms of maintaining a high level of integrity in public administration. The country has also made significant progress in establishing mechanisms to support integrity and transparency in the public procurement systems. The 2015 Corruption Perception Index (CPI), released by Transparency International (TI), ranks the country as the fourth least corrupt country in Africa and 44th globally (<http://www.transparency.org/cpi2015#results-table>). In sub-Saharan Africa, Rwanda is placed 4th in the least corrupt nations. The report shows an improvement in Rwanda's percentage score from 49% (2014) to 54% (2015), placing it on an overall inherent risk rating bracket of medium risk. This goes to show that Rwanda and its institutions are acknowledged as substantially accountable, effective and efficient, participatory, transparent, responsive and equitable in public administration.

5. The above recognition has been due to the country's positive drive on anti – corruption of which one of the means to this has been the establishment of sound financial management practices, with

timely and efficient accounting systems combined with punctual professional reviews by internal and independent auditors. To ensure that this is done, the government of Rwanda placed the mandate of planning, development, implementation and formulation of policy pertaining to accounting systems, procedures, rules and regulations in all public entities under the Ministry of Finance and the office of the Accountant General. In addition, they monitor and evaluate accounting systems in budget agencies, follow-up on budget agencies' annual accounts, audit reports, Auditor General's recommendations, train and develop accountants in the civil service and administer the Organic Law on State Finances and Property. In this respect, therefore, the Organic Law No. 12/2012 of 12/09/2013 on state finances and property requires budget agencies to submit monthly and annual financial statements to the parent ministry (MINAGRI) and to the Accountant General through the Ministry of Finance. The SPIU, being a government budget agency under MINAGRI, is in compliance and this forms part of the fiduciary oversight by the ministry and likewise a channel for project reporting to the government,

6. **Implementation organization.** RDDP fiduciary aspects will be carried out under MINAGRI's Single Project Implementation Unit (MINAGRI/SPIU) under which three IFAD funded projects (KWAMP, PRICE and PASP) are currently being implemented. MINAGRI holds the overall fiduciary responsibility over the SPIU and reserves the right to institute any control measures towards safeguarding the assets of the SPIU. It is in this respect that the Permanent Secretary (PS) is a mandatory signatory to the Withdrawal applications (WA). The signatories to project bank accounts are: the Programme coordinator, Director of Finance and administration, the PS, and the Director General (DG) for corporate services. In line with the project implementation guidelines, *the set-up of the finance department and the existing implementation arrangements will be integrated in a revised Project Finance Manual that will be prepared after RDDP comes into force.*

7. MINAGRI is undergoing a re-structuring process and one of the possible scenarios is devolving donor funded projects into MINAGRI implementing agencies (Rwanda Agriculture Board, RAB) and National Agriculture Export Board, NAEB). *If the re-structuring process approves devolving donor funded projects into MINAGRI implementing agencies, the risk of delayed implementation of activities as a result of changes in structure of the current system may have an impact on RDDP. It is therefore recommended that a fiduciary capacity assessment will be have to be done in line with IFAD requirements and guidelines to ascertain the agency's ability to manage project funds in an efficient manner. The new proposed arrangement of project implementation under the agencies will therefore require a No objection approval from IFAD.*

With the implementation of the mitigation measures outlined in the risk assessment below, the overall FMA risk assessment at design for RDDP is rated as Low.

8. Project specific Financial Management Assessment with a **summarized scoring at design is as shown in the table below:**

Table 1: Summary of project fiduciary risk assessment at design

Control risk category	Initial risk	Risk	Proposed mitigation measures	Final risk assessment
Organisation and staffing	M	At the time of the design mission, the DAF had resigned from his duties. This may pose the risk of delays in decision making due to change in work approaches in the event that the DAF and Accountant to be recruited do not have experience in IFAD procedures	Training of new staff on IFAD procedures Recruitment procedures may consider staff from closing projects with high performance assessment ratings/	L
		Limited skills and clarity of the functions of Steering Committee	Well documented roles and composition of the steering committee to be included in the PIM	
		MINAGRI is undergoing a re-structuring process and one of the possible scenarios is devolving donor funded projects into MINAGRI implementing agencies (RAB and NAEB). The risk is that government agencies may not have the necessary know how to effectively manage project resources	IFAD to Perform a 'Fiduciary assessment' on new proposed agencies to ascertain the agency's ability to manage project funds in an efficient manner	
Budgeting	M	Budget controls not in place. This poses a risk of budget overruns	Project to capture budget into accounting software to monitor performance against targets	L
		Late submission of AWPB for NO objection by IFAD. Implementation of activities may be delayed	<ul style="list-style-type: none"> Revised PIM to spell out clear budgeting procedures, timelines and roles and responsibilities SPIU to share PIM with the participating partners in a formal learning event to ensure clarity to all partners 	
		Budget prepared by participation of other implementing partners - NGOs and Government agencies may contain ineligible activities	<ul style="list-style-type: none"> The project District coordinators/officers and project manager will align the activities to the needs of the beneficiary Districts with due regard to activity eligibility Budgeting process to be integrated in the PIM – participation, composition, budget approval process, deadlines for submission agencies/districts etc 	

Control risk category	Initial risk	Risk	Proposed mitigation measures	Final risk assessment
Funds Flow and disbursement arrangements	L	Delayed withdraw application preparation resulting in liquidity problems.	<ul style="list-style-type: none"> • Prepare monthly Special account reconciliation • Loan administration requirements to be shared with new staff during the startup workshop • Continuous on spot support during supervision missions. 	L
Internal controls	L	Accountability for advances by implementing partners' e.g NGOs and government agencies may be delayed, hence posing the risk of liquidity.	<ul style="list-style-type: none"> • Use control accounts in the software for such receivables, to ensure close monitoring. • Internal Audit to review quarterly returns of partners with advances. 	L
Accounting systems, policies and procedures	M	The current chart of accounts may not provide reports analysed as per components and subcomponents.	Upgrade the current version of the TOMPRO accounting software to ensure the chart of accounts provides for this analysis.	L
Reporting and monitoring	L	As above for accounting system		L
Internal audit	H	None functional audit departments, thus the importance of having an IA department e.g detecting and preventing fraud, testing internal controls, monitoring compliance with policies etc is lost.	Recruit an internal auditor	H
External Audit	L	Late submission of audit reports	<ul style="list-style-type: none"> • Timely presentation of draft accounts for audits • TOR for audits agreed with the Auditor general at project start. 	L
Fiduciary risk at design stage	M		The financial management arrangements of the existing SPIU are assessed as Low.	L

9. **Conclusion.** The financial management arrangements, and capacity of the existing SPIU are adequate to meet IFAD's requirements and the final risk rating at design is overall considered Low.

10. **Organization and staffing.** The proposed FM-arrangements including budgeting, accounting, internal controls, flow of funds, financial reporting, and audit arrangements will follow the FM arrangements already in place at the SPIU. The proposed FM arrangement are described below and will be outlined in detail in the revised Project's implementation Manual which will be prepared before project start up and reviewed during first year of implementation.

11. **Staffing.** Within the SPIU, the FM structure is headed by a Director of Finance and Administration (DAF), who is responsible for all fiduciary aspects of IFAD projects. Under him/her, there is a Chief Accountant, and an Accountant attached to every project within the SPIU. RDDP will also be required to

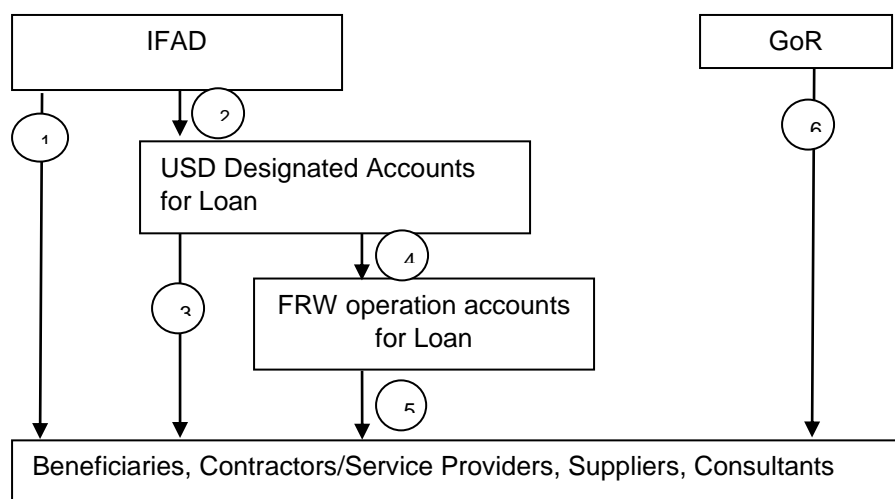
recruit an accountant with the required qualification and experience. During the time of the design mission, the DAF had also resigned from his duties. *MINAGRI should fast track recruitment of a suitably qualified and experienced person to take on the responsibilities of DAF to avoid risks that may arise due to this key position being vacant.*

12. Project budgeting system. The RDDP AWPB will be prepared in the format described in the IFAD guidelines for AWPBs by the SPIU with substantial participation of other implementing partners - NGOs and Government agencies. Each AWPB shall include, among other things, a detailed description of planned Programme activities by component, sub-component and activity, and a procurement plan for eighteen months. The SPIU will establish the funds available for the AWPB for a particular year as per cost tables. The Project District coordinators/Officers will align the activities to the needs of the beneficiary Districts with due regard to the performance contracts entered into by the Districts. The participation of District authorities in this exercise is paramount, and an activity schedule, prepared by the project district coordinator and approved by the district authorities should be submitted to the SPIU for analysis and consolidation of the project AWPB. At this point, the SPIU should ensure that the activities presented for financing are eligible. After consolidation, the draft AWPB will be submitted to the PSC and MINAGRI for approval and later to IFAD for comments and acceptance, no later than 60 days before the beginning of the relevant financial Year. If IFAD does not comment on the draft AWPB within 30 days of receipt, the AWPB shall be deemed accepted. If required, the SPIU may revise the AWPB half yearly. No withdrawal of funds shall be made from the Loan/Grant Accounts until the AWPB has been approved.

13. Funds flow and disbursement arrangements. IFAD will disburse loan/grant proceeds through a Designated Account to be opened at the National Bank of Rwanda (NBR). A subsidiary operation and counterpart fund account, denominated in Rwandan Francs, will also be opened at NBR, through which day to day payments to suppliers will be made. In case there is a need to transfer funds to other implementing partners (e.g RAB, FAO, RCVD, RCA etc); it will be done through the operational account. Other implementing partners may be required to open Bank accounts specific to RDDP funds depending on whether they will receive substantial advances for activities to be implemented by them. Specialized institutions identified as possible implementing partners include; Rwanda Agriculture Board (RAB), Food and Agriculture Organization (FAO), Rwanda Council of Veterinary Doctors (RCVD), Rwanda Cooperative Agency (RCA) and Heifer International.

14. Disbursements from IFAD will be made by way of replenishments to the Designated Account with a possibility of direct payments where the necessary criteria are met as per IFAD guidelines. No SOE threshold are prevailing for the current projects within the SPIU, however, with the possibility of change of Agencies hosting the SPIU and departure of the current DAF, this will be reviewed and determined based on the Fiduciary assessment of the respective agencies nominated by government. This will be clearly spelt out in the Letter to the Borrower at the time of signing of the Loan Agreement and declaration of Entry to Force of the loan and grant.

Figure 1: RDDP Funds flow chart



15. Transfers to service providers will be activity tagged, and to be accounted for before more funds can be transferred.

16. **Project bank accounts.** It is a government policy that all government agencies will open their bank accounts in the National Bank of Rwanda. Similarly, RDDP will open and maintain three bank accounts; Counterpart Account in RWF for the government counterpart funds, the Designated Account in USD and the Operations Account in RWF. The following will be the signatories to the said bank accounts: Permanent Secretary (PS)/Director General for corporate services of MINAGRI (alternate: SPIU Coordinator) and the SPIU Coordinator (alternate: SPIU DAF). The operation and counterpart fund account will be used to make payments to suppliers, service providers and contractors. Management rules for the DA will be based on provision 4.04 of the new IFAD General Conditions for Financing, according to which operational conditions (bank, Authorized Allocation, currency, signatories) are specified in the financing agreement.

17. The **Authorized Allocation** shall be calculated on the basis of the first six months of expenditure, currently estimated at USD 2.3 million. Depending on the cash flow requirements in subsequent years, the Authorized Allocation may be increased to a maximum of 4.0 million upon discussions and agreed upon with IFAD. Certain conditions need to be met by MINAGRI for IFAD to make the first disbursement of project funds to the DA:

- The first Annual Work plan and Budget (AWPB) needs to have received IFAD's no-objection;
- MINAGRI to open a Designated Account in USD and an Operations Account in RWF in the National Bank of Rwanda (BNR);
- A revised Project Implementation Manual needs to have been submitted to IFAD;
- Key personnel needs to have been recruited, i.e. the Project manager for RDDP, Farmer Field Schools (FFS) specialist, animal and health specialist, and animal production and genetic management specialist. Other employees to be recruited are; an accountant, and an Agribusiness and Farmer Institutions officer; and
- Project Steering Committee needs to have been established.

18. **Accounting systems.** Accounting records will be maintained in accordance with IPSAS-cash basis of accounting. The MINAGRI/IFAD SPIU is currently using TOMPRO software for all IFAD funded projects in an efficient and satisfactory manner. TOMPRO is a multi-project software, and hence the SPIU will not be required to purchase another FMS, but engage the services of the developer to issue a license for RDDP. The coding structure of the Chart of Accounts (CoA) for all government projects/entities is pre-determined by the Ministry of Finance (MINECOFIN). The essence is to facilitate government to consolidate financial statements at the end of every financial year. RDDP will also adopt the government recommended CoAs. In order to track expense and revenue accounts by component, category, financier and activity, TOMPRO software allows for the development of an analytical chart whose journals and accounts post to a separate ledger (the analytical ledger). The set up (of the analytical chart) follows the layout of activities in component and category form, as provided for in the project cost tables. Once the cost tables have been drawn, RDDP will setup the analytical CoAs in the FMS, according to the agreed components, subcomponents and activities.

19. **Internal controls and internal audit.** In order to effectively safeguard project resources, internal controls have been instituted at the SPIU in the whole framework of financial and administrative procedures. The identified controls range from; proper record keeping and posting, authorization of accounting, procurement and administrative documents, balancing and checking, physical security of assets, double signing (approval) arrangements, to financial reporting and monitoring. An Internal Audit (IA) department is however vital to check overall compliance to internal controls and provide support towards improving systems, procedures and processes. The SPIU has got an Internal Audit (IA) department, staffed by one person. However, at the moment the only IA position in the department is vacant. *The SPIU should consider recruiting an Internal Auditor immediately in line with government labor laws, as IA is considered good practice and it is generally part of the underlying financial management control framework.*

20. **External audits.** The current projects are all being audited by the Office of the Auditor General (OAG) as mandated under the government Act/Law. The Office has legal personality and financial and administrative autonomy; hence, while discharging its responsibilities, the Office is independent and does not receive any injunctions from other organs. This makes it acceptable and preferable to IFAD.

21. Reviews of the quality of the OAG reports for the current projects indicate highly satisfactory performance ratings, with positive comments given for the level of detail of the audits and use of acceptable standards - INTOSAI auditing standards. It is recommended therefore that RDDP will also be audited by the OAG. A complete set of Financial Statements specific to RDDP will be prepared in accordance with International Public Sector Accounting Standards (IPSAS) - modified cash basis. The Guidelines for the preparation of the terms of reference for the Project Audit are included in attachment to the design and will be shared with the OAG as soon as the Financing agreement is signed. In addition to the audit opinion on the financial statements, the auditors shall provide: (i) an opinion on the certified statements of expenditure and the operation of the Designated Account; and (ii) a separate management letter, addressing the adequacy of accounting and internal control systems. The SPIU/MINAGRI shall deliver the audited set of financial statements to the Fund within six months after end of the relevant financial Year. CFS will review the Audit report and if need be issue a management letter. The SPIU/MINAGRI shall submit to IFAD a feedback to the management letter within one month.

22. **Programme supervision.** The project will be directly supervised by IFAD in partnership with MINAGRI in accordance with IFAD guidelines and this shall be seen as an opportunity to assess achievements and lessons learnt jointly, and to reflect on ways to improve implementation and impact.

From a financial management perspective, a financial management specialist will participate in missions annually to supervise and provide implementation support to the project and follow up the fiduciary risk at various levels including the use of the SOE. In light of the risk assessment (Low FMA risk), in the first two years of implementation, the supervision plan of project will include annual visits to the APCU/PCU focusing on the following actions:

- At least two on-site visits of implementing partners (government agencies, co-operatives, NGOs etc.) to conduct an FM assessment
- Detailed review of adequacy of the staffing arrangements of the FM department , including the TOR's and performance of the financial staff and identification of training needs
- Review of the Project Financial Management and accounting systems and procedures in use
- Review of flow of funds and operation of the designated and project accounts (including monthly reconciliations)
- Detailed review of records management, back up and the use of the Statement of Expenditure (SOE) procedure (adequacy of supporting documentation)
- Follow-up on the identified mitigation actions identified in the project design

Attachment 1. Guidelines for the preparation of the terms of reference for the Project Audit

1. **Audit objective.** The objective of the audit is to enable the auditor to express an opinion on the state of affairs of RDDP for the year ended 30th June 20yy, as reported in Project Financial Statements (PFS), Statements of Expenditures (SOE's) and special account (SA). The audit will be carried out in accordance with IPSAS cash basis and will include such tests and reviews, as the auditor considers necessary under the circumstances. Special attention will be paid to establishing that: (i) all external funds have been used in accordance with the conditions stipulated in the financing agreements, with due attention to economy and efficiency, and solely for the purposes for which the financing was provided; (ii) counterpart funds have been provided and used in accordance with national or organizational financial regulations, with due attention to economy and efficiency, and solely for the purposes for which they were provided; (iii) goods, consultancy and other services, and civil works financed out of project funds have been procured in accordance with stipulations in the financing agreement and/or government regulations; (iv) all necessary supporting documents, records and accounts have been kept in respect of all project ventures, including expenditures reported via SOEs or SAs; (v) the SA has been used in accordance with the provisions of the financing agreement; and (vi) the project accounts have been prepared in accordance and consistent with IPSAS cash basis and give a true and fair view of the financial status of the Project at [dd / mm/ yyyy] and of resources and expenditures for the year ended on that date.

2. **Project financial statements.** The Project Financial Statements (PFS's) should include: (i) yearly and cumulative statements of sources and application of funds, which should disclose separately IFADs funds, counterpart funds (government), other donor funds and beneficiary funds; (ii) statement of financial position; and (iii) cash flow statement.

3. **Reconciliation** between the amounts shown as received by the project and those shown as being disbursed by IFAD should be attached as an annex to the PFS. As part of that reconciliation, the auditor will indicate the procedure used for disbursement (SA funds, letters of credit, special commitments, reimbursement or direct payment) and indicate whether the expenditure is fully documented or uses the SOE format.

4. **Statements of expenditures (SOEs).** In addition to the audit of the PFS, the audit will include a review of SOEs used as the basis for submitting withdrawal applications. The auditor will carry out tests and reviews as necessary and relevant to the circumstances. SOE expenditures will be carefully checked for eligibility with relevant financial agreements, and the letter to the borrower, and with reference to the Project Design Report for guidance when necessary. Where ineligible expenditures are identified as having been included in withdrawal applications and reimbursed, auditors will note these separately. A schedule listing individual SOEs withdrawal applications by reference number and amount should be attached to the PFS. The total withdrawals under the SOE procedure should be part of the overall reconciliation of IFAD disbursements described above.

5. **Special account (SA).** The auditor is also required to audit the activities of the SA associated with the project including the Authorized Allocation or Initial Deposit, replenishments, interest that may accrue on the outstanding balances, and the year-end balances. The auditor must form an opinion as to the degree of compliance with IFAD procedures and the balance(s) of the SA(s) at year's end. The audit should examine: (i) the eligibility of withdrawals from the SA during the period under review; (ii) the operation of the SA in accordance with the relevant financing agreement(s); (iii) the adequacy of internal controls within the project appropriate for this disbursement mechanism (iv) the use of correct exchange rate(s) to convert local currency expenditures to United States dollars.

6. **Audit opinion.** Besides a primary opinion on the Project Financial Statements, the annual audit report of the Project Accounts should include a separate paragraph commenting on the accuracy and propriety of expenditures withdrawn under SOE procedures and the extent to which IFAD can rely on SOE's as a basis for loan disbursement. The financial statements, including the audit report, should be

received by the IFAD no later than six months after the end of the accounting period to which the audit refers. The auditor should submit the report to the borrower's designated agent rather than to any staff member of the project entity. The agent should then promptly forward two copies of the audited accounts and report to IFAD.

7. **Management letter.** In addition to the audit reports, the auditor will prepare a "management letter", in which the auditor: (i) give's comments and observations on the accounting records, systems, and controls that were examined during the course of the audit; (ii) Identifies specific deficiencies and areas of weakness in systems and controls and make recommendation for their improvement; (iii) reports on the degree of compliance of each of the financial covenants on the financing agreement and give comments, if any, on internal and external matters affecting such compliance; (iv) communicates matters that have come to attention during the audit which might have a significant impact on the implementation of the project; and (v) brings to the borrower's attention any other matters that the auditors considers pertinent.

8. **General.** The auditor should be given access to all legal documents, correspondence, and any other information associated with the Project and deemed necessary by the auditor. Confirmation should also be obtained of amounts disbursed and outstanding at the IFAD. It is highly desirable that the auditor become familiar with the relevant IFAD Audit Guidelines or IFAD /World Bank Guidelines for audit, financial and procurement.

9. **Auditor's qualifications.** The person appointed as the project auditor should: (i) have an internationally recognized professional accounting qualification i.e. the person appointed should be either a certified public accountant, a chartered accountant or should be the holder of an equivalent professional accounting qualification; (ii) be a member in good standing of a body of accountants affiliated to the International Federation of Accountants (IFAC); and (iii) have experience and knowledge of the World Bank or IFAD's current financial management requirements.

10. **Key staff.** (i) Team Leader - a senior consultant with ten (10) years of audit experience with IFAD or World Bank funded projects and a Master's degree in one of the following fields: Economics, Accounting or Business Management, and a recognized professional accounting qualification; (ii) an Auditor - a consultant with five (05) years of audit works with audits in the WB projects or IFAD projects, and an Economic Degree or any other related area; and (iii) an Auditor Assistant - A consultant with three (03) years of audit works, an Economic degree or any other related area, and good audit knowledge.

Appendix 8: Procurement arrangements

1. **Procurement procedures and the Procurement Law.** The responsibility for project implementation and for procurement using IFAD funds lies with the government, and IFAD will ensure that the proceeds of any financing are used only for the purpose for which the financing was provided, after full, fair and legitimate competition among bidders. IFAD may permit the adoption of the borrower's national procurement regulations provided that such regulations are compatible with IFAD guidelines. Rwanda made substantial progress in developing the legal and regulatory framework by enacting a public procurement law in 2007 (Law No. 12/2007 of 27/03/2007) and emended in 2013. The decree, with the associated Regulations, also establishment Rwanda Public Procurement Authority (RPPA) as a regulatory body, replacing the then existing National Tender Board (NTB). The 2007 Law (as amended in 2013) and the existing public procurement framework is generally consistent with international standards and is acceptable to IFAD.

2. According to the Law, the RPPA only exercises regulatory functions, and all procurement processes have been devolved to government procuring agencies (Ministries and projects). The procurement regulations require the procuring entities to undertake procurement planning and stipulate the nature and responsibilities of the Tender Committee and who is eligible to be in the tender committee. The Government has also undertaken the use of national Standard Bidding Documents (SBDs). These are all published on the RPPA website for public use. In addition to the amendment to the law, RPPA has prepared a Standard Manual for Public Procurement (Public Procurement User Guide) for the benefit of procuring entities. A procurement manual specific to a procurement entity is thus not necessary and the SPIU will not be required to have one. The manual sets out procurement methods to be used and the thresholds. The procuring entities shall apply open competitive bidding for procurement of supplies, works, goods and other services except when it is not ideal. Foreign bidders are allowed to participate. National Tendering is set at ≤RwF 600,000,000 for goods and services and ≤RwF 1,200,000,000 for works. Goods, services and works' tenders with values beyond the values stated above go through International Tendering processes. Other procurement methods are: Request for Quotations (RwF ≤1,000,000), Single-source procurement/Direct contracting (RwF ≤100,000 and other conditions), Restricted tendering (RwF ≤5,000,000 and other conditions), Force Account (Works difficult to quantify and no threshold is set here), and Community Participation (RwF ≤20,000,000). Details of conditions and thresholds for different procurement methods are set out in the table below:

Table 1: Procurement methods, thresholds and conditions to be applied by RDDP

Procurement method	When to be used	Conditions to be fulfilled	Threshold
Open Competitive Bidding	National Tendering: when adequate national suppliers or contractors are available within threshold	Minimum publication 21 days,	Goods/Services – RwF 600,000,000 and below
		Advertise in at least one newspaper of wide circulation & on internet website, where it is available	Works – RwF 1,200,000,000 and below
	International Tendering: when above national tendering threshold	Advertise in media that has sufficient circulation outside Rwanda,	Goods/Services – Above RwF 600,000,000
		Bidding documents should be in English or French,	Works – Above RwF 1,200,000,000

Procurement method	When to be used	Conditions to be fulfilled	Threshold
		Minimum Publication 45 days	
Restricted tendering	more than two but less than ten suppliers, For highly complex or specialized goods or works which are only available from a few suppliers or contractors	Give invitation to tender to at least six bidders, 21 days for bids preparation, any person may apply for inclusion on the short list, short list shall be drawn from a pre-qualified bidders	Goods and works contracts less than RwF 5,000,000 (five million)
Request for Quotation	contract value is low, off the shelf goods and standard specification works	compare at least three offers technical specifications and drawings for works., not to be used more than once in 3 months for the same item, minimum 3 working days in which to respond	Goods/Services and Works Below RwF 1,000,000 (one million)
Single Source Procurement/ Direct Contracting	only one supplier available contract extension is awarded following previous open bidding standardization of equipment or spare parts is needed exceptional circumstances exist, such as natural disasters, unforeseen urgency.	Negotiations may be carried out, resulting contract must be in writing	Below RwF 100,000 (one hundred thousand) RECOMMEND A HIGHER THRESHOLD
Force Account	Works difficult to quantify	Use civil servant labour & public equipment	No threshold
Community Participation	To be used for community based project.	Communities to provide in kind services e.g. labour, local materials etc.	Contracts below RwF20,000,000 (twenty million).
	Community projects for making terraces, antierosion trenches or planting trees	Communities to provide in kind services e.g. labour, local materials etc	Contracts can exceed RwF20, 000,000 (twenty million).

3. In addition to adoption of the national procurement procedures outlined above the project will have to adhere to the following additional requirements:

- IFAD prior review for contract for goods and works whose value is equal or over USD 80,000 and for services for a value equal or over USD 40,000.
- As per IFAD procurement guidelines (Module F5 of the procurement handbook), International Competitive Bidding (ICB) is a mandatory method of procurement for the following type of contracts;
 - Services: Above USD 100,000
 - Goods: Above USD 200,000
 - Civil works: Above USD 1,000,000

4. **The Procurement Unit.** The procurement unit at the SPIU is made up of four experienced staff that includes a head of department and one procurement officer attached to every project in the SPIU. However, being attached to a particular project will not stop a given procurement officer from undertaking

activities related to another project in the SPIU (as may be directed by the head of department). The roles of contract management and procurement monitoring are all undertaken by this department in an efficient manner. The procurement officer attached to KWAMP is set to exit come June 2016 at the completion date. However, given the experience the employee has, the SPIU may consider retaining the same employee to take on procurement related activities for RDDP. This can be done after undertaking a performance evaluation by the line manager the outcome of which should be the basis for retaining the employee.

5. **The Internal Tender Committee.** The internal tender Committee is already in place. Appointment of members to the tender committee is the responsibility of the MINAGRI Permanent Secretary. Currently, the Internal Tender Committee is made up of five members; Tea Specialist (Chairperson), Climate and Environment Specialist (Vice chairperson), Access to Finance Specialist, Market Support Specialist, and a procurement officer (as secretary depending on the project issuing the tender). A member of the tender committee has a mandate of 3 years – renewable only once. Half of the internal tender committee cannot have their membership renewed at the same time. RDDP will utilize the same tender committee.

6. **Procurement Plan.** Procurement Plan covering 18-months will be prepared each time an AWPB is prepared. This is to initiation of procurement processes for the activities needed in the first months after the expiry of the 12-months AWPB. The Procurement Plan under various columns will indicate at minimum the following:

- The goods, services and civil works to be procured - arranged in optimal contract packages in different lots
- The procurement method to be followed
- Whether IFAD's Prior review will be required or not
- Timelines showing milestones when the key stages of the procurement cycle will be achieved.

Attachment 1: 18 Months Procurement Plan

	Sub component/Activity	Unit	Unit Cost (USD)	Quantity		Total - USD (18 Months)	Financing rule	Category	Prom't method	Responsible
				2017	2018					
1.1	1.1. Knowledge, Attitudes and Behaviour									
1.1.1	Ad hoc National consultant	Month	3500	12	6	63'000	IFAD_L (100%)	C_DA	NCB	SPIU
1.1.2	International consultant	pers.day	1000	20	0	20'000	IFAD_L (100%)	C_DA	NCB	SPIU
1.1.3	Short Term National Consultancies	Lumpsum	3000	1	1	6'000	IFAD_L (100%)	C_DA	NCB	SPIU
1.2	Sustainable Access to Public and Private Livestock Services									
1.2.1	Audit of AI services (service provider)	Day	400	30	-	12'000	IFAD_L (50%); HI (50%)	C_DA	NCB	SPIU
1.2.2	Kit for Private AI (incl. cell phone)	Lumpsum	1200	-	20	24'000	IFAD_L (100%)	EQ_MAT_DA	NCB	SPIU
1.2.3	Motorbikes for private AI /f	Number	3000	-	20	60'000	IFAD_L (50%); BENEFICIARIES (50%)	EQ_MAT_DA	NCB	SPIU
1.2.4	Equipment (kit for vet technicians)	kit	1,200	175		21,210	IFAD_L (100%)	EQ_MAT_EA	NCB	SPIU
1.2.5	Software adaptation and module development	Lumpsum	80000	-	1	80'000	IFAD_L (100%)	C_DA	NCB	SPIU
1.2.6	Equipment (central and district level)	Unit	3000	15	-	45'000	IFAD_L (100%)	EQ_MAT_DA	NCB	SPIU
1.2.7	Equipment - central Server database	Unit	10000	1	-	10'000	IFAD_L (100%)	EQ_MAT_DA	NCB	SPIU
1.2.8	Equipment of services providers (tablets)	Unit	300	-	20	6'000	IFAD_L (50%); BENEFICIARIES (50%)	EQ_MAT_DA	NCB	SPIU
1.3.	Asset Building and Climate-Smart Productivity									
1.3.1	Procurement and distribution of cows	Heifer	920	500	-	460'000	IFAD_L (50%); HI (25%); FIN_GAP (25%)	GSI_EA	NCB	SPIU
1.3.2	Provision of basic vet drugs and other inputs	L/S	500	76		38,000	IFAD_L (50%); HI (50%)	GSI_DA		
2.1.	Organization and Capacity Building									
2.1.1	Assessment of available technologies	Study	30000	1	-	30'000	IFAD_L (50%); HI (50%)	C_DA	NCB	SPIU
2.1.2	Installation and training (including hardware)	Coop	10000	-	8	75'000	IFAD_L (50%); HI (50%)	TR_WKSP_DA	NCB	SPIU
2.1.3	Certification of milk zones and bars	Kiosk	50	-	400	20'000	IFAD_L (50%); HI (50%)	GSI_DA	NCB	SPIU

	Sub component/Activity	Unit	Unit Cost (USD)	Quantity		Total - USD (18 Months)	Financing rule	Category	Prom't method	Responsible
2.1.4	Mapping of dairy processors and analysis of processing gap	Study	50000	1	-	50'000	IFAD_L (50%); HI (50%)	C_DA	NCB	SPIU
2.2.	Investment in milk collection and processing infrastructure									
2.2.1	Milk collection infrastructure gaps assessment	Study	70000	1	-	70'000	IFAD_L (100%)	C_DA	NCB	SPIU
2.2.2	Category 1 upgrading MCCs	Number	44000	-	5	220'000	IFAD_L (80%); BENEFICIARIES (20%)	EQ_MAT_DA	NCB	SPIU
2.2.3	Category 2 upgrading MCCs	Number	52000	-	3	130'000	IFAD_L (80%); BENEFICIARIES (20%)	EQ_MAT_DA	NCB	SPIU
2.2.4	Infrastructure development for new MCCs	Number	130000	-	-	-	IFAD_L (40%); BENEFICIARIES (60%)	EQ_MAT_DA	NCB	SPIU
2.2.5	Infrastructure development for milk collection points	Number	3250	-	25	81'250	IFAD_L (40%); BENEFICIARIES (60%)	EQ_MAT_DA	NCB	SPIU
2.2.6	Feasibility studies (targeted)	Study	50000	1	1	100'000	IFAD_L (100%)	C_DA	NCB	SPIU
2.3.	Financing for enterprise development and market expansion									
2.3.1	Financial literacy training for farmers	Farmer	25	-	3000	75'000	IFAD_L (100%)	TR_WKSP_DA	NCB	SPIU
2.3.2	Financial literacy training for milk dairy business community	Person	25	-	400	10'000	IFAD_L (100%)	TR_WKSP_DA	NCB	SPIU
2.3.3	Market studies (VCA + targeted, demand-driven as requested by firms)	Study	50000	1	1	100'000	IFAD_L (100%)	C_DA	NCB	SPIU
3.1	Policy Formulation									
3.1.1	International technical assistance	Pers.day		40	800	32,000	IFAD_L (100%)	C_EA	ICB	SPIU
3.1.2	National technical assistance	Pers.day		40	400	16,000	IFAD_L (100%)	C_EA	NCB	SPIU
4.1.	Project Management									
4.1.1	Vehicles	Number	45000	4		180'000	IFAD_L (100%)	VEHIC_DA	NCB	SPIU
4.1.2	Motorbikes	Number	4698	12		56'376	IFAD_L (100%)	EQ_MAT_DA	NCB	SPIU
4.1.3	Office materials	Number	4027	14		56'378	IFAD_L (100%)	EQ_MAT_DA	NCB	SPIU
4.1.4	Baseline survey	Number	100'000	1		100'000	IFAD_L (100%)	C_DA	NCB	SPIU

Appendix 9: Project cost and financing

A. INTRODUCTION

1. This Appendix addresses the costing of the Rwanda Dairy Development Project (RDDP). It provides the main underpinning assumptions as well as the summary and detailed cost tables. The costing exercise has been carried out using the Costab software¹ and is based on costs as at May 2016 during the 2nd design mission.

B. METHOD AND ASSUMPTIONS

2. The Project costs taken into account include investment costs and incremental operating costs within the four components: (i) Climate-smart dairy production intensification, (ii) Producer organization and value chain development; (iii) Institutional and policy development; and (iv) Project coordination and management.

3. Costs have been calculated on the basis of following assumptions:

- The presentation of the project to the IFAD's Board of Directors is scheduled for September 2016. It is estimated that RDDP could start its operations in early 2017, for a duration of six years.
- The base costs are broadly derived from the experience of the on-going IFAD projects in Rwanda, namely the Kirehe Community-based Watershed Management Project (KWAMP), the Project for Rural Income through Exports (PRICE) and the Climate Resilient Post-Harvest and Agribusiness Support Project (PASP).
- The project is to some extent flexible, as based on the participatory approach and the principle of intervention at request, in particular as regards the producer public private partnerships (4Ps). The estimated costs should thus be considered as indicative and mostly presented in terms of financial allocations by component, subcomponent or activity. Even when quantities and unit costs are indicated in the detailed tables, it is above all the overall allocation that should be considered. The detailed planning of activities and their implementation will be in response to requests from target groups and/or after needs assessment.
- Prices are inclusive of all taxes, i.e. including custom duties, Value Added Tax (VAT) and other sales taxes. The tax rates retained are similar to those used for the on-going projects mentioned above, as shown in the table 1 below.
- Base costs for goods and services purchased locally are derived from local sales prices (market prices), including all taxes as they are real costs for the project. Prices of goods and services are mostly expressed in foreign currency, albeit payable in Rwanda Franc (RwF). In light of the current inflation and forecast from the International Monetary Fund (IMF), an inflation rate of 5.0% has been used to deal with the rise in prices at local level.²
- Base costs for imported goods include CIF³ prices, duties, sales taxes and domestic value added, i.e. the costs of local handling, transportation, financial intermediation, margins of various actors in the supply chain, up to the delivery location. The international inflation applied to foreign exchange costs (FE) is based on the forecasted evolution of the Manufactures Unit Value (MUV) Index⁴ during the project implementation period (2% during 2017-2022).
- Price contingencies are intended for facing up to the effects of inflation and devaluation of the exchange rate between the Rwanda Franc (RwF) and the US dollar (USD). They are computed by Costab on the basis of the rates set forth for the inflation at national and international levels.
- Physical contingencies are intended for facing up to changes in quantities and/or methods of implementation of the project. They are expressed as a percentage of base costs and are applied on civil works. On the basis of PRICE experience, the physical contingencies are set to five percent for civil works.

¹ Costab is a software originally designed by the World Bank and FAO and used by a number of International Financing Institutions in preparing, organizing and analyzing project costs.

² International Monetary Fund, World Economic Outlook Database, October 2015

³ CIF (foreign costs, insurance and freight) - includes the foreign purchase price plus transportation costs to the port in the country of manufacture, insurance during shipment and the freight costs for transporting the goods to the port of entry).

⁴ World Bank, July 2014.

- The official exchange rate during the design mission is around RwF 745 for USD 1. In light of the past exchange rate movement in Rwanda, it is likely that this rate vary during the life of the project to reflect the significant difference between national and international inflation rates. Therefore, the option of Constant purchasing parity (CPP) has been used in the absence of reliable exchange rate forecast.¹
- The Foreign exchange (FE) represents the direct and indirect imported inputs embodied in the cost. The expenditure categories considered are in accordance with IFAD Circular IC/FOD/02/2013 on standardization of expenditures categories. Table 1 below lays out the expenditures categories and the percentages of physical contingencies, taxes and foreign exchange used, which are mainly derived from on-going IFAD projects in Rwanda.

Table 1: Expenditure categories

Expenditure category	Physical Cont.	Taxes (% of total)	For. ex.
Investment Costs			
Civil works	5%	18%	50%
Vehicles	0%	20%	70%
Equipment & Materials	0%	20%	70%
Goods & Services & Inputs	0%	15%	25%
Consultancies	0%	0%	50%
Training & Workshops	0%	0%	20%
Grants & Subsidies	0%	0%	0%
Recurrent Costs			
Salaries & Allowances	0%	0%	30%
Operating costs	0%	0%	30%

C. PROJECT COSTS

4. **Total costs.** The project total cost, including physical and price contingencies, is estimated at USD 65.1 million (RwF 51.2 billion) of which USD 62.7 million (RwF 46.7 billion) are baseline costs and USD 2.4 million (RwF 4.5 billion) are allowances for physical and price contingencies. The total cost includes taxes amounting USD 4.0 million (6% of total cost) and an amount of foreign exchange estimated at USD 17.3 million (27% of total cost). The investment and recurrent costs account respectively for 92% and 8% of the total cost.

5. **Costs by components.** The baseline cost broken down by project components is as follows: (i) Climate-smart dairy production intensification: USD 26.5 million (RwF 19.7 billion), representing 42% of total base cost; (ii) Producer organization and value chain development: USD 28.8 million (RwF 21.5 billion), representing 46% of total base cost; (iii) Institutional and policy development: USD 1.8 million (RwF 1.3 billion), representing 3% of total base cost; and (iv) Project coordination and management: USD 5.6 million (RwF 4.2 billion), representing 9% of total base cost. Table 2 below summarizes the costs by component and sub-component.

¹ These exchange rates would adjust perfectly for the difference between local and foreign inflation. Adding the impact of devaluation to the impact of foreign inflation would keep the relative costs of imported and locally manufactured goods constant and not affect local purchasing decisions", Introduction to Costab, the World Bank, September, 2007.

Table 2: Summary base costs by components

	(RwF Million)			(US\$ '000)			%	% Total
	Local	Foreign	Total	Local	Foreign	Total	Foreign Exchange	Base Costs
A. Climate-smart Dairy Production								
1. Knowledge, Attitudes and Behaviour	4 411,7	2 514,9	6 926,6	5 921,7	3 375,7	9 297,4	36	15
2. Sustainable Access to Public and Private Livestock Services	3 788,6	2 538,8	6 327,3	5 085,3	3 407,8	8 493,1	40	14
3. Asset Building and Climate-Smart Productivity	5 463,2	997,9	6 461,0	7 333,1	1 339,4	8 672,5	15	14
Subtotal Climate-smart Dairy Production	13 663,4	6 051,5	19 714,9	18 340,1	8 122,9	26 463,0	31	42
B. Producer Organization and Value Chain Development								
1. Organization and Capacity Building of Farmer Cooperatives	3 685,1	1 566,4	5 251,5	4 946,5	2 102,5	7 049,0	30	11
2. Investment in Milk Collection and Processing Infrastructure	1 342,9	2 562,4	3 905,3	1 802,6	3 439,4	5 242,0	66	8
3. Financing for Dairy Enterprise Development	11 994,5	340,4	12 334,9	16 100,1	456,9	16 556,9	3	26
Subtotal Producer Organization and Value Chain Development	17 022,6	4 469,1	21 491,7	22 849,2	5 998,8	28 847,9	21	46
C. Policy and Institutional Strengthening								
1. Policy Formulation	138,9	101,7	240,6	186,4	136,5	322,9	42	1
2. Policy Implementation and Institutional Strengthening	658,5	209,1	867,6	884,0	280,6	1 164,6	24	2
3. Policy Related knowledge management	168,8	63,2	232,0	226,5	84,8	311,4	27	-
Subtotal Policy and Institutional Strengthening	966,2	374,0	1 340,2	1 296,9	502,0	1 798,9	28	3
D. Project Coordination and Management								
1. Project Management	2 267,7	1 105,0	3 372,6	3 043,9	1 483,2	4 527,0	33	7
2. Monitoring and Evaluation	537,3	263,9	801,3	721,3	354,3	1 075,5	33	2
Subtotal Project Coordination and Management	2 805,0	1 368,9	4 173,9	3 765,1	1 837,4	5 602,6	33	9
Total BASELINE COSTS	34 457,2	12 263,4	46 720,7	46 251,3	16 461,0	62 712,3	26	100
Physical Contingencies	10,5	10,5	21,1	14,2	14,2	28,3	50	-
Price Contingencies	2 858,5	1 637,4	4 495,9	1 479,5	849,0	2 328,4	36	4
Total PROJECT COSTS	37 326,3	13 911,4	51 237,6	47 745,0	17 324,1	65 069,1	27	104

D. PROJECT FINANCING

6. The project will be financed by: (i) IFAD to the tune of USD 44.7 million (corresponding to 69% of total cost), through a highly concessional loan of USD 43.6 million and a grant of USD 1.1 million; (ii) Heifer International for USD 4.0 million (corresponding to 6% of total cost); (iii) Private sector/banks for USD 6.6 million (corresponding to 10% of total cost), (iv) Government of Rwanda for a total of USD 3.9 million (corresponding to 6% of total cost), which would be in terms of tax exemptions; and (iii) Beneficiaries for USD 5.9 million (corresponding to 9% of total cost). Table 3 below lays out the detailed financing arrangements.

Table 3: Project financing plan (USD'000)

	IFAD Loan		IFAD GRANT		Heifer International		Private/Banks		Beneficiaries		The Government		Total	
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
A. Climate-smart Dairy Production														
1. Knowledge, Attitudes and Behaviour	8 973,6	91,4	-	-	-	-	-	-	-	-	840,4	8,6	9 814,1	15,1
2. Sustainable Access to Public and Private Livestock Services	6 485,2	72,6	535,7	6,0	404,0	4,5	115,6	1,3	603,6	6,8	790,4	8,8	8 934,5	13,7
3. Asset Building and Climate-Smart Productivity	6 084,4	68,5	-	-	594,0	6,7	1 584,8	17,8	-	-	625,5	7,0	8 888,7	13,7
Subtotal Climate-smart Dairy Production	21 543,3	78,0	535,7	1,9	998,0	3,6	1 700,4	6,2	603,6	2,2	2 256,3	8,2	27 637,3	42,5
B. Producer Organization and Value Chain Development														
1. Organization and Capacity Building of Farmer Cooperatives	4 236,0	57,0	-	-	2 908,7	39,2	-	-	-	-	283,5	3,8	7 428,2	11,4
2. Investment in Milk Collection and Processing Infrastructure	3 146,2	56,7	344,7	6,2	90,2	1,6	-	-	928,2	16,7	1 036,7	18,7	5 546,0	8,5
3. Financing for Dairy Enterprise Development	7 368,1	44,3	-	-	-	-	4 866,7	29,2	4 400,0	26,4	11,7	0,1	16 646,5	25,6
Subtotal Producer Organization and Value Chain Development	14 750,2	49,8	344,7	1,2	2 998,9	10,1	4 866,7	16,4	5 328,2	18,0	1 332,0	4,5	29 620,7	45,5
C. Policy and Institutional Strengthening														
1. Policy Formulation	332,3	98,8	-	-	-	-	-	-	-	-	3,9	1,2	336,2	0,5
2. Policy Implementation and Institutional Strengthening	1 073,4	88,4	-	-	-	-	-	-	-	-	141,0	11,6	1 214,4	1,9
3. Policy Related knowledge management	65,8	20,7	210,3	66,3	-	-	-	-	-	-	41,3	13,0	317,3	0,5
Subtotal Policy and Institutional Strengthening	1 471,5	78,8	210,3	11,3	-	-	-	-	-	-	186,1	10,0	1 867,8	2,9
D. Project Coordination and Management														
1. Project Management	4 767,4	98,8	-	-	-	-	-	-	-	-	59,1	1,2	4 826,5	7,4
2. Monitoring and Evaluation	1 086,5	97,3	-	-	-	-	-	-	-	-	30,3	2,7	1 116,8	1,7
Subtotal Project Coordination and Management	5 853,8	98,5	-	-	-	-	-	-	-	-	89,4	1,5	5 943,3	9,1
Total PROJECT COSTS	43 618,8	67,0	1 090,7	1,7	3 996,9	6,1	6 567,1	10,1	5 931,8	9,1	3 863,9	5,9	65 069,1	100,0

7. The financing from IFAD broken down by expenditure category is shown in the following Table 4 which will help prepare the Annex II of the Loan Agreement.

Table 4: IFAD Financing by expenditure categories (USD'000)

	IFAD Loan		IFAD GRANT	
	Amount	%	Amount	%
1. WORKS	510,2	1%	-	0%
2. VEHICLES	145,4	0%	-	0%
3. EQUIPMENT & MATERIALS	5 095,1	12%	344,7	32%
4. GOODS, SERVICES & INPUTS	9 730,6	22%	210,3	19%
5. CONSULTANCIES	5 689,7	13%	535,7	49%
6. TRAINING & WORKSHOPS	9 724,1	22%	-	0%
7. GRANTS & SUBSIDIES	7 777,2	18%	-	0%
8. SALARIES & ALLOWANCES	3 737,9	9%	-	0%
9. OPERATING COSTS	1 208,6	3%	-	0%
Total PROJECT COSTS	43 618,8	100%	1 090,7	100%

Attachment 1. Other summary tables

Republic of Rwanda Rwanda Dairy Development Project Disbursement Accounts by Financiers (US\$ '000)																		
	Heifer														Local (Excl. Taxes)	Duties & Taxes		
	IFAD Loan		IFAD GRANT		International		Private/Banks		Beneficiaries		The Government		Total					
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%				
1. WORKS	510,2	82,0	-	-	-	-	-	-	-	-	112,0	18,0	622,2	1,0	311,1	199,1	112,0	
2. VEHICLES	145,4	80,0	-	-	-	-	-	-	-	-	36,4	20,0	181,8	0,3	127,3	18,2	36,4	
3. EQUIPMENT & MATERIALS	5 095,1	60,3	344,7	4,1	248,9	2,9	115,6	1,4	952,5	11,3	1 689,2	20,0	8 445,9	13,0	5 912,1	844,6	1 689,2	
4. GOODS, SERVICES & INPUTS	9 730,6	69,5	210,3	1,5	1 476,2	10,5	-	-	579,3	4,1	2 011,2	14,4	14 007,6	21,5	3 513,0	8 396,5	2 098,1	
5. CONSULTANCIES	5 689,7	77,3	535,7	7,3	1 133,6	15,4	-	-	-	-	0,0	-	7 359,0	11,3	3 740,2	3 618,7	-	
6. TRAINING & WORKSHOPS	9 724,1	89,4	-	-	1 138,2	10,5	-	-	-	-	15,2	0,1	10 877,4	16,7	2 236,4	8 625,9	15,2	
7. GRANTS & SUBSIDIES	7 777,2	41,7	-	-	-	-	6 451,5	34,6	4 400,0	23,6	-	-	18 628,7	28,6	-	18 628,7	-	
8. SALARIES & ALLOWANCES	3 737,9	100,0	-	-	-	-	-	-	-	-	0,0	-	3 737,9	5,7	1 121,4	2 616,6	-	
9. OPERATING COSTS	1 208,6	100,0	-	-	-	-	-	-	-	-	0,0	-	1 208,6	1,9	362,6	846,0	-	
Total PROJECT COSTS	43 618,8	67,0	1 090,7	1,7	3 996,9	6,1	6 567,1	10,1	5 931,8	9,1	3 863,9	5,9	65 069,1	100,0	17 324,1	43 794,2	3 950,8	

Republic of Rwanda Rwanda Dairy Development Project Project Components by Year -- Totals Including Continge. (US\$ '000)							
Totals Including Contingencies							
	2017	2018	2019	2020	2021	2022	Total
A. Climate-smart Dairy Production							
1. Knowledge, Attitudes and Behaviour	311,1	2 066,6	3 310,1	3 323,8	702,1	100,4	9 814,1
2. Sustainable Access to Public and Private Livestock Services	1 447,0	2 369,3	1 747,6	1 615,9	1 233,1	521,6	8 934,5
3. Asset Building and Climate-Smart Productivity	1 968,5	1 006,8	1 956,5	990,8	2 003,6	962,6	8 888,7
Subtotal Climate-smart Dairy Production	3 726,5	5 442,7	7 014,2	5 930,5	3 938,8	1 584,6	27 637,3
B. Producer Organization and Value Chain Development							
1. Organization and Capacity Building of Farmer Cooperatives	363,6	1 571,1	2 626,0	2 358,0	448,2	61,3	7 428,2
2. Investment in Milk Collection and Processing Infrastructure	90,9	1 202,8	2 390,1	1 588,4	273,9	-	5 546,0
3. Financing for Dairy Enterprise Development	396,1	2 074,3	5 808,0	5 027,5	3 340,5	-	16 646,5
Subtotal Producer Organization and Value Chain Development	850,6	4 848,1	10 824,0	8 974,0	4 062,6	61,3	29 620,7
C. Policy and Institutional Strengthening							
1. Policy Formulation	-	216,6	59,2	60,4	-	-	336,2
2. Policy Implementation and Institutional Strengthening	506,8	93,8	216,5	191,4	140,5	65,3	1 214,4
3. Policy Related knowledge management	257,9	26,8	-	21,4	-	11,2	317,3
Subtotal Policy and Institutional Strengthening	764,8	337,1	275,7	273,2	140,5	76,4	1 867,6
D. Project Coordination and Management							
1. Project Management	787,1	497,0	687,6	932,8	951,5	970,5	4 826,5
2. Monitoring and Evaluation	653,3	46,4	128,0	48,2	49,2	191,6	1 116,8
Subtotal Project Coordination and Management	1 440,4	543,4	815,6	981,1	1 000,7	1 162,1	5 943,3
TOTAL PROJECT COSTS	6 782,3	11 171,3	18 929,6	16 158,7	9 142,6	2 884,5	65 069,1

Republic of Rwanda Rwanda Dairy Development Project Expenditure Accounts by Years -- Totals Including Contingencies (US\$ '000)							
	Totals Including Contingencies						Total
	2017	2018	2019	2020	2021	2022	
I. Investment Costs							
WORKS	53,0	170,9	229,5	168,8	-	-	622,2
VEHICLES	181,8	-	-	-	-	-	181,8
EQUIPMENT & MATERIALS	1 089,7	1 846,2	3 078,2	2 114,8	316,9	-	8 445,9
GOODS & SERVICES & INPUTS	2 975,4	1 900,9	3 823,2	2 502,9	2 550,6	335,4	14 088,4
CONSULTANCIES	1 040,6	1 797,9	1 699,5	1 661,3	753,4	559,2	7 511,8
TRAINING & WORKSHOPS	970,0	2 443,7	3 166,2	3 326,5	594,9	142,4	10 643,8
GRANTS & SUBSIDIES	-	2 425,7	6 159,1	5 359,1	3 892,4	792,4	18 628,7
Total Investment Costs	6 310,6	10 585,4	18 155,6	15 133,4	8 108,2	1 829,4	60 122,5
II. Recurrent Costs							
A. SALARIES & ALLOWANCIES	371,4	378,8	555,7	794,7	810,6	826,8	3 737,9
B. OPERATING COSTS	100,3	207,1	218,3	230,7	223,8	228,3	1 208,6
Total Recurrent Costs	471,8	586,0	774,0	1 025,4	1 034,4	1 055,1	4 946,5
Total PROJECT COSTS	6 782,3	11 171,3	18 929,6	16 158,7	9 142,6	2 884,5	65 069,1

Republic of Rwanda									
Rwanda Dairy Development Project									
Disbursements by Semesters and Government Cash Flow									
(US\$ '000)									
	Financing Available						Costs to be	The Government	
	Heifer					Financed			
	IFAD Loan	IFAD GRANT	International	Private/Banks	Beneficiaries	Total	Project	Cash Flow	Cumulative
	Amount	Amount	Amount	Amount	Amount		Costs		
1	2 622,6	93,8	319,8	-	-	3 036,1	3 391,2	-355,1	-355,1
2	2 622,6	93,8	319,8	-	-	3 036,1	3 391,2	-355,1	-710,2
3	3 921,0	141,2	405,0	376,3	406,6	5 250,1	5 585,7	-335,6	-1 045,8
4	3 921,0	141,2	405,0	376,3	406,6	5 250,1	5 585,7	-335,6	-1 381,4
5	5 959,4	125,6	577,1	1 131,8	1 065,1	8 859,0	9 464,8	-605,8	-1 987,1
6	5 959,4	125,6	577,1	1 131,8	1 065,1	8 859,0	9 464,8	-605,8	-2 592,9
7	5 215,2	117,6	482,5	971,8	887,4	7 674,6	8 079,4	-404,7	-2 997,6
8	5 215,2	117,6	482,5	971,8	887,4	7 674,6	8 079,4	-404,7	-3 402,4
9	2 910,3	67,2	186,1	645,1	548,2	4 356,9	4 571,3	-214,4	-3 616,8
10	2 910,3	67,2	186,1	645,1	548,2	4 356,9	4 571,3	-214,4	-3 831,1
11	1 180,8	-	28,0	158,5	58,5	1 425,9	1 442,2	-16,4	-3 847,5
12	1 180,8	-	28,0	158,5	58,5	1 425,9	1 442,2	-16,4	-3 863,9
Total	43 618,8	1 090,7	3 996,9	6 567,1	5 931,8	61 205,2	65 069,1	-3 863,9	-3 863,9

A9-2: Detailed tables

Republic of Rwanda Rwanda Dairy Development Project Table 1.1. Knowledge, Attitudes and Behaviour Detailed Costs																		
	Unit	Quantities						Unit Cost	Unit Cost	Totals Including Contingencies (US\$ '000)								Fin. Rule
		2017	2018	2019	2020	2021	2022	Total	(RwF '000)	(US\$)	2017	2018	2019	2020	2021	2022	Total	
I. Investment Costs																		
A. Livestock Farmers'Field Schools																		
1. Preparation and production of training and learning materials																		
Coordination of L-FFS Manual Preparation (Intl Master Trainer)	pers.month	1	-	-	-	-	-	1	14.900	20.000	20,2	-	-	-	-	-	20,2	IFAD_L (100%)
National team	Lumpsum	1	-	-	-	-	-	1	7.450	10.000	10,1	-	-	-	-	-	10,1	IFAD_L (100%)
Coordination and Technical Committee (CTC) for the L-FFS	Lumpsum	1	1	1	1	1	1	6	1.863	2.500	2,5	2,6	2,6	2,7	2,7	2,8	15,9	IFAD_L (100%)
Workshop and retreat	Lumpsum	1	-	1	-	1	-	3	3.725	5.000	5,1	-	5,3	-	5,5	-	15,8	IFAD_L (100%)
Ad hoc National consultant	Month	12	12	6	6	-	-	36	2.608	3.500	42,4	43,3	22,1	22,5	-	-	130,3	IFAD_L (100%)
International consultant	pers.day	20	-	-	-	-	-	20	745	1.000	20,2	-	-	-	-	-	20,2	IFAD_L (100%)
Service provider (translation)	pers.day	30	-	-	-	-	-	30	149	200	6,1	-	-	-	-	-	6,1	IFAD_L (100%)
Service provider (printing)	Lumpsum	1	-	-	-	-	-	1	8.940	12.000	12,1	-	-	-	-	-	12,1	IFAD_L (100%)
Subtotal Preparation and production of training and learning materials											118,7	45,8	29,9	25,2	8,2	2,8	230,6	
2. Training of national Master Trainers (MT)																		
Selection of international MT	Lumpsum	1	-	-	-	-	-	1	745	1.000	1,0	-	-	-	-	-	1,0	IFAD_L (100%)
Selection of national MT	Lumpsum	1	-	-	-	-	-	1	745	1.000	1,0	-	-	-	-	-	1,0	IFAD_L (100%)
International MT (residency)	pers.month	-	6	-	-	-	-	6	14.900	20.000	-	123,6	-	-	-	-	123,6	IFAD_L (100%)
International MT (supervision missions)	pers.day	-	45	-	-	-	-	45	745	1.000	-	46,4	-	-	-	-	46,4	IFAD_L (100%)
Training National MT	Person	-	12	-	-	-	-	12	4.470	6.000	-	74,2	-	-	-	-	74,2	IFAD_L (100%)
Upgrade existing National MT	Person	-	5	-	-	-	-	5	2.235	3.000	-	15,5	-	-	-	-	15,5	IFAD_L (100%)
Study tour	Person	-	18	-	-	-	-	18	1.490	2.000	-	37,1	-	-	-	-	37,1	IFAD_L (100%)
Temporary staffs (8 compensatory)	pers.month	-	96	96	96	-	-	288	447	600	-	59,3	60,5	61,7	-	-	181,6	IFAD_L (100%)
Subtotal Training of national Master Trainers (MT)											2,0	356,0	60,5	61,7	-	-	480,3	
3. Training of FFS Facilitators																		
Selection of facilitators	Lumpsum	1	-	-	-	-	-	1	17.880	24.000	24,2	-	-	-	-	-	24,2	IFAD_L (100%)
TOT for facilitators	Person	-	200	220	220	-	-	640	2.235	3.000	-	618,1	693,5	707,4	-	-	2 019,1	IFAD_L (100%)
Compensation / Incitation for women participation in residential training (50%)	Lumpsum	-	100	110	110	-	-	320	112	150	-	15,5	17,3	17,7	-	-	50,5	IFAD_L (100%)
Subtotal Training of FFS Facilitators											24,2	633,6	710,9	725,1	-	-	2 093,8	
4. Support to FFS Implementation																		
Logistics	Year	1	1	1	1	1	1	6	11.175	15.000	15,2	15,5	15,8	16,1	16,4	16,7	95,6	IFAD_L (100%)
Selection of farm assistants	Lumpsum	-	1	1	-	-	-	2	8.940	12.000	-	12,4	12,6	-	-	-	25,0	IFAD_L (100%)
Selection of smallholder farmers	Lumpsum	1	1	1	1	-	-	4	8.940	12.000	12,1	12,4	12,6	12,9	-	-	50,0	IFAD_L (100%)
Facilitation for FFS facilitators (smallholders)	Pers.day	-	16 640	58 240	83 200	49 920	-	208 000	7	10	-	171,4	612,0	891,8	545,8	-	2 220,9	IFAD_L (100%)
Facilitation for FFS facilitators (farm assistants)	Pers.day	-	-	24 960	-	-	-	24 960	7	10	-	-	262,3	-	-	-	262,3	IFAD_L (100%)
Supervision of facilitators	pers.day	-	160	480	640	320	-	1 600	112	150	-	24,7	75,7	102,9	52,5	-	255,8	IFAD_L (100%)
FFS group starting capital	Lumpsum	-	640	1 280	1 280	-	-	3 200	373	500	-	329,7	672,5	686,0	-	-	1 688,1	IFAD_L (100%)
FFS group starting capital for farm assistants	Lumpsum	-	-	1 280	-	-	-	1 280	149	200	-	-	269,0	-	-	-	269,0	IFAD_L (100%)
Bicycles for facilitators	Number	320	320	-	-	-	-	640	112	150	48,5	49,4	-	-	-	-	97,9	IFAD_L (100%)
Subtotal Support to FFS Implementation											75,8	615,4	1 932,4	1 709,6	614,6	16,7	4 964,5	
Subtotal Livestock Farmers'Field Schools											220,7	1 650,9	2 733,8	2 521,6	622,8	19,5	7 769,3	
B. Gender Action Learning System (GALS)																		
1. GALS for very poor and poor HH																		
Training of the Masters L-FFS (ToT)	Person	16	-	-	-	-	-	16	745	1.000	16,2	-	-	-	-	-	16,2	IFAD_L (100%)
GALS for very poor and poor HH	Household	-	1 000	2 000	3 000	-	-	6 000	149	200	-	206,0	420,3	643,1	-	-	1 269,5	IFAD_L (100%)
Subtotal GALS for very poor and poor HH											16,2	206,0	420,3	643,1	-	-	1 285,6	
C. Knowledge Generation and dissemination																		
1. Technical Committee																		
Scientific Committee for Dairy Research (SCDR)	Lumpsum	1	1	1	1	1	1	6	1.863	2.500	2,5	2,6	2,6	2,7	2,7	2,8	15,9	IFAD_L (100%)
Workshop	Number	-	-	1	1	-	-	2	3.725	5.000	-	-	5,3	5,4	-	-	10,6	IFAD_L (100%)
Subtotal Technical Committee											2,5	2,6	7,9	8,0	2,7	2,8	26,5	
2. Priority Research in Dairy Production																		
a. Research in animal nutrition	Lumpsum	0,1	0,3	0,2	0,2	0,1	0,1	1	223.500	300.000	30,3	92,7	63,0	64,3	32,8	33,5	316,6	IFAD_L (100%)
b. Research in animal health	Lumpsum	0,1	0,3	0,2	0,2	0,1	0,1	1	111.750	150.000	15,2	46,4	31,5	32,2	16,4	16,7	158,3	IFAD_L (100%)
c. Research in animal genetic resources management	Lumpsum	0,1	0,3	0,2	0,2	0,1	0,1	1	111.750	150.000	15,2	46,4	31,5	32,2	16,4	16,7	158,3	IFAD_L (100%)
Subtotal Priority Research in Dairy Production											60,6	185,4	126,1	128,6	65,6	66,9	633,3	
3. Best Practices in Climate-Smart Livestock																		
Short Term National Consultancies	Lumpsum	1	1	1	1	-	-	4	2.235	3.000	3,0	3,1	3,2	3,2	-	-	12,5	IFAD_L (100%)
Peer-Reviewing with Int Organisation	Lumpsum	1	1	1	1	-	-	4	5.960	8.000	8,1	8,2	8,4	8,6	-	-	33,3	IFAD_L (100%)
Training material and ToT	Lumpsum	-	1	1	1	1	1	5	7.450	10.000	-	10,3	10,5	10,7	10,9	11,2	53,6	IFAD_L (100%)
Subtotal Best Practices in Climate-Smart Livestock											11,1	21,6	22,1	22,5	10,9	11,2	99,4	
Subtotal Knowledge Generation and dissemination											74,2	209,6	156,0	159,2	79,3	80,8	759,2	
Total											311,1	2 066,6	3 310,1	3 323,8	702,1	100,4	9 814,1	

Republic of Rwanda
RWANDA DAIRY DEVELOPMENT PROJECT
Detailed Design Report

Rwanda Dairy Development Project																		
Table 1.2. Sustainable Access to Public and Private Livestock Services																		
Detailed Costs																		
Unit	Quantities						Unit Cost (RwF '000)	Unit Cost (US\$)	Totals Including Contingencies (US\$ '000)						Fin. Rule			
	2017	2018	2019	2020	2021	2022			Total	2017	2018	2019	2020	2021		2022	Total	
I. Investment Costs																		
A. Improved animal nutrition and access to quality animal feed																		
1. Technical committee on animal nutrition (TC/AN)																		
Retreat /a	Lumpsum	2	2	2	2	2	2	12	1,863	2,500	5.1	5.2	5.3	5.4	5.5	5.6	31.9	IFAD_L (100%)
Workshop	Lumpsum	1	1	-	-	1	-	3	3,725	5,000	5.1	5.2	-	-	5.5	-	15.7	IFAD_L (100%)
Subtotal Technical committee on animal nutrition (TC/AN)																		
2. Feed formulation																		
Inventory of knowledge and locally available feed resources and action plan	pers.day	60	-	-	-	-	-	60	298	400	24.2	-	-	-	-	-	24.2	IFAD_L (50%); HI (50%)
Technical assistance for feed formulation	Pers.day	-	30	-	-	-	-	30	298	400	-	12.4	-	-	-	-	12.4	IFAD_L (100%)
Translation, duplication and diffusion of feed formulation incl.	Lumpsum	-	1	1	1	1	-	4	3,725	5,000	-	5.2	5.3	5.4	5.5	-	21.2	IFAD_L (50%); HI (50%)
Subtotal Feed formulation																		
3. Improved access to forage																		
Production of pre-basic and basic seeds and vegetative material (research)	Ha	-	15	15	15	-	-	45	56	75	-	1.2	1.2	1.2	-	-	3.5	IFAD_L (100%)
Production and duplication of training support and material for multipliers	Multiplier	450	450	-	-	-	-	900	4	5	2.3	2.3	-	-	-	-	4.6	IFAD_L (100%)
Training and advisory services to multipliers	Lumpsum	1	1	1	0.5	0.5	0.5	4.5	5,029	6,750	6.8	7.0	7.1	3.6	3.7	3.8	31.9	IFAD_L (100%)
Small equipment and initial capital for multipliers	Ha	-	450	450	-	-	-	900	19	25	-	11.8	11.8	-	-	-	23.4	IFAD_L (100%)
Awareness campaign on forage use	Lumpsum	-	1	1	1	1	1	5	2,235	3,000	-	3.1	3.2	3.2	3.3	3.3	16.1	IFAD_L (100%)
Subtotal Improved access to forage																		
4. Small-scale animal feed production units																		
Small-scale standard model Business plan Preparation (nat. cons.)	Day	-	30	-	-	-	-	30	298	400	-	12.4	-	-	-	-	12.4	IFAD_L (100%)
Promotion activities to L-FPS group to create micro-enterprises in feed preparation	Lumpsum	-	1	1	1	-	-	3	2,235	3,000	-	3.1	3.2	3.2	-	-	9.5	IFAD_L (100%)
Advisory services to feed processing micro-enterprises	Feed unit	-	-	5	10	10	-	25	1,118	1,500	-	-	7.9	16.1	16.4	-	40.4	IFAD_L (100%)
Lab equipment for animal feed quality control	Kit	1	-	1	-	-	-	2	14,900	20,000	20.2	-	-	-	-	-	20.2	IFAD_L (100%)
Regular Control of animal feed quality	Lumpsum	-	1	1	1	1	1	5	5,960	8,000	-	8.2	8.4	8.6	8.7	8.9	42.9	IFAD_L (100%)
Subtotal Small-scale animal feed production units																		
5. Prospective study: demand and supply for feed and GHD emission																		
Equipment and furniture for ARD / RAB	Lumpsum	1	-	-	-	-	-	1	7,450	10,000	10.1	-	-	-	-	-	10.1	IFAD_L (100%)
Livestock specialist (study coordinator)	Month	-	12	12	12	-	-	36	2,608	3,500	-	43.3	44.1	45.0	-	-	132.4	IFAD_L (100%)
Mid-time support	Month	-	10	10	10	-	-	30	2,608	3,500	-	36.1	36.8	37.5	-	-	110.3	IFAD_L (100%)
Field surveys	Lumpsum	-	2	1	1	-	-	4	11,175	15,000	-	15.5	15.8	-	-	-	31.2	IFAD_L (100%)
FAO Technical and Methodological support /b	pers.week	-	10	10	7	1	-	28	4,843	6,500	-	67.0	68.3	68.8	7.1	-	191.1	IFAD_G (100%)
Technical support (International) (incl. travel & DSA) /c	pers.week	-	10	10	8	-	-	28	5,888	7,500	-	77.3	78.8	64.3	-	-	220.4	IFAD_L (100%)
Presentation and duplication of the final report (incl. workshop)	Lumpsum	-	-	-	-	1	-	1	11,175	15,000	-	-	-	-	16.4	-	16.4	IFAD_L (100%)
Subtotal Prospective study: demand and supply for feed and GHD emission																		
Subtotal Improved animal nutrition and access to quality animal feed																		
B. Enhanced public and private animal health services																		
1. Enhanced diseases prevention and control and food safety																		
a. Enhanced prevention and control of major dairy-related diseases																		
Training of vet technicians	Person	175	175	-	-	-	-	350	503	675	119.3	121.7	-	-	-	-	241.0	IFAD_L (100%)
Motorcycles for districts DVMs /d	Number	-	12	-	-	-	-	12	1,118	1,500	-	18.5	-	-	-	-	18.5	IFAD_L (50%); PRIVATE (50%)
Motorcycles for sector vets /e	Number	-	175	-	-	-	-	175	1,118	1,500	-	270.4	-	-	-	-	270.4	IFAD_L (50%); PRIVATE (50%)
Equipment (kit for vet technicians)	Kit	175	-	-	-	-	-	175	894	1,200	212.1	-	-	-	-	-	212.1	IFAD_L (100%)
Brucellosis status (prevalence study)	Lumpsum	1	-	-	-	-	-	1	10,058	13,500	13.6	-	-	-	-	-	13.6	IFAD_L (100%)
Contingency plan for Brucellosis	Lumpsum	1	-	-	-	-	-	1	11,175	15,000	15.2	-	-	-	-	-	15.2	IFAD_L (100%)
Contingency plan for FMD	Lumpsum	-	1	-	-	-	-	1	11,175	15,000	-	15.5	-	-	-	-	15.5	IFAD_L (100%)
Vaccination Brucellosis	Lumpsum	-	1	1	-	-	-	2	215,044	288,650	-	297.4	303.3	-	-	-	600.7	IFAD_L (100%)
Vaccination FMD	Lumpsum	-	1	1	1	-	-	4	77,219	103,650	-	106.8	108.9	111.1	113.3	-	440.1	IFAD_L (100%)
Vaccination LSD	Lumpsum	-	1	1	1	-	-	4	140,135	188,100	-	193.8	197.7	201.6	205.6	-	798.7	IFAD_L (100%)
Diseases surveillance	Lumpsum	1	1	1	1	1	1	6	70,775	95,000	96.0	97.9	99.8	101.8	103.9	105.9	605.3	IFAD_L (100%)
Subtotal Enhanced prevention and control of major dairy-related diseases																		
b. Enhanced animal diseases diagnostic capacity																		
Rehabilitation of satellite laboratories	Lumpsum	-	1	1	-	-	-	2	5,960	8,000	-	8.7	8.8	-	-	-	17.5	IFAD_L (100%)
Training of ten (10) lab technicians	Lumpsum	1	-	-	1	-	-	2	26,075	35,000	35.4	-	-	37.5	-	-	72.9	IFAD_L (100%)
Training of two (2) lab technician abroad (Kenya)	Lumpsum	-	1	-	-	-	-	1	22,350	30,000	-	30.9	-	-	-	-	30.9	IFAD_L (100%)
Subtotal Enhanced animal diseases diagnostic capacity																		
c. Improve milk quality (safety standards) from farm to MCCs																		
Equip Rubriz National lab	Lumpsum	-	1	-	-	-	-	1	12,591	16,900	-	17.4	-	-	-	-	17.4	IFAD_L (100%)
Initial Training and refreshing courses for food safety agents	Lumpsum	40	-	40	-	-	-	80	186	250	10.1	-	10.5	-	-	-	20.6	IFAD_L (100%)
Food safety audits	Lumpsum	-	20	20	20	20	100	149	200	-	4.1	4.2	4.3	4.4	4.5	21.4	IFAD_L (100%)	
Equipment of satellite labs	Lumpsum	-	2	2	-	-	-	4	6,671	8,955	-	18.5	18.8	-	-	-	37.3	IFAD_L (100%)
Subtotal Improve milk quality (safety standards) from farm to MCCs																		
Subtotal Enhanced diseases prevention and control and food safety																		
2. Support to private proximity animal health services																		
Retreat and workshops of TC/AN	Lumpsum	1	1	-	1	-	-	3	3,725	5,000	5.1	5.2	-	5.4	-	-	15.6	IFAD_L (50%); HI (50%)
Consultancy services for implementation plan / concept	Lumpsum	1	-	-	-	-	-	1	14,900	20,000	20.2	-	-	-	-	-	20.2	IFAD_L (50%); HI (50%)
Selection candidates VD, AHW, awareness campaigns, guidance & supervision by	Lumpsum	2	1	1	1	1	1	7	2,235	3,000	6.1	3.1	3.2	3.2	3.3	3.3	22.1	IFAD_L (50%); HI (50%)
Service providers for preparation of AHWs/Manual and revision	Lumpsum	2	0.5	0.5	0.5	-	-	3.5	5,588	7,500	15.2	15.9	3.9	4.0	-	-	27.0	IFAD_L (50%); HI (50%)
Service provider (printing)	Lumpsum	30	30	30	200	-	-	290	112	150	4.5	4.6	4.7	32.2	-	-	46.1	IFAD_L (50%); HI (50%)
Initial training of DV & AHWs and refreshing course (session for 25 participants)	Session	-	1	1	1	2	2	7	4,470	6,000	-	6.2	6.3	6.4	13.1	13.4	45.4	IFAD_L (50%); HI (50%)
Kit for AHWs (incl. bicycle and cell phone)	Number	-	24	-	48	-	-	72	894	1,200	-	29.7	-	61.7	-	-	91.4	IFAD_L (50%); HI (50%)
Kit for VDs	Lumpsum	-	3	-	-	6	-	9	1,043	1,400	-	4.3	-	-	9.2	-	13.5	IFAD_L (50%); HI (50%)
Contribution to Sanitary Mandate (Pilot)	Lumpsum / Network	-	3	3	3	1.5	1.5	12	2,682	3,600	-	11.1	11.3	11.6	5.9	6.0	46.0	IFAD_L (100%)
Contribution to Sanitary Mandate (Up-scaling)	Lumpsum / Network	-	-	-	-	6	6	12	1,341	1,800	-	-	-	-	11.8	12.0	23.9	IFAD_L (100%)
Assessment of the pilot and scaling-up investment programme (Intl cons.)	Week	-	-	-	2	3	-	5	4,943	6,500	-	-	-	13.9	21.3	-	35.3	IFAD_L (100%)
Subtotal Support to private proximity animal health services																		
Subtotal Enhanced public and private animal health services																		
C. Improved Sustainable Access to Most Appropriate Animal Genetic Resources																		
1. Enhanced capacity of the Masaka Bul Station																		
Rehabilitation of installation	Lumpsum	0.5	0.5	-	-	-	-	1	74,500	100,000	53.0	54.1	-	-	-	-	107.1	IFAD_L (100%)
Upgrading lab equipment	Lumpsum	1	-	-	-	-	-	1	89,400	120,000	121.2	-	-	-	-	-	121.2	IFAD_L (100%)
Human resources capacity building	Lumpsum	-	1	1	1	1	5	5	3,725	5,000	-	5.2	5.3	5.4	5.5	5.6	26.8	IFAD_L (100%)
Acquisition of high genetic merit bulls	Bull	3	3	-	2	2	-	10	14,900	20,000	60.6	61.8	-	42.9	43.7	-	109.0	IFAD_L (100%)
Subtotal Enhanced capacity of the Masaka Bul Station																		
2. Breeding Programme for sustainable improvement and management of Ang																		
Establishment and support to stakeholders working group	Lumpsum	1	1	1	1	1	1	6	7,450	10,000	10.1	10.3	10.5	10.7	10.9	11.2	63.7	IFAD_L (100%)
Longitudinal study and genotyping study	Lumpsum	-	1	1	1	-	-	3	37,250	50,000	-	51.5	52.5	53.6	-	-	157.6	IFAD_L (100%)
Supervision of the study	Lumpsum	-	1	1	1	-	-	3	3,725	5,000	-	5.2	5.3	5.4	-	-	15.8	IFAD_L (100%)
Nat cons. Livestock specialist study coordinator (incl. local transport)	Month	-	12	12	12	-	-	36	2,980	4,000	-	49.4	50.4	51.4	-	-	151.3	IFAD_L (100%)
Ad-hoc national consultations (incl. transport)	Month	-	6	6	6	-	-	18	2,608	3,500	-	21.6	22.1	22.5	-	-	66.2	IFAD_L (100%)
FAO Technical and Methodological support (for breeding program and animal identi	Week	-	14	12	12	12	-	50	4,843	6,500	-	93.7	82.0	83.6	85.3	-	344.6	IFAD_G (100%)
Workshops on breeding Plan preparation and presentation of results	Lumpsum	-	1	-	-	1	-	2	18,625	25,000	-	25.8	-	-	27.3	-	53.1	IFAD_L (100%)
Production and Diffusion of the Breeding Plan	Lumpsum	-	-	-	-	1	-	1	11,175	15,000	-	-	-	-	16.4	-	16.4	IFAD_L (50%); HI (50%)
Implementation of pilot phase of Breeding Programme in two regions	Lumpsum	-	-	1	2	2	2	7	37,250	50,000	-	-	52.5	107.2	109.3	111.5	380.6	IFAD_L (100%)
Subtotal Breeding Programme for sustainable improvement and management																		
3. Enhanced Artificial Insemination and private AI services																		
Nitrogen Plant Equipment cand installation /g	Unit	1	-	-	-	-	-	1	372,500	500,000	505.0	-	-	-	-	-	505.0	IFAD_L (50%); HI (50%)
Tank for transport of nitrogen	Number	-	12	-	-	-	-	12	745	1,000	-	12.4	-	-	-	-	12.4	IFAD_L (50%); HI (50%)
Semen straws for AI	Straw	-	6 000	8 000	8 000	7 000	7 000	36 000	11	15	-	92.7	126.1	128.6	114.8	117.1	579.3	BENEFICIARIES (< 100% >; FT)
Audit of AI services (service provider)	Day	30	-	-	-	-	-	30	298	400	12.1	-	-	-	-	-	12.1	IFAD_L (100%)
Training of new private AI technicians /h	Session	-	2	2	2	2	-	8	4,470	6,000	-	12.4	12.6	12.9	13.1	-	51.0	IFAD_L (50%); HI (50%)
Kit for Private AI (incl. cell phone)	Lumpsum	-	40	40	40	40	-	160	1,043	1,400	-	57.7	58.8	60.0	61.2	-	237.8	IFAD_L (100%)
Refreshing courses for private AI technicians /i	Session	-	2	2	2	2	2	10	1,490	2,000	-	4.1	4.2	4.3	4.4	4.5	21.4	IFAD_L (50%); HI (50%)
Control performance AI public and private	Lumpsum	1	1	1	1	1	1	6	2,235	3,000	3.0	3.1	3.2	3.2	3.3	3.3	19.1	IFAD_L (100%)
Subtotal Enhanced Artificial Insemination and private AI services																		
4. Animal identification and performance recording system																		
Software adaptation and module development	Lumpsum	-	1	0.5	0.5	0.5	-	2.5	59,600	80,000	-	82.4	42.0	42.9	43.7	-	211.1	IFAD_L (100%)
Equipment (central and district level)	Unit	15	-	-	-	-	-	15	2,235	3,000	45.5	-	-	-	-	-	45.5	IFAD_L (100%)
Equipment - central Server database	Unit	1	-	-	-	-	-	1	7,450	10,000	10.1	-	-	-	-	-	10.1	IFAD_L (100%)
Training decentralized services (distric and central)	Session	-	2	1	1	-	-	4	3,725	5,000	-	10.3						

Republic of Rwanda
Rwanda Dairy Development Project
Table 1.3. Asset Building and Climate-Smart Productivity
Detailed Costs

	Unit	Quantities							Unit Cost (RwF '000)	Unit Cost (US\$)	Totals Including Contingencies (US\$ '000)							Fin. Rule
		2017	2018	2019	2020	2021	2022	Total			2017	2018	2019	2020	2021	2022	Total	
I. Investment Costs																		
A. Increased Asset in poor households																		
1. Support to Girinka																		
Farmers Identification and validation of lists of beneficiaries	Visit	500	250	250	250	250	-	1 500	1	2	1,0	0,5	0,5	0,5	0,5	-	3,1	IFAD_L (50%); HI (50%)
Farmers preparation (pre-placement training)	Smallholder	500	250	250	250	250	-	1 500	4	6	3,0	1,5	1,6	1,6	1,6	-	9,4	IFAD_L (50%); HI (50%)
Farmers inspection	Visit	500	250	250	250	250	-	1 500	1	2	1,0	0,5	0,5	0,5	0,5	-	3,1	IFAD_L (50%); HI (50%)
Support to shed construction /a	Lumpsum	500	250	250	250	250	-	1 500	89	120	60,6	30,9	31,5	32,2	32,8	-	188,0	IFAD_L (50%); HI (50%)
Procurement and distribution of cows	Heifer	2 000	-	1 000	-	1 000	-	4 000	685	920	1 858,4	-	966,7	-	1 005,8	-	3 830,9	IFAD_L (88%); HI (12%)
Scaling up the asset building (PoG)	Farmer	-	250	-	125	-	125	500	97	130	-	33,5	-	17,4	-	18,1	69,0	IFAD_L (50%); HI (50%)
Provision of basic vet drugs and other inputs	Lumpsum	500	-	250	-	250	-	1 000	57	76	38,4	-	20,0	-	20,8	-	79,1	IFAD_L (50%); HI (50%)
Post placement training	Farmer	-	500	250	250	250	250	1 500	3	4	-	2,1	1,1	1,1	1,1	1,1	6,4	IFAD_L (50%); HI (50%)
Incentive advisory services	Farmer	-	500	250	250	250	250	1 500	17	23	-	11,8	6,0	6,2	6,3	6,4	36,8	IFAD_L (50%); HI (50%)
Monitoring of performance	Lumpsum	1	1	1	1	1	1	6	4.470	6.000	6,1	6,2	6,3	6,4	6,6	6,7	38,2	IFAD_L (50%); HI (50%)
Subtotal Support to Girinka											1 968,5	87,1	1 034,3	65,9	1 076,0	32,3	4 264,1	
B. Increased Climate Smart Investment at farm-level																		
Support to preparation and implementation	Lumpsum	-	1	1	1	1	1	5	92.082	123.600	-	127,3	129,9	132,5	135,1	137,8	662,6	IFAD_L (100%)
Climate-Smart and Strategic investment (Matching Grant Fund)	Lumpsum	-	1	1	1	1	1	5	590.338	792.400	-	792,4	792,4	792,4	792,4	792,4	3 962,0	IFAD_L (60%); PRIVATE (40%)
Subtotal Increased Climate Smart Investment at farm-level											-	919,7	922,3	924,9	927,5	930,2	4 624,6	
Total											1 968,5	1 006,8	1 956,5	990,8	2 003,6	962,6	8 888,7	

\a In kind contribution from farmers + project support

Republic of Rwanda
Rwanda Dairy Development Project
Table 2.1. Organization and Capacity Building
Detailed Costs

Detailed Costs																			
									Unit Cost										
									(RwF	Unit Cost	Totals Including Contingencies (US\$ '000)								
	Unit	2017	2018	2019	2020	2021	2022	Total	'000)	(US\$)	2017	2018	2019	2020	2021	2022	Total	Fin. Rule	
I. Investment Costs																			
A. Organization and capacity building of dairy coops (primary & unions)																			
1. Capacity assessment and preparation of EDPs																			
Mapping and capacity assessment of all existing dairy cooperatives	Study	1	-	-	-	-	-	1	52.150	70.000	70,7	-	-	-	-	-	70,7	IFAD_L (50%); HI (50%)	
Formation and registration of coops not properly constituted and registered	Coop	-	30	22	-	-	-	52	1.863	2.500	-	77,3	57,8	-	-	-	135,1	IFAD_L (50%); HI (50%)	
Preparation of 5-year Business Plans (Primary cooperatives & unions)	Number	-	20	20	12	-	-	52	7.450	10.000	-	206,0	210,2	128,6	-	-	544,8	IFAD_L (50%); HI (50%)	
Subtotal Capacity assessment and preparation of EDPs											70,7	283,3	268,0	128,6	-	-	750,6		
2. Capacity building of dairy cooperatives																			
Establishment of governance and management structures & systems	Coop	-	20	20	12	-	-	52	3.725	5.000	-	103,0	105,1	64,3	-	-	272,4	IFAD_L (50%); HI (50%)	
Farmer mobilization, recruitment & establishment of representation structures	Coop	-	12	20	20	-	-	52	7.450	10.000	-	123,6	210,2	214,4	-	-	548,1	IFAD_L (50%); HI (50%)	
Capacity building on leadership and governance – across all structures of the coop	Coop	-	12	20	20	-	-	52	3.725	5.000	-	61,8	105,1	107,2	-	-	274,1	IFAD_L (50%); HI (50%)	
Capacity building on entrepreneurship, business and financial management	Coop	-	12	20	20	-	-	52	3.725	5.000	-	61,8	105,1	107,2	-	-	274,1	IFAD_L (50%); HI (50%)	
Subtotal Capacity building of dairy cooperatives											-	350,3	525,4	493,0	-	-	1 368,7		
3. Technical & management support in establishment of business service units																			
Milk collection and marketing	Coop	-	12	20	20	-	-	52	3.725	5.000	-	61,8	105,1	107,2	-	-	274,1	IFAD_L (50%); HI (50%)	
Processing	Coop	-	4	8	8	-	-	20	3.725	5.000	-	20,6	42,0	42,9	-	-	105,5	IFAD_L (50%); HI (50%)	
Input supply	Coop	-	10	20	20	10	-	60	3.725	5.000	-	51,5	105,1	107,2	54,7	-	318,4	IFAD_L (50%); HI (50%)	
AI, AH & Extension services	Coop	-	10	20	20	10	-	60	3.725	5.000	-	51,5	105,1	107,2	54,7	-	318,4	IFAD_L (50%); HI (50%)	
Financial services	Coop	-	10	20	20	10	-	60	3.725	5.000	-	51,5	105,1	107,2	54,7	-	318,4	IFAD_L (50%); HI (50%)	
Subtotal Technical & management support in establishment of business service units											-	236,9	462,4	471,6	164,0	-	1 334,9		
4. Agriculture Information Communication Technology for cooperatives																			
Assessment of available technologies	Study	1	-	-	-	-	-	1	22.350	30.000	30,3	-	-	-	-	-	30,3	IFAD_L (50%); HI (50%)	
Installation and training (including hardware)	Coop	-	12	20	15	5	-	52	7.450	10.000	-	123,6	210,2	160,8	54,7	-	549,2	IFAD_L (50%); HI (50%)	
Operational support for initial period	Coop	-	-	12	20	15	5	52	1.490	2.000	-	-	25,2	42,9	32,8	11,2	112,0	IFAD_L (50%); HI (50%)	
Subtotal Agriculture Information Communication Technology for cooperatives											30,3	123,6	235,4	203,6	87,5	11,2	691,6		
Subtotal Organization and capacity building of dairy coops (primary & unions)											101,0	994,1	1 491,1	1 296,9	251,4	11,2	4 145,7		
B. Organization and capacity building of milk collectors and traders																			
Mapping and capacity assessment of milk collectors and traders (national)	Study	1	-	-	-	-	-	1	44.700	60.000	60,6	-	-	-	-	-	60,6	IFAD_L (50%); HI (50%)	
Mobilization, formation and strengthening of sector associations	District	3	9	-	-	-	-	12	7.450	10.000	30,3	92,7	-	-	-	-	123,0	IFAD_L (50%); HI (50%)	
Training and capacity building of milk collectors and traders (at Cell level)	Group	-	120	140	140	-	-	400	745	1.000	-	123,6	147,1	150,1	-	-	420,8	IFAD_L (50%); HI (50%)	
Certification of milk zones and bars	Kiosk	-	800	2 000	2 000	1 200	-	6 000	37	50	-	41,2	105,1	107,2	65,6	-	319,1	IFAD_L (50%); HI (50%)	
Technical support in refinement of franchising model for milk zones/points /a	Lumpsum	1	2	1	-	-	-	4	14.900	20.000	20,2	41,2	21,0	-	-	-	82,4	IFAD_L (50%); HI (50%)	
Subtotal Organization and capacity building of milk collectors and traders											111,1	298,8	273,2	257,2	65,6	-	1 005,9		
C. Organization and capacity building of processors																			
Mapping of dairy processors and analysis of processing gap	Study	1	-	-	-	-	-	1	37.250	50.000	50,5	-	-	-	-	-	50,5	IFAD_L (50%); HI (50%)	
Mobilization, formation and strengthening of sector associations (district + national)	District	-	6	7	-	-	-	13	7.450	10.000	-	61,8	73,6	-	-	-	135,4	IFAD_L (50%); HI (50%)	
Capacity building in business and technical skills	Firm	-	40	80	80	-	-	200	745	1.000	-	41,2	84,1	85,7	-	-	211,0	IFAD_L (50%); HI (50%)	
Targeted technical and operational support for processors (competitive)	Firm	-	-	10	10	-	-	20	37.250	50.000	-	-	525,4	535,9	-	-	1 061,3	IFAD_L (100%)	
Subtotal Organization and capacity building of processors											50,5	103,0	683,0	621,7	-	-	1 458,2		
D. Support to national dairy federation and market expansion initiatives																			
Capacity building support to NDDFR	Lumpsum	1	1	1	1	1	-	5	37.250	50.000	50,5	51,5	52,5	53,6	54,7	-	262,8	IFAD_L (100%)	
Market studies (VCA + targeted, demand-driven as requested by firms)	Study	1	1	1	1	-	-	4	37.250	50.000	50,5	51,5	52,5	53,6	-	-	208,1	IFAD_L (50%); HI (50%)	
Domestic market promotion campaigns	Number	-	1	1	1	1	1	5	14.900	20.000	-	20,6	21,0	21,4	21,9	22,3	107,2	IFAD_L (50%); HI (50%)	
Targeted export market development support	Number	-	1	1	1	1	1	5	18.625	25.000	-	25,8	26,3	26,8	27,3	27,9	134,0	IFAD_L (50%); HI (50%)	
Market expansion trade fairs, study tours & exchange visits	Lumpsum	-	1	1	1	1	-	4	18.625	25.000	-	25,8	26,3	26,8	27,3	-	106,2	IFAD_L (51,5%); HI (48,5%)	
Subtotal Support to national dairy federation and market expansion initiatives											101,0	175,1	178,6	182,2	131,2	50,2	818,4		
Total											363,6	1 571,1	2 626,0	2 358,0	448,2	61,3	7 428,2		

/a Including financing arrangements) - linked to lead processors

Republic of Rwanda
Rwanda Dairy Development Project
Table 2.2. Investment in milk collection and processing infrastructure
Detailed Costs

	Unit	Quantities						Unit Cost	Unit Cost (US\$)	Totals Including Contingencies (US\$ '000)							Fin. Rule	
		2017	2018	2019	2020	2021	2022	Total		(RwF '000)	2017	2018	2019	2020	2021	2022		Total
I. Investment Costs																		
A. Milk collection and aggregation infrastructure																		
1. Milk collection infrastructure gaps assessment	Study	1	-	-	-	-	-	1	52.150	70.000	70,7	-	-	-	-	-	70,7	IFAD_L (100%)
2. Infrastructure upgrading for existing MCCs																		
Category 1	Number	-	10	10	5	-	-	25	32.780	44.000	-	453,3	462,4	235,8	-	-	1 151,4	IFAD_L (80%); BENEFICIARIES (20%)
Category 2	Number	-	5	15	5	-	-	25	38.740	52.000	-	267,9	819,6	278,7	-	-	1 366,2	IFAD_L (80%); BENEFICIARIES (20%)
Category 3	Number	-	-	1	1	-	-	2	38.740	52.000	-	-	54,6	55,7	-	-	110,4	IFAD_L (80%); BENEFICIARIES (20%)
Subtotal Infrastructure upgrading for existing MCCs																		
3. Infrastructure development for new MCCs	Number	-	-	3	3	-	-	6	96.850	130.000	-	721,1	1 336,6	570,2	-	-	2 628,0	
4. Infrastructure development for milk collection points	Number	-	50	50	50	50	-	200	2.421	3.250	-	167,4	170,8	174,2	177,7	-	690,0	IFAD_L (80%); BENEFICIARIES (20%)
Subtotal Milk collection and aggregation infrastructure																		
											70,7	888,5	1 917,2	1 162,4	177,7	-	4 216,5	
B. Milk processing and marketing infrastructure																		
1. Feasibility studies (targeted)	Study	1	2	1	1	-	-	5	14.900	20.000	20,2	41,2	21,0	21,4	-	-	103,9	IFAD_L (100%)
2. 4P partnership development	TA	-	1	1	1	-	-	3	7.450	10.000	-	10,3	10,5	10,7	-	-	31,5	IFAD_L (100%)
3. Infrastructure development	Firm	-	-	2	2	-	-	4	37.250	50.000	-	-	110,3	112,5	-	-	222,9	IFAD_L (100%)
4. Management support for operationalization	Firm	-	-	2	2	1	-	5	7.450	10.000	-	-	21,0	21,4	10,9	-	53,4	IFAD_L (100%)
5. Support in establishment of model milk kiosks/bars (inc. artisans)	Kiosks	-	30	70	70	30	-	200	745	1.000	-	30,9	73,6	75,0	32,8	-	212,3	IFAD_L (50%); HI (50%)
6. Pilot testing of market driving milk zones for institutions /a	Milk zone	-	10	10	10	4	-	34	8.940	12.000	-	123,6	126,1	128,6	52,5	-	430,8	IFAD_G (100%)
Subtotal Milk processing and marketing infrastructure																		
											20,2	206,0	362,5	369,8	96,2	-	1 054,8	
C. Rural access roads and spot improvements																		
1. Spot improvements	Spot	-	2	2	1	-	-	5	37.250	50.000	-	108,2	110,3	56,3	-	-	274,8	IFAD_L (100%)
Total											90,9	1 202,8	2 390,1	1 588,4	273,9	-	5 546,0	

a 24 schools, 10 health facilities

Republic of Rwanda Rwanda Dairy Development Project Table 2.3. Financing for enterprise development and market expansion Detailed Costs																	
Unit	Quantities						Unit Cost (RwF '000)	Unit Cost (US\$)	Totals Including Contingencies (US\$ '000)						Total	Fin. Rule	
	2017	2018	2019	2020	2021	2022			2017	2018	2019	2020	2021	2022			
I. Investment Costs																	
A. Facilitating access to financial services at dairy producer level																	
1. Financial literacy training																	
Farmer	-	6 000	14 000	14 000	6 000	-	40 000	19	25	-	154,5	367,8	375,1	164,0	-	1 061,4	IFAD_L (100%)
Person	-	800	2 400	3 000	2 800	-	9 000	19	25	-	20,6	63,0	80,4	76,5	-	240,6	IFAD_L (100%)
Subtotal Financial literacy training																	
2. Matching grant for enterprise development																	
Coop	-	4	16	12	8	-	40	149.000	200.000	-	800,0	3 200,0	2 400,0	1 600,0	-	8 000,0	IFAD_L (30%); BENEFICIARIES (< 30% >; FT); PRIVATE (< 40% >; FT)
Firm	-	-	4	4	2	-	10	248.333	333.333	-	-	1 333,3	1 333,3	666,7	-	3 333,3	IFAD_L (30%); BENEFICIARIES (< 20% >; FT); PRIVATE (< 50% >; FT)
Subtotal Matching grant for enterprise development																	
3. Dairy cow insurance																	
a. Trainings																	
Day	8	3	-	-	-	-	11	373	500	4,0	1,5	-	-	-	-	5,6	IFAD_L (100%)
Day	12	8	-	-	-	-	20	447	600	7,3	4,9	-	-	-	-	12,2	IFAD_L (100%)
Day	30	20	-	-	-	-	50	559	750	22,7	15,5	-	-	-	-	38,2	IFAD_L (100%)
Day	6	4	-	-	-	-	10	373	500	3,0	2,1	-	-	-	-	5,1	IFAD_L (100%)
Day	8	6	-	-	-	-	14	596	800	6,5	4,9	-	-	-	-	11,4	IFAD_L (100%)
Day	6	5	-	-	-	-	11	298	400	2,4	2,1	-	-	-	-	4,5	IFAD_L (100%)
Day	20	40	-	-	-	-	60	745	1.000	20,2	41,2	-	-	-	-	61,4	IFAD_L (100%)
Day	12	20	-	-	-	-	32	559	750	9,1	15,5	-	-	-	-	24,5	IFAD_L (100%)
Day	30	35	-	-	-	-	65	745	1.000	30,3	36,1	-	-	-	-	66,4	IFAD_L (100%)
Day	15	5	-	-	-	-	20	373	500	7,6	2,6	-	-	-	-	10,2	IFAD_L (100%)
Day	6	9	-	-	-	-	15	373	500	3,0	4,6	-	-	-	-	7,7	IFAD_L (100%)
Day	25	30	-	-	-	-	55	596	800	20,2	24,7	-	-	-	-	44,9	IFAD_L (100%)
Subtotal Trainings																	
b. Mobilization of beneficiaries																	
Lumpsum										3,2	2,6	-	-	-	-	5,8	IFAD_L (100%)
Day	10	6	-	-	-	-	16	894	1.200	12,1	7,4	-	-	-	-	19,5	IFAD_L (100%)
Lumpsum										3,5	2,1	-	-	-	-	5,6	IFAD_L (100%)
Event	5	3	-	-	-	-	8	1.490	2.000	10,1	6,2	-	-	-	-	16,3	IFAD_L (100%)
Session	10	15	-	-	-	-	25	373	500	5,1	7,7	-	-	-	-	12,8	IFAD_L (100%)
Session	3	3	-	-	-	-	6	1.490	2.000	6,1	6,2	-	-	-	-	12,2	IFAD_L (100%)
Subtotal Mobilization of beneficiaries																	
c. Studies and M&E																	
Day	25	10	-	-	-	-	35	186	250	6,3	2,6	-	-	-	-	8,9	IFAD_L (100%)
Day	45	15	-	-	-	-	60	186	250	11,4	3,9	-	-	-	-	15,2	IFAD_L (100%)
Day	5	5	-	-	-	-	10	373	500	2,5	2,6	-	-	-	-	5,1	IFAD_L (100%)
Day	5	5	-	-	-	-	10	373	500	2,5	2,6	-	-	-	-	5,1	IFAD_L (100%)
Day	30	30	-	-	-	-	60	373	500	15,2	15,5	-	-	-	-	30,6	IFAD_L (100%)
Day										2,0	2,1	-	-	-	-	4,1	IFAD_L (100%)
Subtotal Studies and M&E																	
d. National Technical assistance																	
Day	15	5	-	-	-	-	20	373	500	7,6	2,6	-	-	-	-	10,2	IFAD_L (100%)
Day	6	8	-	-	-	-	14	373	500	3,0	4,1	-	-	-	-	7,2	IFAD_L (100%)
Day	15	10	-	-	-	-	25	373	500	7,6	5,2	-	-	-	-	12,7	IFAD_L (100%)
Day	10	20	-	-	-	-	30	596	800	8,1	16,5	-	-	-	-	24,6	IFAD_L (100%)
Subtotal National Technical assistance																	
e. Pilot coordination at ACRE																	
Lumpsum										26,3	28,3	-	-	-	-	54,6	IFAD_L (100%)
Subtotal Dairy cow insurance																	
SACCO	-	5	10	5	-	-	20	745	1.000	-	5,2	10,5	5,4	-	-	21,0	IFAD_L (100%)
Subtotal Facilitating access to financial services at dairy producer level																	
B. Improving financial services for aggregators and traders in the dairy value chain																	
Pers.month	3	-	-	-	-	-	3	7.450	10.000	30,3	-	-	-	-	-	30,3	IFAD_L (100%)
Pers.month	5	-	-	-	-	-	5	7.450	10.000	50,5	-	-	-	-	-	50,5	IFAD_L (100%)
Pers.month	2	-	-	-	-	-	2	7.450	10.000	20,2	-	-	-	-	-	20,2	IFAD_L (100%)
Pers.month	4	-	-	-	-	-	4	7.450	10.000	40,4	-	-	-	-	-	40,4	IFAD_L (100%)
Milk zone	-	50	50	50	50	-	200	12.417	16.667	-	833,3	833,3	833,3	833,3	-	3 333,3	IFAD_L (60%); BENEFICIARIES (< 40% >; FT)
Subtotal Improving financial services for aggregators and traders in the dairy value chain																	
Total																	
141,4 833,3 833,3 833,3 833,3 - 3 474,7																	
396,1 2 074,3 5 808,0 5 027,5 3 340,5 - 16 646,5																	

/a Matching grants for financing dairy cooperative's business plans (30:30:40)

/b Matching grants for processing development under 4P (30:20:20:30)

/c Innovations development matching grants (60:40)

Republic of Rwanda
Rwanda Dairy Development Project
Table 3.1. Policy Formulation
Detailed Costs

									Unit Cost (RwF '000)	Unit Cost (US\$)	Totals Including Contingencies (US\$ '000)								
									</										

Republic of Rwanda
Rwanda Dairy Development Project
Table 3.2. Policy Implementation and Institutional Strengthening
Detailed Costs

	Unit	Quantities							Unit Cost (RwF '000)	Unit Cost (US\$)	Totals Including Contingencies (US\$ '000)							Total	Fin. Rule				
		2017	2018	2019	2020	2021	2022	Total			2017	2018	2019	2020	2021	2022							
I. Investment Costs																							
A. Support for decentralized policy implementation (milk hygiene)																							
1. Identification of beneficiaries (MCCS, Kiosks, small scale industries)																							
Perdiems	Days	128	-	-	-	-	-	128	40	54	6,9	-	-	-	-	-	6,9 IFAD_L (100%)						
Car hiring (transport)	Days	96	-	-	-	-	-	96	78	105	10,2	-	-	-	-	-	10,2 IFAD_L (100%)						
Communication fees	Lumpsum	1	-	-	-	-	-	1	320	430	0,4	-	-	-	-	-	0,4 IFAD_L (100%)						
Subtotal Identification of beneficiaries (MCCS, Kiosks, small scale industries)											17,5							-	-	-	-	-	17,5
2. Training of beneficiaries																							
Trainers' Perdiems /a	Days	330	-	-	-	-	-	330	40	54	17,9	-	-	-	-	-	17,9 IFAD_L (100%)						
Trainers' transport	MCC	66	-	-	-	-	-	66	78	105	7,0	-	-	-	-	-	7,0 IFAD_L (100%)						
Tea breaks /b	Person	660	-	-	-	-	-	660	3	4	2,9	-	-	-	-	-	2,9 IFAD_L (100%)						
Training materials	Lumpsum										5,1	-	-	-	-	-	5,1 IFAD_L (100%)						
Subtotal Training of beneficiaries											32,8							-	-	-	-	-	32,8
3. Pre-audit based on ministerial instructions																							
Perdiems	Days	500	-	-	-	-	-	500	40	54	27,1	-	-	-	-	-	27,1 IFAD_L (100%)						
Car hiring (transport)	Days	250	-	-	-	-	-	250	78	105	26,4	-	-	-	-	-	26,4 IFAD_L (100%)						
Communication fees	Lumpsum	1	-	-	-	-	-	1	320	430	0,4	-	-	-	-	-	0,4 IFAD_L (100%)						
Subtotal Pre-audit based on ministerial instructions											54,0							-	-	-	-	-	54,0
4. Full audit & sampling and testing																							
Perdiems	Days	500	500	500	500	500	500	3 000	40	54	27,1	27,7	28,2	28,8	29,3	29,9	171,0 IFAD_L (100%)						
Car hiring (transport)	Days	250	250	250	250	250	250	1 500	78	105	26,4	27,0	27,5	28,1	28,6	29,2	166,8 IFAD_L (100%)						
Communication fees	Lumpsum	1	1	1	1	1	1	6	320	430	0,4	0,4	0,5	0,5	0,5	0,5	2,7 IFAD_L (100%)						
Sampling and testing	Lumpsum										4,7	4,8	4,9	5,0	5,1	5,2	29,9 IFAD_L (100%)						
Certificates	Lumpsum										0,4	0,4	0,4	0,4	0,4	0,4	2,6 IFAD_L (100%)						
Subtotal Full audit & sampling and testing											59,1							60,3	61,5	62,8	64,0	65,3	373,0
Subtotal Support for decentralized policy implementation (milk hygiene)											163,4							60,3	61,5	62,8	64,0	65,3	477,3
B. Implementation of nutrition messaging	Lumpsum	-	-	0,4	0,4	0,2	-	1	186.250	250.000	-	-	105,1	107,2	54,7	-	266,9 IFAD_L (100%)						
C. Modules and receipts for nutition in dairy VC for FFS	Lumpsum	1	-	-	-	-	-	1	7.450	10.000	10,1	-	-	-	-	-	10,1 IFAD_L (100%)						
D. Other nutrition traning and messaging	Lumpsum	1	1	1	1	1	-	5	14.900	20.000	20,2	20,6	21,0	21,4	21,9	-	105,1 IFAD_L (100%)						
E. Capacity building for cooperatives & apex via RNDP																							
1. Creation / adaptation of training manuel for coop leaders	Lumpsum	1	-	-	-	-	-	1	7.450	10.000	10,1	-	-	-	-	-	10,1 IFAD_L (100%)						
2. Training for coop leaders and women and youth coop members	Number	-	5	10	-	-	-	15	1.863	2.500	-	12,9	26,3	-	-	-	39,1 IFAD_L (100%)						
3. Visits to other cooperatives for leaders (x 25 leaders)	Person	-	-	50	-	-	-	50	37	50	-	-	2,6	-	-	-	2,6 IFAD_L (100%)						
4. Support to RNDP - policy capacity																							
Training on policy for RNDP representation	Lumpsum	1	-	-	-	-	-	1	37.250	50.000	50,5	-	-	-	-	-	50,5 IFAD_L (100%)						
Monitoring and evaluation of policy framework	Lumpsum	1	-	-	-	-	-	1	37.250	50.000	50,5	-	-	-	-	-	50,5 IFAD_L (100%)						
Facilitation of participation of membership in policy processes	Lumpsum	1	-	-	-	-	-	1	37.250	50.000	50,5	-	-	-	-	-	50,5 IFAD_L (100%)						
Subtotal Support to RNDP - policy capacity											151,5							-	-	-	-	151,5	
5. Support to RCVD - strengthening of private animal health services																							
Training of private vets	Lumpsum	1	-	-	-	-	-	1	37.250	50.000	50,5	-	-	-	-	-	50,5 IFAD_L (100%)						
Monitoring and Evaluation of private vets	Lumpsum	1	-	-	-	-	-	1	37.250	50.000	50,5	-	-	-	-	-	50,5 IFAD_L (100%)						
Registration and Licencing of private vets	Lumpsum	1	-	-	-	-	-	1	37.250	50.000	50,5	-	-	-	-	-	50,5 IFAD_L (100%)						
Subtotal Support to RCVD - strengthening of private animal health services											151,5							-	-	-	-	151,5	
Subtotal Capacity building for cooperatives & apex via RNDP											313,1							12,9	28,9	-	-	354,9	
Total											506,8							93,8	216,5	191,4	140,5	65,3	1 214,4

\a 5 days/MCC
\b 10 persons / MMC and Kiosks

Republic of Rwanda
Rwanda Dairy Development Project
Table 3.3. Policy Related knowledge management
Detailed Costs

	Unit	Quantities						Unit Cost	Unit Cost (US\$)	Totals Including Contingencies (US\$ '000)							Fin. Rule	
		2017	2018	2019	2020	2021	2022	Total		(RwF '000)	2017	2018	2019	2020	2021	2022		Total
I. Investment Costs																		
A. One Cup pilot programme design and evaluation																		
Design and follow up of study	Lumpsum	1	-	-	-	-	-	1	14.900	20.000	20,2	-	-	-	-	-	20,2	IFAD_L (100%)
Pilot distribution to 36 schools with 200 pupils /a	Liter of milk	260 000	-	-	-	-	-	260 000	1	1	211,5	-	-	-	-	-	211,5	IFAD_G (92,5%); IFAD_L (7,5%)
Subtotal One Cup pilot programme design and evaluation											231,7	-	-	-	-	-	231,7	
B. Study on SMART Girinka	Lumpsum	-	-	-	-	-	1	1	7.450	10.000	-	-	-	-	-	11,2	11,2	IFAD_L (100%)
C. Study on agriculture gender strategy	Lumpsum	-	-	-	1	-	-	1	7.450	10.000	-	-	-	10,7	-	-	10,7	IFAD_L (100%)
D. Implementation LED strategy in dairy sector	Lumpsum	-	-	-	1	-	-	1	7.450	10.000	-	-	-	10,7	-	-	10,7	IFAD_L (100%)
E. FAO MAFAP studies on dairy policy	Person.week	4	4	-	-	-	-	8	4.843	6.500	26,3	26,8	-	-	-	-	53,0	IFAD_G (100%)
Total											257,9	26,8	-	21,4	-	11,2	317,3	

\a Cost per liter reduced to local purchase

Republic of Rwanda
RWANDA DAIRY DEVELOPMENT PROJECT
Detailed Design Report

Republic of Rwanda Rwanda Dairy Development Project Table 4.1. Project Management Detailed Costs																		
	Unit	Quantities						Unit Cost	Unit Cost (US\$)	Totals Including Contingencies (US\$ '000)							Fin. Rule	
		2017	2018	2019	2020	2021	2022	Total		(RwF '000)	2017	2018	2019	2020	2021	2022		Total
I. Investment Costs																		
A. Vehicles	Number	4	-	-	-	-	-	4	33.525	45.000	181,8	-	-	-	-	-	181,8 IFAD_L (100%)	
B. Motobikes	Number	12	-	-	-	-	-	12	3.500	4.698	56,9	-	-	-	-	-	56,9 IFAD_L (100%)	
C. Office materials	Number	14	-	-	-	-	-	14	3.000	4.027	56,9	-	-	-	-	-	56,9 IFAD_L (100%)	
D. Thematic trainings for gender specialist /a	Number	1	1	1	1	1	1	6	2.000	2.685	2,7	2,8	2,8	2,9	2,9	3,0	17,1 IFAD_L (100%)	
E. Gender awareness training for SPIU staff /b	Number	1	-	1	-	-	-	2	1.300	1.745	1,8	-	1,8	-	-	-	3,6 IFAD_L (100%)	
F. Gender awareness training for implementing partners /c	Number	1	-	1	-	-	-	2	1.750	2.349	2,4	-	2,5	-	-	-	4,8 IFAD_L (100%)	
G. Gender learning and sharing events /d	Number	1	1	1	1	1	1	6	2.000	2.685	2,7	2,8	2,8	2,9	2,9	3,0	17,1 IFAD_L (100%)	
H. SMART Girinka knowledge management	Lumpsum	1	1	1	1	1	1	6	7.450	10.000	10,1	10,3	10,5	10,7	10,9	11,2	63,7 IFAD_L (100%)	
Total Investment Costs											315,3	15,8	20,5	16,5	16,8	17,1	402,0	
II. Recurrent Costs																		
A. Salaries and Allowances																		
1. Salaries																		
a. New Staff																		
Program Manager	Pers.month	12	12	12	12	12	12	72	2.100	2.819	34,2	34,8	35,5	36,3	37,0	37,7	215,5 IFAD_L (100%)	
Farmers organization specialist	Pers.month	12	12	12	12	12	12	72	1.800	2.416	29,3	29,9	30,5	31,1	31,7	32,3	184,7 IFAD_L (100%)	
FFS specialist	Pers.month	12	12	12	12	12	12	72	1.800	2.416	29,3	29,9	30,5	31,1	31,7	32,3	184,7 IFAD_L (100%)	
Animal production specialist	Pers.month	12	12	12	12	12	12	72	1.800	2.416	29,3	29,9	30,5	31,1	31,7	32,3	184,7 IFAD_L (100%)	
Animal health specialist	Pers.month	12	12	12	12	12	12	72	1.800	2.416	29,3	29,9	30,5	31,1	31,7	32,3	184,7 IFAD_L (100%)	
Policy specialist	Pers.month	12	12	12	12	12	12	72	1.800	2.416	29,3	29,9	30,5	31,1	31,7	32,3	184,7 IFAD_L (100%)	
Market support specialist	Pers.month	12	12	12	12	12	12	72	1.800	2.416	29,3	29,9	30,5	31,1	31,7	32,3	184,7 IFAD_L (100%)	
Nutrition specialist	Pers.month	12	12	12	12	12	12	72	1.800	2.416	29,3	29,9	30,5	31,1	31,7	32,3	184,7 IFAD_L (100%)	
Accountant	Pers.month	12	12	12	12	12	12	72	1.600	2.148	26,0	26,6	27,1	27,6	28,2	28,7	164,2 IFAD_L (100%)	
Assistant procurement officer	Pers.month	12	12	12	12	12	12	72	1.600	2.148	26,0	26,6	27,1	27,6	28,2	28,7	164,2 IFAD_L (100%)	
M/E Assistant	Pers.month	12	12	12	12	12	12	72	1.600	2.148	26,0	26,6	27,1	27,6	28,2	28,7	164,2 IFAD_L (100%)	
Drivers	Pers.month	48	48	48	48	48	48	288	300	403	19,5	19,9	20,3	20,7	21,1	21,6	123,1 IFAD_L (100%)	
Subtotal New Staff											336,8	343,5	350,4	357,4	364,5	371,8	2 124,3	
b. Existing SPIU Staff																		
Coordinator of SPIU	Pers.month	-	-	-	12	12	12	36	2.900	3.893	-	-	-	50,1	51,1	52,1	153,2 IFAD_L (100%)	
Head of Finance	Pers.month	-	-	-	12	12	12	36	2.400	3.221	-	-	-	41,4	42,3	43,1	126,8 IFAD_L (100%)	
Head of Procurement	Pers.month	-	-	-	12	12	12	36	2.400	3.221	-	-	-	41,4	42,3	43,1	126,8 IFAD_L (100%)	
Head of M/E	Pers.month	-	-	12	12	12	12	48	2.400	3.221	-	-	40,6	41,4	42,3	43,1	167,4 IFAD_L (100%)	
Chief accountant	Pers.month	-	-	12	12	12	12	48	1.800	2.416	-	-	30,5	31,1	31,7	32,3	125,6 IFAD_L (100%)	
Access to finance specialist	Pers.month	-	-	-	12	12	12	36	1.800	2.416	-	-	-	31,1	31,7	32,3	95,1 IFAD_L (100%)	
Gender Specialist	Pers.month	-	-	-	12	12	12	36	1.800	2.416	-	-	-	31,1	31,7	32,3	95,1 IFAD_L (100%)	
Administration and logistic specialist	Pers.month	-	-	12	12	12	12	48	1.800	2.416	-	-	30,5	31,1	31,7	32,3	125,6 IFAD_L (100%)	
Knowledge management officer	Pers.month	-	-	-	12	12	12	36	1.900	2.550	-	-	-	32,8	33,5	34,1	100,4 IFAD_L (100%)	
Information technology officer	Pers.month	-	-	12	12	12	12	48	1.200	1.611	-	-	20,3	20,7	21,1	21,6	83,7 IFAD_L (100%)	
Internal auditor	Pers.month	-	-	12	12	12	12	48	1.600	2.148	-	-	27,1	27,6	28,2	28,7	111,6 IFAD_L (100%)	
Administration officer	Pers.month	-	-	12	12	12	12	48	600	805	-	-	10,2	10,4	10,6	10,8	41,9 IFAD_L (100%)	
Administrative assistant	Pers.month	-	-	12	12	12	12	48	600	805	-	-	10,2	10,4	10,6	10,8	41,9 IFAD_L (100%)	
Messenger	Pers.month	12	12	12	12	12	12	72	130	174	2,1	2,2	2,2	2,2	2,3	2,3	13,3 IFAD_L (100%)	
Subtotal Existing SPIU Staff											2,1	2,2	2,2	2,2	2,3	2,3	140,4	
Subtotal Salaries											338,9	345,6	352,8	360,1	366,8	374,1	3 532,7	
2. Field mission perdiems	Month	12	12	12	12	12	12	72	2.000	2.685	32,5	33,2	33,9	34,5	35,2	35,9	205,2 IFAD_L (100%)	
Subtotal Salaries and Allowances											371,4	378,8	386,7	394,7	402,0	410,0	3 737,9	
B. Operational costs																		
Operational costs for Vehicles /e	Vehicle	4	4	4	4	4	4	24	3.000	4.027	16,3	16,6	16,9	17,3	17,6	18,0	102,6 IFAD_L (100%)	
Operational costs for motobikes /f	Motobike	12	12	12	12	12	12	72	2.000	2.685	32,5	33,2	33,9	34,5	35,2	35,9	205,2 IFAD_L (100%)	
Communication fees /g	Lumpsum										21,7	22,2	22,6	23,0	23,4	23,9	190,5 IFAD_L (100%)	
Office running costs	Month	12	12	12	12	12	12	72	250	336	4,1	4,1	4,2	4,3	4,4	4,5	25,7 IFAD_L (100%)	
Vehicle hiring for Kigali	Month	12	12	12	12	12	12	72	1.500	2.013	24,4	24,9	25,4	25,9	26,4	26,9	153,9 IFAD_L (100%)	
Steering/technical comity meetings	Number	2	2	2	2	2	2	12	250	336	0,7	0,7	0,7	0,7	0,7	0,7	4,3 IFAD_L (100%)	
Inter comity meetings	Number	2	2	2	2	2	2	12	250	336	0,7	0,7	0,7	0,7	0,7	0,7	4,3 IFAD_L (100%)	
Subtotal Operational costs											100,3	102,4	111,4	121,7	124,1	126,6	686,5	
Total Recurrent Costs											471,8	481,2	497,1	516,4	526,1	534,4	4 424,5	
Total											787,1	497,0	687,6	932,8	951,5	970,5	4 826,5	

/a SPIU Gender specialist will participate in thematic trainings (Gender in: value chain, dairy sector, youth, etc.), 1 person, 8 days, inside or outside Rwanda

/b Gender awareness training for SPIU staff of RDDP, 10-15 technical specialists for all components, 3 days in Kigali

/c Training for staffs of RAB, HPI, other implementing agency or partner on IFAD Targeting and Gender Policies, approaches and tools, 10-15 person, 4 days

/d SPIU Gender specialist will attend learning events such as Procasur Learning routes, IFAD Gender Regional workshops, 1 person, 8 days, inside or outside Rwanda

/e Insurance, fuel and maintenance

/f Telephone recharges, 130,000 to 10,000 RwF/month for each staff member, depending on level of responsibility

Republic of Rwanda
Rwanda Dairy Development Project
Table 4.2. Monitoring and Evaluation
Detailed Costs

	Unit	Quantities						Unit Cost (RwF '000)	Unit Cost (US\$)	Totals Including Contingencies (US\$ '000)							Fin. Rule	
		2017	2018	2019	2020	2021	2022			Total	2017	2018	2019	2020	2021	2022		Total
I. Investment Costs																		
Baseline survey	Number	1	-	-	-	-	-	1	74.500	100.000	101,0	-	-	-	-	-	101,0	IFAD_L (100%)
Midterm survey	Number	-	-	1	-	-	-	1	37.250	50.000	-	-	52,5	-	-	-	52,5	IFAD_L (100%)
Completion survey	Number	-	-	-	-	-	1	1	74.500	100.000	-	-	-	-	-	111,5	111,5	IFAD_L (100%)
Gender studies for baseline, mid-term review and at completion	Number	1	-	1	-	-	1	3	20.000	26.846	27,1	-	28,2	-	-	29,9	85,3	IFAD_L (100%)
Set-up of electronic participatory M&E system and MIS	Lumpsum	1	-	-	-	-	-	1	149.000	200.000	202,0	-	-	-	-	-	202,0	IFAD_L (100%)
Knowledge Management	Lumpsum	1	1	1	1	1	1	6	33.525	45.000	45,5	46,4	47,3	48,2	49,2	50,2	286,7	IFAD_L (100%)
Study on climate-smart Girinka	Number	1	-	-	-	-	-	1	37.250	50.000	50,5	-	-	-	-	-	50,5	IFAD_L (100%)
Study on environment	Number	1	-	-	-	-	-	1	37.250	50.000	50,5	-	-	-	-	-	50,5	IFAD_L (100%)
Women's empowerment in agric index (WEAI)	Lumpsum	1	-	-	-	-	-	1	130.375	175.000	176,8	-	-	-	-	-	176,8	IFAD_L (100%)
Total											653,3	46,4	128,0	48,2	49,2	191,6	1 116,8	

Appendix 10: Economic and financial analysis

Introduction

1. This Appendix lays out the methodology, assumptions and results of the economic and financial analysis carried out to assess the impact and viability of RDDP. The aim is to identify, calculate and compare project costs and benefits and thereby assess its viability, first from the point of view of individual participants in the project (financial analysis) and then from the standpoint of the national economy as a whole (economic analysis).

2. The methodology used is the cost-benefit analysis which is based on the valuation in monetary terms of project costs and benefits. The analysis performed is based mainly on data collected from different stakeholders in the dairy value chain in Rwanda, as well as from the FAO's technical division in charge of animal production and health (AGA). The benefits accounted for in this economic and financial analysis (EFA) are those that are readily computable given the data available, deriving from dairy farming, milk collection and cooling, milk processing and marketing. It remains agreed that project benefits go beyond these, given the large array of activities to be implemented. Nonetheless, they can realistically be considered as enough to lead to a satisfactory estimate of the project profitability.

Project beneficiaries and benefits

3. The primary target group of the project comprises 95,500 poor rural households, of whom 80,000 are expected to be involved in dairy farming. The Project will: (i) improve the livelihoods (notably cash incomes, food security, nutrition, resilience to shocks) of beneficiaries; (ii) create further employment at farm level as well as in the rest of the dairy value chain; and (iii) increase tax revenue due to increased output of the dairy sector. The expected benefits would go beyond the project development objective (PDO) and intermediate results indicated in the results framework. The main economic benefits generated by the project would be as follows:

- Increased cash income, thanks to enhanced productivity as a result of the adoption of improved dairy farming practices and access to high-quality inputs and extension services, through the Hub Model approach;
- Enhanced nutrition and food security through increased milk quantity and quality, along with better access to social services such as education and health;
- Increased employment and business opportunities along the dairy value chain owing to the increase in the share of milk production that is marketed/processed as well as matching grants to develop public private partnership initiatives; and
- Increased taxes revenue and net foreign revenue stemming from reduced imports of dairy products and increased exports to neighbouring countries such as Burundi and Democratic Republic of Congo (DRC).

Financial Analysis

4. The primary aim of the financial analysis is to assess the impact of adoption of new technologies proposed by the project on the financial situation of its key stakeholders. It helps ensure that the target group has enough incentives to participate to the project activities. This requires that the operating revenues outstrip the operating costs, along with a higher financial return in the "with-project situation" than in the "without-project situation". This analysis is of paramount importance because the adoption by the target group of proposed technologies is essential to achieving the project objective.

5. The financial analysis has been undertaken for project activities that lend themselves to it and when sufficient data are available. It has been conducted from the standpoint of: (i) dairy farmer, (ii) milk collection centre, (iii) small-scale milk processor, and (iv) milk retail point. The analysis aims first at assessing the financial profitability of typical models and then at establishing that the financial situation is continuously balanced (net cash-flow positive). It should be noted that the financial models

have been developed solely for the purpose of the EFA analysis, as in practice farm's characteristics usually change from one place to another.

Dairy farmer

Methodology and assumptions

6. From the dairy farmer standpoint, the analysis has been carried out by means of the livestock herd growth model developed by CIRAD¹ (ALIVE+ EcoRum/LSIPT toolkit), which has been used to assess the economic and financial viability of many livestock projects in African countries. The model is designed for simulating bio-economic performances of herds of tropical domestic ruminants. It is built on Microsoft Excel and uses demographic equations to simulate livestock population dynamics over a given period of time. It calculates different livestock production outputs (live weights, meat, milk, skin and hides, manure) and financial outputs that can be used in the calculation of economic and financial performance indicators such as internal of return and net present value.

7. The analysis has been conducted for a typical beneficiary of RDDP rearing two cows under the “zero grazing” system which is the most widespread smallholder dairy farming system in Rwanda, in addition to being the one recommended by the Government for the whole country. Two farm models have been developed by the livestock specialist of the design mission on the basis of livestock practices in Rwanda: (i) local breed (*Ankole*) model, in which the farmer is assumed to rear local breed cows in the without-project situation, which will be replaced by cross breed cows through artificial insemination in the with-project situation; and (ii) model of crossed local breed with Frisian-Heifer, in which the farmer is assumed to rear cross breed cows both in the without-project and with-project situations, the increase in productivity in the with-project situation being expected only from the enhancement of animal husbandry practices, animal feed and health services. Details on these models can be found in the working paper 2 related to animal production (component 1).

8. In the model, cattle population is divided between females and males and in three age groups, juveniles, sub-adults and adults. Model parameters used comprise parturition rate, mortality rate, prolificacy rate, and offtake rate. Parturition rate is the percentage of reproductive females in the female population. Prolificacy rate is calculated as the average number of calves per birth. Mortality rates are calculated as the ratio of deaths in an age group to the total number of cattle in that group during the observation period. Besides, the model requires for each age and sex group data on importation of animals, weighs and prices of animals, derived products' yields (milk, hides, wool and manure), as well as feeding requirements. The models take into account the “with-project situation” and the “without-project situation”, the incremental being the project benefits, that can be financial or economic depending on the kind of analysis selected in the diagnostic spreadsheet.

9. In the “without-project situation”, due to low husbandry capacities and poor access to inputs (feed and health), dairy farmer faces low parturition rate and high mortality rate, as well as a low productivity of milk per cow. Moreover, the difficulty to sell raw milk at a remunerative price reduces his incentives to invest time and money in dairy farming. In addition to these common constraints, in the local breed model, farmer is assumed to rear local breed cows (*Ankole*) which are less productive.

10. In the “with-project situation”, dairy farmer is expected to increase his/her milk production thanks to better access to high-quality production inputs (including knowledge and changes in behaviour) and the availability of a more profitable and reliable market. For the local breed model, the replacement of local breed cows with cross breed cows would translate into a greater increase in productivity.

11. Inflows are composed of milk sales, milk consumed at home (self-consumption), cattle sales (offtake) and manure. Outflows are the costs of animal feeds (forage and concentrates), water, animal health inputs, labour and transport. The prices used in the financial analysis are the prices paid to farmers by MCCs. They have been collected from farmers and MCCs during the design mission.

¹ Agricultural Research Centre for International Development

12. In Rwanda, labour used in dairy farming is composed of both salaried and family labour. Salaried labour is mostly used for fetching fodder and water as well as milking. It is usually paid around RwF 12,000 to RwF 30,000 a month. The family labour is mainly used for feeding and supervising. In the without-project situation, it is estimated that dairy farmer spends on average 2 hours per day taking care of his animals. In the with-project situation, it has been assumed that he would spend 4 hours per day (half day) on dairy farming. In accordance with the approach used for other IFAD-funded projects, the family labour has been valued at its opportunity cost, assumed to be the daily wage of hired labour (1,000 RwF). Given that the herd model has no option for accounting for the family labour in the financial analysis, the family labour has been factored through the field "Salaried labour" of the dialog box, as the unit cost is assumed to be the same.

Results

13. The table below shows the results which are quite acceptable both for the local breed model and for the cross breed model. For the local breed model, the financial internal rate of return (FIRR) is 26.6% and the net present value (NPV) amounts USD 1,220, at an opportunity cost of 17% (average interest rate charged by local banks). For the cross breed model, the FIRR is 18.2% and the NPV is USD 180.

Table 1: Farm models - summary of financial analysis results

Models	FIRR	NPV (RwF)	NPV (USD)
Local breed model	43.4%	1,935,667	2,600
Cross breed model	22.6%	493,679	660

14. The financial profitability is greater for the local breed model than for the cross breed model. At first glance, this may seem inconsistent given that cross breed cows are more productive than local breed cows. But, it is worth remembering that in the local breed model, local breed cows are replaced by cross breed cows, which should translate into a higher incremental revenue from milk sales as a result of higher productivity. On the other hand, there is less room for milk productivity increase in the cross breed model since the breed enhancement is not a result of the project (the farmer has the cross breed cows in the without-project situation). These financial results are thus what should be expected, as in the financial and economic analysis what matters is the incremental net benefit, not (only) the net benefit.

Milk collection centre

Methodology and assumptions

15. The analysis undertaken consists of setting out and comparing annual expected income and expense streams (investment and operation costs) calculated from the standpoint of a MCC as an entity. Three operating models have been developed, consistently with the categorization of MCCs in Rwanda. As this project will support only existing MCCs, there is low requirement for additional investment in infrastructure and equipment for all the models, even though the categories 2 and 3 may be supported to acquire rust free metal cans for milk transport, in order to avoid the use of plastic jerry cans banned by the Government. The main difference between these models lays in the operations, as indicated below in light of information gathered during the design mission.

16. In the category 1 model, the MCC is assumed to operate quite well in the without-project situation, providing farmers with most of the services needed, including a veterinarian to assist in improving animal health and adopting artificial insemination. This service is so far free of charge since the farmer pays just the cost of inputs and transport. In the with-project situation, the MCC will increase the quantity of milk collected, from 4,000 litres/day at the first year to 4,500 litres/day at the second year, 5,000 litres/day at the third year, 5,500 litres/day at the fourth year and 6,000 litres/day at the fifth year.

17. In the category 2 model, the MCC is also assumed to operate well in the without-project situation, but only few services are provided to farmers. So, in this model, there is no veterinarian in

the without-project situation. But, in the with-project situation, the MCC will hire a veterinarian to support farmers. The quantity of milk collected will increase from 2,500 litres/day at the first year to 3,000 litres/day at the second year, 3,500 litres/day at the third year, 4,000 litres/day at the fourth year, 4,500 litres/day at the fifth year and 5,000 litres/day at the sixth year.

18. In the category 3 model, the MCC is not operating in the without-project situation. In the with-project situation, the MCC will start operating and the quantity of milk collected will increase from 3,000 litres/day at the second year to 3,500 litres/day at the third year, 4,000 litres/day at the fourth year, 4,500 litres/day at the fifth year and 5,000 litres/day at the sixth year.

19. In the with-project situation, all MCCs will have their organization and management capacities strengthened by the project. As a hub, each MCC will provide various services to farmers. Some activities like selling animal drugs and other commodities to farmers may generate additional income for MCC. These benefits have not been accounted for in the calculations but would have pulled upwards the financial benefits.

20. Two kind of calculations/presentations of revenue and expenditure have been carried out, an income statement to assess if the MCC is expected to make a profit over a 15-year period and a cash-flow statement to assess if the cumulated annual cash-flow is always positive (financial sustainability) and thereby establish the required credit conditions from a financial institution.

21. Outflows consist of investment and operating costs. The investment cost comprises the cost for infrastructure/equipment and for the incremental working capital whose stream is a real resource use. To be on the safe side, the working capital is assumed to be 45 days operating expenses². The incremental working capital needed during a year is entered at the end of the preceding year. In compliance with the accounting convention for farm investment analysis, the operating expenditures and benefits in year 1 generally remain the same as they were in the without-project situation, the production would not be affected until year 2³. In the without-project situation, in order to simplify models, investment costs are taken as zero, which is a conservative assumption given that they would have somewhat increased the project benefits. The incurred costs in the past for establishing the MCC are sunk costs, they have not been included in the cost because only future returns to future costs should be considered in the analysis.

22. Inflows are the milk sales to processors and the incremental residual value of the working capital. At the end of the project, the incremental working capital for each year is added together algebraically and taken out of the project as part of the residual value in the final year. Post-harvest losses during transport and milk handling have been considered because omitting them would have inevitably induced an overestimate of income. They are assumed to be 1%, which is still important since it is equivalent to up to 50 or 60 litres of milk per day per MCC.

23. The prices of milk used in the financial analysis correspond to those actually paid by MCCs to farmers and those paid by processors to MCCs (market prices). For the purpose of the analysis, average prices of 180 RwF and 210 RwF have been used respectively as the price paid by MCCs and by processors.

24. MCCs use hired labour which is paid monthly, usually comprising a manager/accountant, a sales manager/receptionist, a cleaner, a security guard and a veterinarian depending upon the level of services offered. The overall management of MCCs is mostly assured by farmer cooperatives through an elected voluntary board comprising a chairman, a vice-chairman, a secretary and 2 advisers and a supervising committee of 3 members.

² MCC are usually paid by processors twice or more per month.

³ The discounting process used in discounted cash-flow analysis implicitly assumes that every transaction falls at the end of the accounting period. This is accomplished when the initial investment is considered to take place at the end of year 1 of the project, regardless of whether it will actually take a full year or only a few weeks. Year 2, then, is the first accounting period in which increases in operating cost and incremental benefits occur. If all transactions are considered to fall at the end of the accounting period, then we must allow for the availability of the needed operating expenditure at the beginning of the production cycle (cf. J. PRICE GITTINGER, *Economic analysis of agricultural projects*, second edition, 1982, pp. 95-99).

25. In keeping with IFAD guidelines, a discount rate of 17% has been used in the financial analysis as the opportunity cost of capital for economic agent in Rwanda. This is the weighted average interest rate charged by commercial banks during the design mission.

26. It is to be noted that the analysis performed here is the assessment of the investment worth, which is the return to all resources engaged, whether coming from the MCC's own contribution or from a lending institution.

Results

27. On the basis of the above methodology and assumptions, investment and operating costs as well as incomes have been calculated in the without-project and in the with-project situations. Then, the net incomes have been calculated in the without-project and with-project situations by deducting for each year total cost from total income. The stream of incremental net income is then calculated by subtracting the net income in the without-project situation from the one in the with-project situation. In the early years of the with-project situation, the incremental net benefit is negative as investment is undertaken, allowing for the calculation of FIRR and NPV. Table 2 below lays out the financial results.

Table 2: Results of financial analysis for MCCs

Models	FIRR	NPV (RwF)	NPV (USD)	B/C
MCC category 1	28.7%	26,147,778	35,098	1.12
MCC category 2	25.4%	23,823,701	31,978	1.11
MCC category 3	34.7%	65,903,731	88,461	1.11

28. Under the assumptions made, the results show that milk collection is financially profitable for all categories of MCCs. The financial internal rate of return (FIRR) ranges from 25.4% to 34.7%. The net present value (NPV), at the opportunity cost of 17% over a 15-year period is positive in all models, ranging from 32,000 USD to 88,000 USD. The results are greater for category 3 MCC because it is not operating in the without-project situation, meaning that the income in the without-project situation is nil. Accordingly, in the with-project situation, all the net income would be incremental, which is not the case for MCCs in categories 1 and 2. The benefit/cost ratio (1.11) is low because of the nature of MCC's business, with a milk purchasing cost representing more than 90% of the total operating costs.

29. The cash-flow analysis conducted to assess the financial sustainability of the models shows that in the hypothesis of a project subsidy for investment in infrastructure/ equipment of 80%, the MCCs in categories 1 and 2 (that are already operating) will be able to pay back within just one year a loan equivalent to 20% of investment in infrastructure/equipment and the incremental working capital needed. But, the situation is quite different for a category 3 MCC. The need for incremental working capital for the first year of operation is around 35,000 USD, equivalent to more than 6 times the one for categories 1 and 2. As this MCC is not operating in the without-project situation, the incremental working capital is equivalent to the total working capital. Consequently, to achieve financial sustainability, a category 3 MCC needs, in addition to the project subsidy for investment of 80%, a loan of 45,000 USD to be paid back over a period of at least four years.

Small-scale processor

30. Upon request, MCCs with proven management capacities may be supported to process part of the milk collected in order to meet the local demand for processed milk, including for schools and other government institutions. This will help reduce transport cost, making processed milk available at local level at an affordable cost. The project support will be provided through the Public Private Partnership development window, subject to a proper design study of the micro-project. The current analysis is mainly based on IAKIB's milk transformation unit project. However, the assumptions regarding the unit prices of outputs and packaging materials have been adjusted to be more conservative so as to make the analysis more robust.

Methodology and assumptions

31. The analysis carried out aims at evaluating the profitability of processing activity separately from the usual activity of collecting and cooling which has been analysed above. The analysis involves the following four step process: (i) identifying the costs and benefits pertaining to the activity of processing; (ii) developing annual operating accounts over a 15-year period considered as the life period of the equipment to be acquired, (iii) computing of the FIRR and the NPV; and (iv) calculating the cash-flow after financing.

32. The costs accounted for in the calculations consist of the investment costs including the working capital⁴ and the operating costs. The latter comprise among others the cost of raw milk evaluated at the price at which MCCs sell milk to processors, the cost of packaging which is assumed to be between 40% and 50% of total operating costs⁵, and the labour cost which is entirely a hired labour.

33. The benefits expected from processing will derive from the sales of a range of milk products including: (i) pasteurized milk of which 90% will be sold in packs of 200 ml to 1,000 ml and 10% unpacked; (ii) skimmed milk of which 90% will be sold in packs of 200 ml to 1,000 ml and 10% unpacked; (iii) butter in packs of 500 mg and 1,000 mg; (iv) ghee in packs of 500 mg and 1,000 mg; and (v) and fresh cream in packs of 500 mg and 1,000 mg.

34. To be on the safe side, although the installed capacity is up to 15 000 litres of raw milk per day, it assumed that the unit will operate at 20% of its capacity at the second year, 40% at the third year and 60% at the fourth year and beyond. At start-up, the plant will daily process 3,000 litres of raw milk, of which 1,000 litres will be used to produce pasteurized milk (990 litres of pasteurized milk), 1,000 litres to produce skimmed milk (990 litres of skimmed milk), 500 litres to produce butter (30 kg of butter and 400 litres of skimmed milk), and 500 litres to produce ghee (30 kg of ghee and 400 litres of skimmed milk). The fresh cream daily production will be 30 kg and will not require extra raw milk.

35. The prices of milk products in Rwanda are freely set by the market although they tend to remain constant over the year and across the main competitors (notably Inyange and Crystal). The retail price of pasteurized unpacked milk (which is the dominant processed milk product) is RwF 400 per litre. To be on the safe side, the prices used in the analysis are lower than the prices applied by existing competitors. The prices used for the main inputs and outputs are as follows.

Table 3: Input and output prices used in small-scale processor model

Item	Unit	Financial Price
Outputs		
Skimmed milk		
Pack of 200 ml	Number	200
Pack of 500 ml	Number	360
Pack of 1000 ml	Number	640
Unpacked	Liter	240
Pasteurized milk		
Pack of 200 ml	Number	200
Pack of 500 ml	Number	360
Pack of 1000 ml	Number	640
Unpacked	Liter	240
Butter		
Pack of 500 mg	Number	1 200
Pack of 1000 mg	Number	2 200
Ghee		
Pack of 500 mg	Number	1 200
Pack of 1000 mg	Number	2 200
Fresh cream		

⁴ Equivalent to 15 days for raw milk and 6 months for other operating costs including packaging materials.

⁵ In light of the current high cost of packaging in Rwanda, the level of packaging materials costs used in the study of IAKIB's milk transformation unit seems too optimistic (less than 10% of operating cost)

Pack of 500 mg	Number	700
Pack of 1000 mg	Number	1 200
Inputs		
Raw milk	liter	210
Packaging materials		
Skimmed milk	Number	80
Pasteurized milk	Number	80
Butter and ghee	Number	200
Fresh cream	Number	200
Electricity	KWH	182
Water	Cubic meter	736
Fuel	Liter	820

36. In Rwanda, accounting depreciation of fixed assets is not allowable as a deduction for tax purposes. However, businesses are granted specified deductions, referred to as tax depreciation in respect of specified classes of assets⁶. In the analysis, the fiscal deductible depreciation has been calculated in order to compute the taxes to be paid. It should be noted this amount of deductible depreciation has been added back for the calculation of cash-flow to compute the FIRR and NPV.

Results

37. On the basis of the methodology and assumptions indicated above, it results that the activity of dairy processing by MCC is profitable. The FIRR and the NPV are respectively 48.5% and USD 2 million. It is agreed that the MCC should be able to address the issue of marketing of final products through a reliable network, especially as the local institutional demand may not be able to absorb all the production. This implies that the transformation units should be established close to areas with high consumption potential. Besides, it is to be noted that in practice it is likely that other MCCs may adopt a smaller size model, as the model prepared here is based on the case of IAKIB which is one of the best performing in the country.

Milk retail point

38. In order to make processed milk available to consumers at affordable price, Inyange and Crystal dairies have put in place a new retail point model, named respectively “milk zone” and “milk point”⁷. The retail point operates under a franchise arrangement between a processor and a trader committed to managing a milk kiosk under agreed conditions in terms of hygiene and marketing exclusivity. This model proves to be a promising option to address the issue of processed milk marketing as it helps reduce the production cost since it does not require packaging materials which account for close to half of the final product price. At request, the project may support the replication of this distribution business model through public-private partnerships, especially outside Kigali where it is not yet well established.

Methodology and assumptions

39. Using data collected from Inyange, Crystal and the retail points, an operating account of the model has been prepared for a 15-year period. The investment cost as well as the operating cost have been factored in the calculation of the micro-project cost. The investment to be made includes a milk cooling tank and a fridge for selling processor’s other products. The total price of a milk cooling tank with a capacity of 2,000 to 2,500 litres is around RwF 4.5 million, including the cost of installation and ancillary facilities. The operating cost consists of the cost of pasteurized milk and other products, the cost of electricity and water for cleaning the tank, the shop’s rent and the labour.

40. The processor delivers the fresh pasteurized milk at the retail point at the price of RwF 320 per litre. The selling price to the consumer of the pasteurized milk is RwF 400 per litre. The prices

⁶ 5% for buildings, 5% for plant equipment and 20% for office equipment.

⁷ Inyange and Crystal dairies have in Kigali a network of around 80 'Milk Zones' and 40 milk points respectively.

retained in the analysis are these market prices. The quantity of daily marketed milk is assumed to be 500 litres, which is achievable when the milk retail point is well located⁸.

41. The labour used is a mix of hired and family labour. It has been assumed that the business running requires two permanently hired persons (shopkeepers) and one family member for the management and supervision. The family labour has been accounted for in the calculations at the cost of hired labour which is estimated at RwF 80,000 per month.

Results

42. The FIRR and NPV are respectively 36.6% and RwF 8 million, meaning that the milk retail point model under the conditions specified above is financially viable. Of course, it should be located in a suitable place where it is possible to sell at least 450 to 500 litres of milk per day.

Economic Analysis

43. The economic analysis aims to assess the viability of the proposed project from the standpoint of the society as a whole. It is based on the aggregation of individual incremental net benefits calculated through the models developed in the financial analysis, subject to some adjustments highlighted hereafter and in accordance with the targets set in the logical framework.

Methodology and assumptions

44. Such as financial analysis, economic analysis is predicated on the comparison of the with-project situation to the without-project situation to measure the incremental benefits arising from the project. The methodology used is the cost-benefit analysis at shadow prices that better reflect the economic value to society of goods and services, often referred to as “economic opportunity costs” or “social opportunity costs”.

45. The analysis has been carried out for a 20-year period, corresponding to the likely life period of the benefits expected from the project. In keeping with IFAD guidelines, a 12.0% discount rate has been used to reflect the social opportunity cost of capital in Rwanda. This rate is the yield on the five-year government bonds in 2015 (National Bank of Rwanda)⁹.

46. The analysis has been done in domestic currency at domestic price level. A shadow exchange rate of 750 RwF for 1 USD has been used to reflect the opportunity cost of foreign exchange to the country. It has been calculated on the basis of data from the World Bank (WDI) according to the following formula.

$$SER = OER \cdot \frac{[(M + Tm) + (X - Tx)]}{(M + X)}$$

Where SER stands for shadow exchange rate,

OER stands for official exchange rate,

M stands for imports value,

Tm stands for tariff on imports,

X stands for exports value,

Tx stands for taxes on exports.

47. The financial prices and the streams of costs and benefits have been converted into economic values, by removing taxes, subsidies and other transfers, and using specific conversion

⁸ According to the marketing manager of Inyange and the milk zone visited, the tank of 2,500 litres is usually replenished each 3 to 4 days, meaning more than 500 litres per day.

⁹ The use of this rate has been discussed and agreed upon with the Chief economist at the Ministry of Finance and Economic Planning, during the design mission.

factors. A specific conversion factor for milk has been calculated (1,05) on the basis of data from OECD/FAO Agricultural Outlook 2015-2024 and the World Bank commodities price data (January 2016), using the import parity prices method. For hired labour, a specific conversion factor of 0.8 has been assumed to account for underemployment in rural area. For equipment, a conversion factor of 0.8 has also been retained to take into account taxes embodied in the financial prices.

Economic costs and benefits

48. The project economic costs have been generated with Costab software which deducts the amounts pertaining to taxes and provisions for price contingencies from the financial costs and applies the shadow exchange rate to convert the cost portion in foreign exchange into local currency. The four project components have been accounted for in the computation of the total economic cost. However, in order to avoid double counting, the amounts regarding the investments already taken into account in the financial models have been deducted from the total project cost¹⁰. The deduction was made directly in the Costab before computing the economic costs. Furthermore, it has been included an extra cost that will be financed by the government after the project implementation period to provide necessary advisory support to dairy farmers and their organizations. This cost has been estimated at 778 million RwF per year, equivalent to the economic cost of the component pertaining to project management during the last year of the implementation period.

49. The economic benefits accounted for in the calculation of economic profitability indicators are those that are readily quantifiable, deriving from dairy farming, milk collection and cooling, milk processing and marketing. They result from the increase in the production of milk and other livestock products at the farmer level (marketed and self-consumed) and the increase in the value-added generated along the rest of the dairy value chain.

50. The models developed in the financial analysis have been transformed into economic values using economic prices instead of financial prices as stated above. The total incremental economic benefits for each model have then been computed by multiplying the individual incremental economic benefits to the number of beneficiaries that are expected to adopt the improved practices proposed by the project. To take into account the fact that adoption of new practices is likely to be gradual and that for various reasons some beneficiaries may not even adopt, the following cumulative adoption rates have been assumed.

Table 4: Expected cumulative adoption rates

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6 - year 15
Farm models	0%	5%	10%	40%	60%	70%
MCC category 1	10%	30%	50%	80%	80%	80%
MCC category 2	10%	30%	50%	80%	80%	80%
MCC category 3	5%	10%	30%	50%	70%	70%
Milk retail point	0%	5%	10%	20%	50%	70%

51. The total project incremental benefits have then been calculated by summing up the aggregate incremental economic benefit pertaining to each model. Finally, the stream of economic costs (computed using Costab) have been deducted from the stream of total incremental economic benefits to get the stream of net incremental benefits, so as to compute the economic IRR and NPV.

Economic results and sensitivity analysis

52. The Project would yield an economic internal rate of return (EIRR) of 26.2 percent and a net present value (NPV) of USD 44.1 million at a twelve percent economic discount rate. The Project is therefore profitable from an economic standpoint. This result is quite satisfactory, especially as some

¹⁰ Costs of MCC infrastructures and equipment, 4P development, milk zones establishment

benefits have not even been taken into account in the calculations due to data shortage. These include the improvement of living conditions and nutrition, the positive spill-over effects of capacity building on the local economy (suppliers of inputs, equipment, services), especially for women and youth.

53. Furthermore, the sensitivity analysis carried out shows that the economic profitability of RDDP will remain satisfactory even if the project cost increases by 50%, the project benefits decrease by 50% or if the benefits lag behind by 2 years.

Table 5: Sensitivity analysis results

Indicators	Base case	Increase in project costs			Decrease in benefits			Delay of benefits	
		10%	20%	50%	-10%	-30%	-50%	1 year	2 years
EIRR	26.2%	24.3%	22.6%	18.4%	24.1%	19.3%	13.3%	22.1%	19.0%
NPV (USD million)	44.1	40.3	36.5	25.2	35.9	19.5	3.2	34.0	25.0

Fiscal impact of the project

54. The potential fiscal impact shall be positive, mainly due to: (i) increased output, income and employment, resulting in increased tax revenues; and (ii) multiplier effects due to increased economic activities within and outside the dairy value chain, resulting in sustained demand for goods and services, which is expected to have positive effects on income and employment.

Appendix 11: Mainstreaming nutrition into RDDP

1. Rwanda's economic growth as well as rural livelihoods continues to be largely supported by a robust performance in the agriculture sector. Despite the fact that 85% of households cultivate land and rely on agriculture livestock as their main and only livelihood activity, access to productive land is a problem which has direct implication on household food consumption score: the smaller the cultivated plot the more likely they are to have low food consumption score. About 60% of farming households cultivate plots smaller than 0.5 ha in steep slopes with poor soil fertility. According to the Comprehensive Food Security and Vulnerability Analysis and Nutrition Survey (CFSVA/NS) 2015, about 19% of the total households in Rwanda¹ are classified as food insecure with inadequate food consumption score before the harvest season, in particular.

2. **Causal factors of food insecurity.** Analysis from the CFSVA suggests that the lack of food availability does not seem to be driving food insecurity. Food production is increasing in Rwanda, markets are functioning and food is flowing easily within and outside the country thanks to the well-connected road network and market infrastructure. The food insecure families have the following characteristics: (i) They are dependent on a small number of livelihood activities; (ii) have limited access to main roads, market, hospital or other public infrastructure; and (iii) are households headed by those with low levels of literacy or the elderly. The survey illustrates that the higher the level of education of the household head, the lower the likelihood of the household having low food consumption score. Similarly, the lower the level of a mother's education the greater the chances of her having chronically malnourished (stunted) children.

3. **Nutrition status in Rwanda.** Chronic food and nutrition security remains one of the Rwanda's greatest human and economic development challenges². While there have been marked reductions in the prevalence of chronic malnutrition (stunting) over the last decade, the prevalence of stunting in Rwanda continues to be above the WHO high severity threshold and a major public health concern³. Almost 38% of children under 5 (600,000 children) are chronically malnourished (stunted): very high stunting level (>40%) persists in one of three districts of Rwanda, and only three districts have the stunting rate of below 30%. In addition, overall, 37% of children suffered from some degree of anemia⁴ and the prevalence of anemia decreases with age, ranging from a high of 66% among children age 6-11 months to a low of 21% among children age 48-59 months (CFSVA 2015). Further, iron deficiency is a major cause of anemia and is a contributor of adverse pregnancy outcomes, impaired physical and cognitive development, increased risk of morbidity and decreased work productivity. The NFNS Plan 2013-2018 takes into account the severe issue around anemia among pregnant women that can lead to poor growth of the fetus during pregnancy.

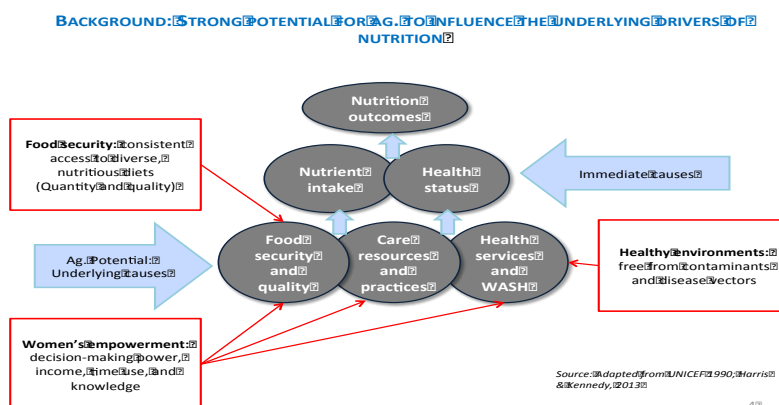
4. **Causal factors of undernutrition – multi-sectoral agenda.** Overall, the high prevalence of undernutrition in Rwanda has multiple causal factors: food insecurity (especially due to seasonality); rising food prices, poor dietary diversity; poor access to water and sanitation; infections (especially from diarrhea and malaria); poor maternal nutrition; and poor infant and young child feeding practices. Three major underlying causes of malnutrition based on the UNICEF diagram below is critical to improving undernutrition, and none of them alone is sufficient to solve the whole problem.

¹ Among food insecure households, 17% are moderately food insecure and 2% are severely food insecure.

² In this paper, **stunting** is referred to as "chronic malnutrition or chronic undernutrition" and **wasting** as "acute malnutrition acute undernutrition".

³ RDHS 2014/2015 and CFSVA 2012

⁴ 21% were classified as mildly anaemic, 15% were moderately anaemic and less than 1% was severely anaemic.



5. Two immediate causal factors of undernutrition that directly have impact on the nutritional status in children, are individual food intake and health status (infectious diseases). The food consumption score collected by the CFSVA 2015 reflects food intake at the household level is closely related with household food access. This means that the household food consumption contributes to the explanation of the nutritional status of the household members older than two years. In addition to the household food consumption pattern, other potential impact on the nutritional status of children include hygiene & sanitation practices and care which directly affects the nutritional and health status of children. Underlying causes of malnutrition, on the other hand, are the followings: Household food insecurity; Inappropriate care for children and women; and inadequate access to clean water and hygiene.

6. Stunting is a serious and persistent concern with various causal factors and socio-cultural elements in Rwanda. In order to reverse the situation, causes behind the high prevalence of chronic malnutrition among infants and young children are yet to be explored through analysis on dietary pattern and food system of each district. Various data on food and nutrition insecurity that are regularly gathered and updated for the CFSVA/NS suggests that two immediate causes of child and maternal undernutrition: inadequate dietary intake and diseases (infections). To tackle these fundamental challenges that the country is facing, the National Food and Nutrition Policy (NFP 2013-2018) includes two crucial causal factors to give special attention to: the poor health and nutrition status of mothers (e.g. early pregnancies intra-uterine growth development of children), and poor infant care practices (exclusive breastfeeding until 6 months, breastfeeding and complementary feeding 6-23 months).

Nutrition agenda in Rwanda: Policies, strategies and stakeholders

7. **Nutrition governance in Rwanda:** Nutrition governance in Rwanda has been strongly supported by the President Kagame who is committed to continue fighting malnutrition among children. In June 2010, the National Multi-sectoral Strategy to Eliminate Malnutrition (NSEM) with its 3-year Action Plan⁵ (2010-2013) was prepared to aim at reducing by 30% all forms of malnutrition in Rwanda by 2013. Rwanda joined the SUN Movement in 2011 and appointed Ministry of Health (MISANTE) as the SUN Focal Point who provides overall coordination for implementing the NSEM 2010-2013 and its Action Plan (Comprehensive Joint Action Plan to Eliminate Malnutrition). Several multi-stakeholder platforms have been set up National Food and Nutrition Technical Working Group among several multi-stakeholder platforms was set up in 2013 as a multi-sectoral nutrition coordination platform.

8. In order to address and accelerate the reduction rate of stunting by scaling up necessary nutrition sensitive actions, all the core national strategies elaborate the importance of multi-sectoral efforts: Economic Development and Poverty Reduction Strategy (EDPRS) 2, the Third Rwandan Health Sector Strategic Plan (HSSP III, 2012-2018), the National Food and Nutrition Policy and the

⁵ Comprehensive Joint Action Plan to Eliminate Malnutrition.

⁶ MINAGRI (2013), MINAGRI Nutrition Action Plan 2013-2018.

National Food and Nutrition Strategic Plan (NFNS) 2013-2018. The high-level policy documents, Rwanda VISION 2020 and Economic Development and Poverty Reduction Strategy 2, recognize that despite major economic and poverty reduction progress, improving in household nutrition security remains a bottleneck of poverty reduction. Under the Rwanda NFNP 2013-2018, Rwanda has engaged seven key social cluster ministries to update the “Joint Action Plan to Eliminate Malnutrition (JAPEN)” which is the common results framework for implementation. The NFNP 2013-2018 aims to reduce stunting by 2018 and priorities of the UN Development Assistance Program have been in align with NFNP.

9. At district level, in accordance with the National Decentralization Policy, and its strategic framework, multi-sectoral committees to eliminate malnutrition at all level were established to coordinate the implementation of the district plan under the leadership of District Mayor⁷. Nutrition programs are decentralized through District Action Plans to Eliminate Malnutrition (DPEM) and Joint Action Development Forum District Levels (JADF) that are led by Ministry of Health. Outcomes of interviews conducted during the IFAD design mission (December 2015) pointed out that despite of the well-structured nutrition governance mechanisms at both national and district level, actual coordination efforts on nutrition-sensitive interventions (vs. nutrition intervention) have been a big challenge among the six social-cluster governmental officials. In particular, among the Ministry of Agriculture officials, there still exists a notion that “nutrition” agenda should be sorted out by the Ministry of Health.

10. **Collaboration and active partnerships**⁸: In order to make a steady progress on the priority national agenda on nutrition security, it is imperative to coordinate and harmonize multi-sectoral efforts among various ministries at all levels. The NENP, in fact, is co-owned by MINAGRI, MINISANTE and Ministry of Local Government (MINALOC); and major responsibilities of Strategic Directions are under the responsibility of MINISANTE, MINAGRI and Ministry of Gender and Family Promotion (MIGEPRO), Ministry of Education (MINEDUC) and Ministry of Disaster Management and Refuges (MIDIMAR) with active collaboration with other Social Cluster ministries and Development Partners. The key challenge of co-responsibility to address the national priorities of EDPRS 2 is appropriate mechanism to share both cost implication and human resource allocation based on each Ministry’s mandate, responsibilities and human resources.

11. **MINAGRI’s role**: Agriculture has an essential role to play in overcoming these barriers and enabling Rwandan households to improve the quality of their diets in particular for women and children, and thereby improve nutrition status in the country. In particular, agriculture is vital in improving the following outcomes: women’s and children’s diet quality and quantity, prevalence of micronutrient deficiencies (e.g. anemia) and seasonal prevalence of acute undernutrition (wasting).

- *MINAGRI Nutrition Action Plan (NAP) 2015-2016*: In order to tackle its food insecurity and malnutrition issues, the NAP 2015-2016 elaborates specific nutrition sensitive agriculture interventions with explicit nutrition-related objectives and specific indicators. The target group of the NAP is food insecure rural households, female-headed households, poor farmers and smallholders. In order to achieve the MDG target of less than 24.5% of chronic malnutrition prevalence by 2015, specific vulnerable groups such as infants and young children, women in reproductive age have been targeted. In addition, a gender-responsive approach has been adopted throughout the formulation of the plan to ensure the achievement of program and policy goals. Currently, key interventions planned under the MINAGRI NAP have been integrated into the NFNP and National Food and Nutrition Strategic Plan (NFNSP) under “Strategic Direction 3: Promote services and practices that result in improved households food security”, recognizing the close linkages between adequate nutrition and food security at household level⁹.

⁷ National Joint Supervision on District Plan to Eliminate Malnutrition (DPEM) Draft Report, June 2012, Ministry of Health..

⁸ Republic of Rwanda (2014), National Food and Nutrition Policy 2013-2018.

⁹ MINAGRI (2015), Operational and M&E Plan of MINAGRI Nutrition Action Plan (NAP), Jan 2015-June 2016.

- *Rwanda National Dairy Strategy (NDS) 2013*¹⁰: In align with the PSTA-III and EDPRS, NDS aims to contribute to overall national poverty reduction as a roadmap to identify potential roadblocks and to prepare for removing them. The strategies for implementation are formulated within an environment of public-private partnership (PPP) in close multi-sectoral collaboration among MINAGRI and the Ministry of Trade and Industry (MINICOM). Without this strong PPP, there will certainly be a disconnect between production and marketing including nutrition education and dairy promotion campaign, both within the GOR as well as between the GOR and the private sector.

12. With regard to the promotion program on increasing milk consumption, under the NDS 2013, a comprehensive dairy nutrition education targeting women and children about the importance of dairy in their diet has been developed within the MINEDUC and the MINISANTE. In the close collaboration with MINAGRI and MINEDUC, MINISANTE takes the lead on the health and nutrition activities. On the other hand, Rwanda Agricultural Board under the MINAGRI coordinates to scale-up on-going school milk program with expansion of coverage and number of pupils (with the national budget allocation of USD 3,090,000).

13. **Strategic view on milk for health promotion through balanced diet:** Milk¹¹ is an excellent source of both macro- and micronutrient: high in energy, lipids, and high-quality proteins as well as calcium, vitamin A, riboflavin and vitamin B12 which are critical nutrients for physical growth and development (Hoppe et al, 2008¹²). It has been widely recognized that under nutrition during the first two years of life (the first 1,000 days window of opportunity) is a strong predictor of child mortality (Black et al., 2008¹³). Further, undernutrition during this critical period determines long-term, irreversible serious health and developmental consequences (Victoria et al., 2008¹⁴). Despite of the fact that milk appears to be one of the potential accessible nutritious food items as animal protein source¹⁵ for the rural food-insecure population in Rwanda, per capita consumption of milk in Rwanda is estimated to be 64 litres per year in 2015. Within the ordinary dietary pattern of Rwandan people, only one third of population consumes milk, dependent on a variety of reasons including the accessibility of safe milk in the vicinity. In order to increase milk consumption and expand the market for the increased production of milk in the country, there has been a strong drive and milk-promotion campaign by the Government of Rwanda and other stakeholders, including Land O'Lakes¹⁶ and NGOs working in the dairy sector to promote milk consumption together with Inyange industries, e.g. Milk Zones in urban areas to provide pasteurized milk without packaging¹⁷.

¹⁰ Government of Rwanda (2013), National Dairy Strategy.

¹¹ Lactose intolerance is common among certain population groups globally. Nevertheless, all infants have lactose tolerance: they can digest lactose without problems (there are rare cases of allergies to milk proteins). Lactose intolerance sets in around 2-5 years in many children of certain population groups. However, people with lactose intolerance can typically consume around a glass of milk (8 oz.) a day without problems. This is much higher than the current availability of milk in Rwanda. Most cultures in Africa ferment milk as a means of preservation: fermenting milk removes the lactose so fermented milk is safe to drink even if a person is lactose intolerant. The below messaging during the milk promotion can be considered: (i) Milk for children from 6 months to two years as part of a balanced diet; (ii) For lactose intolerant children over 2 years: up to one glass of milk and no restriction on fermented milk as part of a balanced diet; (iii) For lactose intolerant adults: up to one glass of milk and no restriction on fermented milk as part of a balanced diet; (iv) For normal body weight or underweight lactose tolerant children and adults: no restrictions on milk/fermented milk as part of a balanced diet; and (v) For overweight children or adults: semi-skimmed or fat free milk as part of a balanced diet.

¹² Hoppe, C., Andersen, G.S., Jacobsen, S., Mølgaard, C., Friis, H., Sangild, P.T. & Michaelsen, K.F. 2008. The use of whey or skimmed milk powder in fortified blended foods for vulnerable groups. *J. Nutr.*, 138(1): 145S–161S.

¹³ Black, R.E., Allen, L.H., Bhutta, Z.A., Caulfield, L.E., de Onis, M., Ezzati, M., Mathers, C. & Rivera, J. 2008. Maternal and child undernutrition. Global and regional exposures and health consequences. *Lancet*, 371(9608): 243–260.

¹⁴ Victora, C., Adair, L., Fall, C., Hallal, P., Martorell, R., Richter, L. & Sachdev, H. 2008. Maternal and child undernutrition. Consequences for adult health and human capital. *Lancet*, 371 (9609): 340–357.

¹⁵ Another animal protein source which has been promoted is eggs through poultry rearing..

¹⁶ Land O'Lakes implements project Rwanda Competitiveness Dairy Program II (RCDP II) funded by USAID Feed the Future program.

¹⁷ Processing requires the largest percentage of the final consumer price (~52%) largely a result of the high cost of packaging (in Rwanda plastic suitable for milk pouches is banned) whereas farmers get only 16 % compared to about 50% in most dairy production neighbouring countries (Appendix 1 of IFAD concept note).

A. Key nutritional issues and opportunities for RDDP intervention

14. The review of current national policy and strategy as well as programs and activities implemented among the development community identified a number of nutrition-related issues and agenda which could be considered as entry points for the nutrition-sensitive interventions for the proposed RDDP:

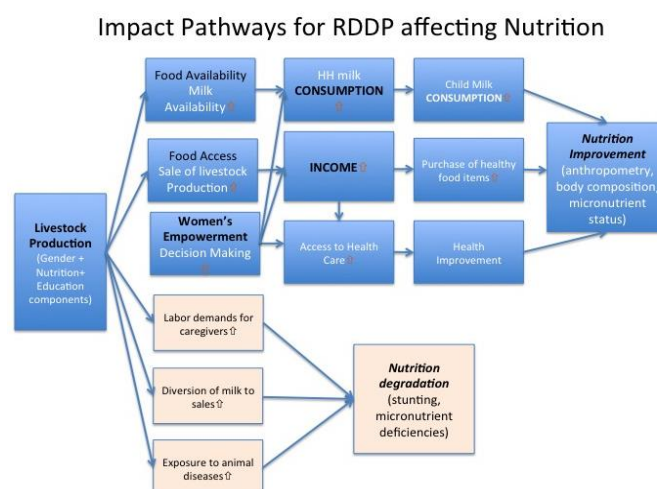
- Multi-sectoral coordination to work on nutrition sensitive interventions at national, district and village levels;
- Nutrition education and Behaviour Change Communication in nutrition to promote milk consumption in particular at household level of small scale farmers (and milk producers) as well as healthy balanced diet with specific attention to complementary food for infants and young children, and maternal nutrition;
- Effective and efficient milk production and distribution through targeted institutional markets, namely schools and health facilities (linking to one-cup per child program and social protection programs by MINLOG) and accessible venues (e.g. kiosks and milk bars etc.);
- Coordination with private sector in align with the new legal framer of milk fortification.

15. **Nutrition sensitive interventions in the RDDP.** Agriculture plays an essential role in improving nutrition by ensuring the availability, accessibility and affordability of diverse, nutritious food at all time to meet nutritional requirements of people throughout the generations. In order to optimize agriculture's contribution to improving nutrition throughout the lifecycle, the RDDP envisages applying a comprehensive approach of mainstreaming nutrition interventions, beyond increasing production or incomes.

16. **Rationale:** The Government is highly committed to improve the food and nutrition security status of its population, especially of vulnerable population groups including infants under two years of age, and pregnant and lactating women (in light of focusing on the first 1,000 day window of opportunity to address stunting in particular). The RDDP explores the potential of quality and affordable milk that will be available through the improved milk value chain (all through collection, processing, packaging, distribution and marketing) by applying the nutrition lens to each component and at every stage of project phase. The target population group of the proposed nutrition sensitive interventions through RDDP is wider than the population groups that may have direct impact on the stunting rate as a nature of dairy development project. In the close coordination with the targeting and gender strategy of the RDDP (Appendix 2), the importance of women's role will be emphasized for the improvement of nutrition at household level.

17. **Purpose of mainstreaming nutrition:** The objective of the proposed project is to increase the availability of and access to safe and affordable milk by strengthening capacity of medium- and smallholders. Through applying the nutrition lens to the dairy value chain, the project envisages to maximize the positive impact of project at household food and nutrition security with specific focus on increasing the availability and accessibility of, and to create demand for, the safe, affordable and nutrient-rich dairy products through behaviour change communication and nutrition education. The RDDP with nutrition-sensitive interventions aims to generate positive impacts on three different pathways¹⁸: Increased safe and affordable milk availability from production leading to increased direct consumption (*Consumption Pathway*); improved access to diversified food as a result of increased income (*Income Pathway*); and increased awareness on shared-income, appropriate infant caring capacity and practices through women's empowerment (*Empowerment through Increased Knowledge Pathway*). The nutrition-sensitive interventions, which will be mainstreamed in components 1, 2, and 3, focus on facilitating linkages between productive dairy value chain development and positive nutrition outcomes.

¹⁸ <https://www.spring-nutrition.org/publications/briefs/understanding-and-applying-primary-pathways-and-principles>



Adopted from *Milk and dairy programs affecting nutrition* (Iannotti, L. 2013¹⁹).

18. **Proposed interventions for mainstreaming nutrition:** The suggested activities for the above-mentioned entry points for nutrition sensitive interventions are the following:

- **Awareness and capacity building through nutrition sensitive training²⁰:** Multi-sectoral coordination for nutrition-sensitive agriculture interventions at both national and district level is essential for the project success. It was agreed to sensitize the agricultural sector with respect to the opportunities for integrating nutrition-sensitive interventions to support improving the diets of target beneficiaries by promoting both milk production and consumption by introducing healthy and balanced diet through household- and school-based nutrition-sensitive interventions by using the multiple channels for social behaviour change on the food utilization and balanced diet based on the locally based fruits and vegetables. It is suggested to link with UNICEF who is preparing an Integrated Programme for Nutrition in the country. There is the potential to partner with UNICEF in nutrition to utilize their comparative advantage to enhance nutrition in the project.
- **Preparation of Food-Based Dietary Guideline (FBDG):** FBDG is a key source of information intended to establish a basis for public food and nutrition, health and agricultural policies and nutrition education programs, including the national school feeding program, such as school milk distribution, to foster healthy eating habits and lifestyle²¹. Based on the FBDG, policy makers and program staff are able to recommend food items, food groups and dietary patterns to meet the nutrient requirement of the general public for balanced healthy diet. It is suggested to link with FAO which is organizing a regional workshop to develop revise and implement FBDG in line with current scientific evidence and country's specific nutrition situation, and food availability, culinary cultures and eating habits.
- **Mainstreaming Nutrition in the Livestock-Farmer Field School Module (L-FFS):** During the initial phase of project launch, an international Nutrition Expert and national Nutrition expert will be hired to develop a module on "milk and nutritional facts for healthy balanced diet" with the "first 1000-day window of opportunity" messaging to raise awareness among both men and women for the proposed Livestock Farmer Field Schools (L-FFS). The module will be validated by Nutrition Technical Working Group as well as other partner agencies that have been working in the dairy sector development with regard to milk promotion and nutrition enhancement. By using this module, all the staff at SPIU, national-level Food and Nutrition Working Group members, district-

¹⁹ In Milk and dairy products in human nutrition (FAO, 2014).

²⁰ A project is considered nutrition-sensitive if nutrition is targeted intentionally and nutrition is included in the project objective(s), activities and indicators.

²¹ <http://www.fao.org/nutrition/nutrition-education/food-dietary-guidelines/en/>

level District Plan for Eradicating Malnutrition (DPEM) committee members from the six social ministries are trained.

- **Behavioural Change Communication (BCC) Strategy for milk promotion as the heart of healthy balanced diet and food system:** Based on the on-going (~June 2016) and previous milk promotion campaigns by MINAGRI and Land O'Lakes²², the Nutrition Experts and Nutrition Specialist at SPIU will prepare the BCC Strategy for the project which encompasses the importance of milk as a nutrient-rich food and dietary diversity for healthy balanced diet with a special attention to complementary food and caring practice as well as diet for pregnant and lactating women²³. With regard to the access to diversified food items (e.g. fruits and vegetables as well as other animal sourced protein such as eggs), the proposed project can link with the on-going kitchen garden programs implemented by MINAGRI and other NGOs²⁴ in close coordination with Nutrition Technical Working Group. In order to develop an attractive and well-targeted messaging for the campaign for milk marketing as well as promotion of milk consumption and a healthy food system which facilitates social behavior change, a successful media company will be tendered to produce an effective radio program as well as advertisement, posters at schools and community-based facilities (hospitals and churches) to promote milk consumption and healthy diet.

Linking to Institutional Markets:

- *School Milk Distribution* - As the milk is given to children in school age (pre- and primary school – age 3-9) who are already outside the core target group of stunted children (from conception to 24 months), the impact of RDDP on reducing the stunting rate will probably be minimal. However, it can have good nutrition sensitive impact in the form of higher attendance rate and improved cognitive functions of children leading to better school results and more educated children, adolescents and future parents with understanding of a balanced and healthy diet. More educated parents normally have less malnourished children. In addition, the milk and healthy diet promotion campaign will take place at schools where mothers as well as entire communities are all invited to attend. The planned agenda will include cooking demonstrating for milk-based meals, with special focus on complimentary food preparation for young infants older than 6 months to complement mother's breast milk. The recipes of milk-based meals will be also prepared for distribution at the campaign as well as at various venues including health facilities, churches and Dairy Hubs and MCCs. In order to avoid compromise recommended exclusive breastfeeding practices all sessions will include strong messages on exclusive breastfeeding 0 - 6 months.
- *Health Facilities* – In addition to the age of mothers (below 18 as a high risk factor for low birth weight babies) the health status, especially the micronutrient deficiency, of pregnant and lactating women directly affect the nutrient outcome of their infants during their initial 1,000-days of their lives. The RDDP will assist in establishing efficient and effective channels between MCCs and nearby health facilities to provide fresh and safe quality milk at the facilities to ensure the milk consumption during their anti-natal care and during the growth monitoring and promotion sessions. Community Volunteers who are trained on the healthy diet and food system will also provide these mothers and women in child-bearing age with relevant information using leaflets and posters (using the food-based dietary guideline).

²² RDCP II attempts to leverage the project efforts to promote nutrition beyond milk through behaviour change campaign, illustrations, Radio Advert and the video and drama.

²³ Milk should be consumed as part of an overall balanced diet, complementary to breast milk for infants and fruits, vegetables and other animal source protein (eggs, meat and fish).

²⁴ MINAGRI as well as NGO such as Global Community currently run programs to promote kitchen garden for livelihood development and food and nutrition security. MINSANTE with the support of UNICEF implements Community-Based Nutrition Project that also promotes the introduction of kitchen garden and animal husbandry (chicken and goats).

- **Promotion of Milk Bars:** The IAKIB Cooperative with nearly 700 members initiated its operation of Milk Bar in March 2014. The Milk Bar initiative is based on the idea of replacing alcoholic beverages with healthy milk at neighbouring kiosks, which has been promoted by MINAGRI with FAO's technical assistance. The RDDP can promote this idea of creating milk bars as convenient market places for rural population where fresh milk (or pasteurized milk) collected and safely processed at the MCCs or fermented milk (which is popular among children) can be readily purchased at reasonable price (without expensive packaging material)²⁵. Easy access to nearby Milk Bar can eliminate one of the reasons for not being able to purchase milk at market that is located in the distance. In order to promote milk consumption as well as to create employment opportunities among the targeted women (under Component 2 and 5,400 women targeted for off-farm activities related to milk production, distribution and marketing), establishment of Milk Bars within and around the MCCs in rural areas will be promoted and supported. The further lessons learnt from the current Milk Zones by the Inyange Industries and Land O'Lakes in the urban areas and FAO support to the existing Milk Bars need to be gathered and assessed for further consideration on the modality.
- **Innovative approach with food processing and fortification to reduce nutritional gaps:** As a part of enterprise development under the sub-component 2.3 *Financing for dairy enterprise development*, the grant will encourage the innovation towards dairy products that supports consumption of milk among children older than 6 months and less than 5 years of age and women in reproductive age, including fortification, or creating of child-friendly dairy product (e.g. small portion size, or attractive packaging with a clear 1,000-days messaging). Currently, in collaboration with GOR and private partners, Clinton Health Access Initiative (CHAI) Nutrition Program is undertaking an initiative to reduce the incidence of chronic malnutrition, with a major focus on local production of nutrient-dense foods intended to complement breastfeeding among 6-23 month old children²⁶. Although the production is planned to be in operation at the end of 2016, CHAI is searching ways to produce powder skim milk in country for the production of fortified food with reasonable price to reach the vast majority of Rwandan children and women in reproductive age. The RDDP should be closely sharing information as possible outlet for quality milk produced through the project support.
- **Exploration of fortified milk:** Milk can be enriched with various compounds to increase the intake of particular micronutrients, for example vitamins A, D and C and iron. Milk can play an important role as a vector of supplements: the complexity and nutritional stability of milk makes it an ideal vehicle for providing important trace nutrients that can improve nutritional quality and prevent chronic degenerative diseases (Arsenio et al., 2010²⁷). In recent decades when technological innovations have led to a wide variety of dairy products, the dairy industry is in a pivotal position to distribute health and nutrition information through advertising and labelling²⁸.

²⁵ FAO (2015), GTFS/RAF/391/ITA Project - Improvement of Food Security through Commercial Agriculture in cross-border Districts of Rwanda, Burundi, DR Congo and Uganda in support to Modernization of Agriculture under the NEPAD and CAADP Frameworks

²⁶ CHAI utilizes the business model that has been successful in other African countries, such as Ethiopia. IFC has been investing through a channel to a holding company, Africa Improved Foods (Holding) B.V. (AIFH) which will have a shareholding structure of 47% owned by a Royal DSM NV (DSM), 20% by IFC and the remaining equity held by other DFI's. Via AIFH, an operating company, Excellent African Foods Limited (EAFL), will be established in Rwanda with AIFH having an approximate 90% equity stake in the EAFL, and approximately 10% owned by the Government of Rwanda. AIFH will finance the construction of a processing plant to produce fortified blended food in Rwanda. The proposed financing package will be supported by the Private Sector Window of the Global Agriculture and Food Security Program ("GAFSP"). GAFSP funding plays a catalytic role to create opportunity to support innovative private sector investments and deliver a level of additionality and impact beyond what is possible through IFC's regular operations.
(<http://ifcextapps.ifc.org/ifcext/spiwebsite1.nsf/78e3b305216fcd8a85257a8b0075079d/5447274eca39445985257cf3006c1eb4?opendocument>)

²⁷ Arsenio, L., Caronna, S., Cioni, F. & Dall'aglio, E. 2010. *Homo sapiens* and milk: A valuable food in the past and in the future. *Med. J. Nutrition Metab.*, 3(2): 99Nutrit

²⁸ Stanton, C., McMahon, D., and Mills, S. *Dairy components, products and human health* in Milk and dairy products in human nutrition (FAO, 2013).

According to 2015 DHS, while most women take iron supplements during their last pregnancy (62 percent), as was noted above, about 19 percent of women in Rwanda continues to suffer from anemia due to iron deficiency. In order to prevent adverse pregnancy outcomes, impaired physical and cognitive development and increased risk of morbidity and decreased work productivity in the long-term of child life, there could be a space of discussion to introduce iron fortification of milk among relevant stakeholders: Government, industries and donor agencies. Learning from other countries, including Chile, India and Mexico where fortification of milk with iron and other micronutrients has improved iron status and reduced anemia among infants and undernourished children²⁹, it is critical to evaluate the impact of the fortified milk as a whole.

²⁹ Iannotti, L. 2012. *Milk and dairy programs affecting nutrition in Milk and dairy products in human nutrition* (FAO, 2013).

Appendix 12: Compliance with IFAD Policies

Alignment with IFAD Policies

Policy	Alignment with IFAD Policy
IFAD Strategic Framework 2016-2025 : « Enabling Inclusive and Sustainable Rural Transformation »	<p>Aligned: IFAD's fifth Strategic Framework covers the period 2016-2025. It serves as an overarching policy guideline to provide direction to IFAD's work, and as a key instrument for consolidating IFAD's development effectiveness. The new framework builds on and reinforces many of the strategic thrusts of the previous one (2011-2015). It responds to the new global environment and positions IFAD to play a crucial role within it – by enabling the transformation of rural areas in a manner that is both more inclusive and sustainable. The framework has four purposes:</p> <ol style="list-style-type: none"> 1. to situate IFAD relative to current and emerging development challenges and within the larger global development architecture, and to define its activities in terms of their contribution to the 2030 sustainable development agenda (Agenda 2030); 2. to define and present IFAD's overarching development goal, principles of engagement, strategic objectives, outcomes and pillars of results delivery; 3. to give orientation to the development of country strategic opportunities programmes (COSOPs) and IFAD-supported investment projects, global and regional grant-funded programmes, and new policies and strategies; and 4. to provide overall coherence to IFAD's work and guide managers and staff across the entire organization so as to enable them to contribute more effectively to the Fund's overall development goal. <p>Its 10-year timeframe is a long one, and so to ensure its relevance amid changes in the broader development context a mid-term review will be carried out in 2020 to determine the need for any substantive reorientations.</p>
Country level policy engagement	<p>Consistent with best practice. IFAD does not have a corporate policy on country level policy engagement, this being a relatively new area of intervention and a corporate commitment in IFAD 10 exclusive to COSOPs, however the project dovetails with what IFAD has come to be considered good practice. IFAD promotes policy engagement in projects in order to reach two main objectives: i) help create an enabling environment for implementation and achieving the project's impact, and ii) help create the conditions for a large number of rural population to out of poverty. It is a key element of the scaling up agenda. IFAD's role is not intended to advocate for specific policy outcomes; it is rather to assist governments to use the project experience in the design or reform of policies, and to facilitate dialogue among national stakeholders on key policy issues. The program is in line with these objectives and principles, seeking to create and provide spaces for policy strengthening, formulation and implementation in a consultative way, led by the government and including multiple actors in the dairy value chain. These results will help in creating a more comprehensive and implementable policy environment for the Rwandan dairy sector.</p>

Targeting policy	Aligned. The RDDP targeting strategy is based on inclusiveness and will include very poor, poor and resourceful poor households as direct beneficiaries. The project will adopt several targeting mechanisms: direct and self-targeting, enabling environment, as well as ensuring procedural and operational measures. The strategy will be assessed at various stages of the project life to readjust or reinforce whenever it is needed.
Gender equality and women's empowerment policy	Aligned. The project will bring an innovative feature to the FFS by integrating the Gender Action Learning System. This will lead to: (i) equitable share of participation and benefits for women and men involved in dairy farming, (ii) improve their decision-making capacities at household and community levels and (iii) ensure equitable share of workloads in dairy and domestic activities. In addition, RDDP will foster economic empowerment of women in the off-farm economy.
Rural finance policy	Aligned. The RDDP is consistent with IFAD's Rural Finance Policy (2009) which has six guiding principles to be applied at the micro, meso and macro levels: (i) support access to a variety of financial services; (ii) promote a wide range of financial institutions, models and delivery channels; (iii) support demand driven and innovative approaches; (iv) encourage – in collaboration with private sector partners – market-based approaches that strengthen rural financial markets, avoid distortions in the financial sector and leverage IFAD's resources; (v) develop and support long-term strategies focusing on sustainability and poverty outreach; and (vi) participate in policy dialogues that promote an enabling environment for rural finance. Bankable business plans developed by milk sellers and processors will receive technical support in order to facilitate access to financial products; the project will also support larger investments through a variety of financial mechanisms, utilizing the full scope of financing available in Rwanda. The project will not work directly on policies related to rural finance.
Access to land and land security	Aligned. The project will not work specifically on land or land tenure but will work on production intensification and access to natural resources (especially water). The guiding principles of IFAD's land policy suggest that IFAD should be aligned to national policy priorities, do no harm, focus on gender dimensions of land usage and empower rural people and their organizations on land tenure. The project aims to apply these policy priorities.
IFAD strategy on climate change	Aligned. Particularly with principle 3 – promote climate-smart approaches to rural development and principle 4 on risk and resilience. The climate change strategy suggests that climate change should be factored into the project design, explore new ways to work on emerging problems and mobilize resources to address these problems. The project is aligned with these three ways of working.
Knowledge management	Aligned. The Knowledge Management strategy suggests that projects should have baseline studies and should have dedicated frameworks for knowledge management in order to "learn systematically and collectively from its own projects and programmes, and from the experience of its partners, particularly poor rural people, in order to deliver high-quality services and to enable its partners to find innovative ways to overcome poverty, and to use the knowledge

acquired to foster pro-poor policy reforms." The project is utilizing new guidance on best practice for logical frameworks and results hierarchies, and will have a dedicated M&E system as well as significant budget for knowledge management related to policy experience.

Scaling up

Consistent with best practice. While IFAD has an operational framework for scaling up and a commitment to scaling up, there is not as of yet a scaling up policy. However, the project is consistent with IFAD's vision of scaling up. The definition adopted by IFAD for scaling up is: "expanding, adapting and supporting successful policies, programmes and knowledge, so that they can leverage resources and partners to deliver larger results for a greater number of rural poor in a sustainable way". Scaling up results does not mean transforming small IFAD projects into larger projects. Instead, IFAD interventions will focus on how successful local initiatives can sustainably leverage policy changes, additional resources and learning to bring the results to scale. The RDDP project intends to utilize the extensive set of lessons learned from the IFAD grant programme and aid projects lead by partner agencies (USAID) and NGOs (Heifer international) in order to ensure that the project interventions provide continuity while growing in scale. As part of those efforts, Heifer International was involved in the design of the project, will provide co-financing and will take responsibility for elements of implementation.

Appendix 12b

SECAP Review Note on:

Rwanda Dairy Development Project

I. Major landscape characteristics and Issues (Social, natural resources, and climate)

A. Socio-cultural context

1. The agricultural sector is the backbone of the Rwandan economy as the sector employs more than 80% of the population and represents 33% of GDP (EICV 4). However, Rwanda is a small country with only 1.4 million hectares of arable land, of which 3% is irrigated. Consequently 84% of households are cultivating less than 0.9 hectares of land. Cattle ownerships also vary with a national average of 50.4% with the highest percentage recorded in the Northern Province.

2. Dairy production systems are classified in three categories: pastoral, agro-pastoral and sedentary systems. These systems vary according to their agro-climatic conditions, objectives of production, resources used, scale of production, market orientation and the use of equipment, input and services. In Rwanda, dairy farming is mostly developed in the highlands areas characterized by a cool and humid climate which encompasses small fluctuations in milk production throughout the year. Dairy farming is dominated by small scale farmers, characterized by low productivity, insufficient use of modern farm technologies and practices, lack of improved breeds and inadequate access to animal feed. In addition, the current structure of the small scale farm is an obstacle to the efficiency of the dairy value chain. As farms are sparsely located, milk collection entails a significant transaction with regard to the small quantity of milk produced and the high operational cost. Thus, transportation is done by bikes and it results in milk spoilage due to the time spent between the milk harvest and the reception of milk in a cooling tank. The loss of milk due to spoilage is also seen as a major risk by all stakeholders, as it might cause income loss and supply disruptions at processing plant (Bingi & Tondel, 2015).

3. Livestock production has a particular economic and cultural signification as households use cattle herds as store of values, symbol of wealth and are considered as a cultural asset in tradition such as weddings. As a result, livestock ownership is widespread throughout Rwanda and presents differences in milk production according to agro-climatic conditions. In addition, farm as an enterprise compounds diverse income generating activities including dairy farming. Most farming households participate in a number of value chains, often using the profits/cash income from their dairy enterprises to provide capital for cropping activities around their homesteads and areas designated for crop production.

B. Natural resources and NRM

4. The degradation of Rwanda's resource base is closely tied to relentless pressure exerted by a large and rapidly growing population on a limited land area for arable farming, raising livestock and sourcing timber for both building and fuel. These anthropogenic pressures on Rwanda's natural resources are compounded by an increasingly erratic climate. The high priority given to the dairy industry in Rwanda increases the pressure on the natural resource base which is vulnerable to climate variability and climate change effects. On the production side, as water and land become more limited for fodder production and as temperatures increase production, transport and safe storage of milk are more complex and demand more energy use. Without major unit cost-reducing innovations and quality improvement in; feed/forage production, milk supply and the marketing chain; the short term gains and improvements in livelihoods generated by the large GoR investment in the

Girinka programme will be reduced due to increasing climatic risks, higher energy costs and possible tradeoffs between a households dairy and cropping enterprises.

5. Water availability is a constraint within the dairy value chain. Indeed, livestock herding is associated with a rain-fed agro-pastoral system which represents 68% of the country's current annual use of fresh water from rivers and lakes (Niyonzima & al., 2013). While the United Nations recommends a minimum fresh water requirement of 1700 m³ per capita per year, the average Rwandan receives only 638 m³. This situation is due to inadequate water supply infrastructures leading to high technical losses, competitive water demands and insufficient investments in the water supply network. Yet, increased access to water is seen as a way to increase agricultural and livestock productivity. Inadequate water management has several consequences, such as: excessive grazing in areas near water sources; uneven utilization of rangeland; livestock traveling long distances to get to water, which reduces grazing or feeding time, forage intake, weight gain and milk production. Developing water harvesting and storage technologies for domestic and livestock use will increase the availability of water in the homestead and at MCCs and would reduce the daily labour burden of women and children that is estimated at more than 2 hours per day.

C. Climate

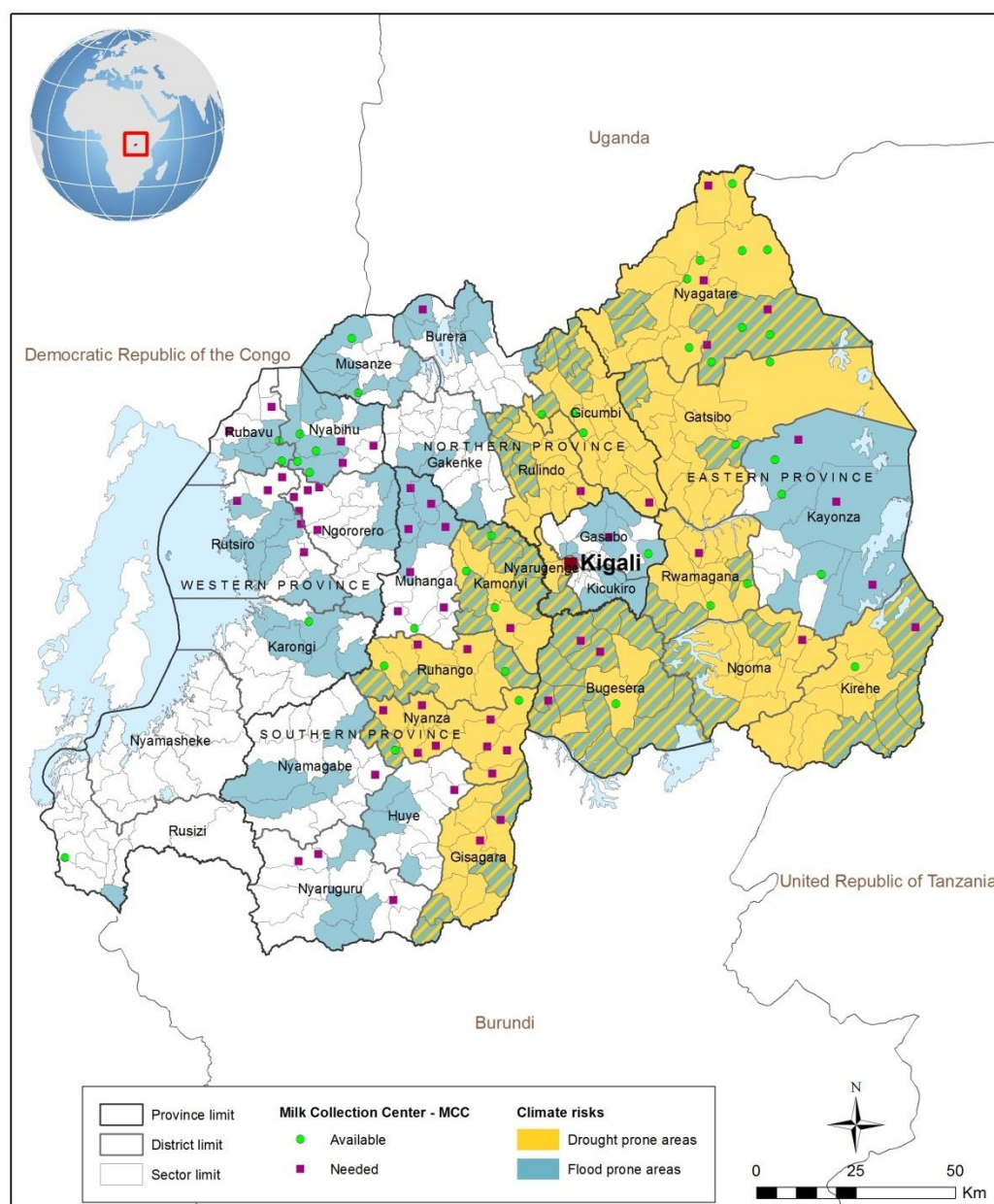
6. Environmental and ecosystem degradation in Rwanda is triggered by two main factors: climate disturbances and anthropogenic activities. The former is caused by several factors including the El-Niño and La Niña phenomena associated with surface temperatures in the Indian and Atlantic Oceans. A study by the University of Reading shows that climate variability in Eastern Africa is due to the influence of ocean –atmosphere climate phenomena, namely El Niño Oscillations (ENSO) and the Indian Ocean Dipole (IOD). Warm ENSO events are thought to be responsible for a build-up of warm sea surface temperatures (SSTs) in the Eastern Pacific Ocean which lead to increasing rainfall. These events are specifically observed in the short rains seasons. Furthermore, the recently discovered Indian Ocean Dipole (IOD), in addition to ENSO effects, most probably causes anomalously high rainfall in East Africa (see Marchal et al., 2006; REMA, 2011). High rainfall anomalies are increasingly common throughout East Africa through both independent and synergistic IOD and ENSO events. For some years (1963, 1972, 1982, 1997, 2016), El Niño events are thought to have coincided with positive IOD events leading to very high and prolonged rainfall in East Africa,

7. However, as East Africa has varied topography (e.g. mountains and rift valleys) its features are not yet adequately represented in climate model projections and deserve further investigation, especially with the modifying influence of the Congo basin.

8. Agricultural production and livestock development coupled with a rapid growing population are factors that have increased the degradation of both Rwanda resource's base and its limited arable lands. These anthropogenic pressures on natural resources in Rwanda are compounded by climate-induced problems. Climate change impacts in Rwanda vary depending agro-ecological zones; while the North and Western provinces are more affected by flood events, Eastern and Southern provinces are more vulnerable to drought events. The impact of floods and droughts associated with El Nino and La Nina events of recent years are thought to have been exacerbated by climate change and the environmental degradation observed throughout the country (NAPA, 2006). The mean annual temperature is expected to increase up to 3.25°C for the region by the end of the century resulting in proliferation of diseases, crop decline and reduced land availability, which in return, affects food security and livestock production. Rainfall variability is more uncertain, though most of the models predict more extreme events with higher rainfall intensities leading to landslides, crop and livestock products losses, health risks and damages to infrastructures.

9. Climate change impacts in Rwanda vary depending agro-ecological zones; while the North and Western provinces are mostly affected by flooding events, Eastern and Southern provinces are more vulnerable to droughts. The impact of floods and droughts associated with El Nino and La Nina events of recent years are thought to have been exacerbated by climate change and the environmental degradation observed throughout the country (NAPA, 2006). The mean annual temperature is

expected to increase up to 3.25°C for the region by the end of the century resulting in proliferation of diseases, declines crop production and reduced land availability that will impact on food security and livestock production. Rainfall variability is more uncertain, though most of the models predict more extreme events with higher rainfall intensities leading to landslides, crop losses, health risks and damages to infrastructures. The heterogeneity of emerging climate risks across the country is summarized within the Figure 1 below.



The designations employed and the presentation of the material in this map do not imply the expression of any opinion whatsoever on the part of IFAD concerning the delimitation of the frontiers or boundaries, or the authorities thereof.
Map compiled by IFAD | 08-02-2016

D. Key Issues

10. To address these issues the intensification of the dairy production value chain must ensure any interventions are environmentally sustainable, and are appropriate to the diverse agro-ecological zones and climate of Rwanda. For example, the pasture-based production systems prevalent in the high altitude Northern and Western milksheds have been developed in response to the sloping

topography. Intensification of these pastures should focus on increasing productivity through better rotational grazing and soil fertility amendments (both organic and inorganic), particularly applications of phosphates and the introduction of leguminous plants and fodder banks that can withstand grazing. This will contribute to reduction of soil erosion and the sedimentation of water sources from such steep slopes following the heavy rains that occur at the beginning of season.

11. In the Eastern Milkshed dairy cattle feeding is still based on an extensive type of grazing. If cattle numbers are not controlled, the lands can be easily eroded, the use agroforestry species for live fencing, fire wood and fodder production to control cattle movements needs to be explored. The GOR instituted a policy of individual use of land; hence, a farmer is accountable for damage on the piece of land he/she uses. This has at least reduced the potential damage that arises from common property systems in other African countries that has led to what is termed the “tragedy of the commons.” Across the systems of production, conservation of forages during the rainy season should be advocated in order to increase the supply of feed during the dry season, and hence reduce pressure on the grazing lands.

II. Potential project’s social, environmental, and climate change impacts and risks

A. Key potential impacts

12. Key challenges are not only identified at production stage but constraints have also been noted along the whole dairy value chain. Smallholders lack the skills and the resources to manage their farm as ‘productive enterprises’ and their livelihoods are affected by inappropriate farm infrastructures, poor access to support services like market advices, inadequate dairy processing machinery. Most of farmers have little or no capital and limited access to credits to (re)invest in milk production and processing plants. The following table depicts bottlenecks at each nodes of the dairy value chain and their associated climate risks.

Table 1: Constraints at each node of the dairy value chain and associated climate risks

Dairy value chain nodes	Specific Climate constraints (Eastern and Southern provinces are drought prone areas while Northern and western are flood prone areas)
Production: <ul style="list-style-type: none"> Low productivity of cows associated with: <ul style="list-style-type: none"> Low number of improved breeds Poor feeding practices due to lack of knowledge of farmers and low availability of raw feeding materials Limited knowledge and resources to comply with dairy quality standards Cattle rearing often culturally oriented rather than business oriented Low incomes prevent uptake of appropriate feeds However, there is a concentration of livestock population in urban areas There is also a growing concern regarding overgrazing of agricultural and rangelands associated with expansion of grazing areas in agricultural and forest areas 	<p>Eastern and southern Province</p> <ul style="list-style-type: none"> Long dry season / drought which leads to seasonal variation of production volume up to 50% due to quantity and quality of feeds Water availability and accessibility Increasing overgrazing and environmental degradation of rangelands, forest ecosystems, pasture and farm lands (depletion of carbons) Increasing soil erosion and nutrient losses Waste from livestock production as well as manure disposal affects atmosphere (CH4) and surface and groundwater systems Deforestation associated with use of firewood for heating water for hygiene purposes (milking and cleaning equipment) Cereal and leguminous production especially become more difficult to cultivate because of the lack of water Increase of animal diseases/parasites Poor quality of forage and fodder leading to acidity of milk Seasonal fluctuations in rain water distribution that entails low hydroelectric production and affects availability and use of electricity in the milk cold chain <p>Northern and Western Province</p> <ul style="list-style-type: none"> Seasonal fluctuations in rain water distribution that entails low hydroelectric production and affects availability and use of electricity in the milk cold chain Water accessibility Loss of soil fertility by leaching of arable lands Local risks of landslides, irreversible land leaching, soil erosion and degradation
Transport : <ul style="list-style-type: none"> Weak market infrastructures (feeder roads, cold chain, electricity , aggregation centres) Inefficient transportation system that leads to milk spillage, spoilage and side selling Long distance covered by transporters from Farm to MCCS 	<p>Northern and Western Province</p> <ul style="list-style-type: none"> Floods and landslides that damages or closes roads making milk transport more difficult <p>Eastern and southern Province</p> <ul style="list-style-type: none"> cold chain failure/break during periods of high temperatures
Bulking and chilling <ul style="list-style-type: none"> Extensive use of diesel generators that uses a lot of fuel raising cost of chilling as well as contributing to GHG production Poor management of some MCCs leading to poor maintenance and upgrade 	<p>Northern and western province</p> <ul style="list-style-type: none"> Destruction of livestock infrastructure (MCCs, Processing units, Cow sheds, water installations, etc.) <p>Eastern and southern Province</p> <ul style="list-style-type: none"> Drought and dry spells leading to water shortage
Processing <ul style="list-style-type: none"> Low level of product diversification High processing cost mainly from packaging and electricity leading to high prices of local products Inappropriate and expensive milk processing machineries (e.g. pasteurizers, sterilizers) with limited locally available spare parts 	<p>Northern Province:</p> <p>Destruction of rural and livestock infrastructure (MCCs, Processing units, Cow sheds, water installations, etc.)</p> <p>Eastern and southern Province</p> <p>Drought and dry spells leading to water shortage</p>
Retailing <ul style="list-style-type: none"> Inappropriate cold chain / transport systems leading to poor quality of raw/fresh milk Long distances covered between milk shed to milk processing units 	<p>Northern Province:</p> <p>Destruction of rural and livestock infrastructure (MCCs, Processing units, Cow sheds, water installations, etc.)</p> <p>Eastern and southern Province</p> <p>cold chain failure/break during heat events</p>

B. Climate change and adaptation

13. Dairy farming is perceived as both contributor to and victim of climate change. On the one hand, increases in dairy production may contribute to anthropogenic greenhouse gas (GHG) emissions, biophysical degradation and potential loss of biodiversity if extensification occurs and green strategies are not promoted along with good dairy management practices; while on the other hand, dairy farming is highly vulnerable to climate change and variability mainly through increased temperatures and alterations in rainfall patterns. Hence, climate-smart livestock approach encourages the potential of the livestock sector to mitigate its environmental impacts while increasing energy efficiency and enhancing rural livelihoods. This approach aims at conserving natural resources, raising productivity, increasing animal productivity and optimizing the use of resources (Seinfeld & Mack, 2014).

C. Environmental and social category (B)

14. The Environmental and Social category is B, considering that the project approach will promote enhanced natural resources management, green energy technologies and better integration of livestock and crop production. RDDP will ensure that climate smart technologies (e.g. improved feed and fodder varieties, live fencing with multi-use agroforestry species, solar energy and biogas technologies) are widely promoted along with capacity building, improved management of natural resources and water supplies, and dairy cattle herds, which in return, will contribute to mitigation of environmental risks.

15. RDDP will create strong synergies with the on-going IFAD funded Climate Resilient Post-harvest and Agribusiness project (PASP) that tackles post-harvest losses within the scope of climate change adaptation strategies. As the component II on Producers Organisations and Value Chain Development includes an activity on “facilitating synergies/partnerships with GoR funded initiatives”, the project should advocate for the inclusion of climate resilient aspects in the building codes of any rural infrastructures (e.g. rainwater harvesting facilities, siting and better placement and borrow pits during road construction/rehabilitation that allow capture of rainwater into tanks, etc.) and equipment using green energy technologies (solar and biogas). This was initiated in the Climate Resilient Post-harvest and Agribusiness Support Project (PASP) and will ensure that all rural infrastructures from farm to dairy processing plants are climate smart. The communication and dissemination of appropriate climate information will also be an asset in building rural communities resilience.

D. Climate risk category (High to Moderate)

16. Climate pattern in Rwanda are diverse and complex. The targeted zones are in both drought prone areas (East and Southern regions) and flood prone areas (Northern and Western regions). Dairy farming contributes to GHG (i.e. emissions associated with land management, dairy cows themselves, milk production from processing to transportation) and is affected by climate change (livestock nutrition and diseases). The climatic risk category for this project is medium to high. During project implementation, the project team must assess existing constraints along the dairy value chain and monitor and address carefully climate risks and environmental impact.

III. Recommended features of project design and implementation

A. Adaptation and mitigation measures

17. RDDP will embody both adaptation and mitigation measures and encourages locally based solutions and easy and affordable technologies and facilities. Adaptation options will encompass, for instance, access to climate information services tailored to climate risk and vulnerabilities specific to the dairy value chain; promotion of flood and drought tolerant and diversified forage varieties; sensitization campaign for good water and soil management such as rooftop rainwater harvesting facilities and equipment, use of organic fertilizer and efficient use of available land. The project will advocate and support through matching grant mechanism access to climate resilient facilities and

technologies along the dairy value chain. Mitigation options will include pasture land management, promotion of agroforestry for increasing soil carbon sequestration and reducing soil erosion as well as manure and waste management to decrease water and soil pollution. Hence, climate risk management will be mainstreamed in all project components and activities so as to contribute to national endeavours towards low-carbon development and sustainable economic growth.

B. Incentives for good practices

Water use efficiency and management

18. Water development is hence a challenge for livestock production. Inadequate access to clean water affects livestock productivity, especially during the dry season. Limited availability of potable and hot water remain a major challenge that is compromising milk quantity, quality and hygiene. Milk production is severely impacted by water availability as average milk production drops by 60% during the dry season in the drought prone plains of Eastern and Western provinces (Niyonzima & al., 2013). The lack of water resources at the farm level is worse during the dry season and in zero-grazing units, yet, with higher temperatures water requirements of livestock increase. In addition, surrounding groundwater accessible to MCCs or collection points can be contaminated by civil works, waste water and discharges generated by adjacent slaughterhouses. This is a concern, as few of the MCCs have water heating facilities to clean and sterilize milk handling and holding equipment. Unclean water increases the risks of contamination and spoilage, reducing the profitability of the value chain.

19. As a primary solution to address water scarcity, farmers can spend USD\$ 2 per day to buy water from local vendors during the dry season. Unfortunately, most farmers are not aware that a cow producing 10 to 12 litres of milk per day requires 40 to 50 litres of water per day to maintain its production. The need for more water distribution at farm and MCC levels is a high priority for all milksheds. Hence, the project recommends promoting water use efficiency and management. This includes promoting water management best practices and technologies adapted at all level of the dairy value chain. Identifying the adequate water storage system solution requires the use of a rainwater harvesting formula that includes data on precipitation, collection surface in m², and efficiency of the surface areas. In addition, when planning for a rainwater harvesting system, it is important to take into consideration: (i) roof material, (ii) the slope of the roof, (iii) the footprint of the catchment areas and (iv) size of the pipes. Indeed, rainwater collected on the roof is most likely pure but it can be mixed with contaminants (roof fragments such as woods materials or leaves, bird droppings, dust, etc.) and therefore needs to be filtered before storage with sand bed filter, popup filter or stabilization tanks. It is also important to install adequate pipes to ensure that water flow through the system properly; a small size of pipes will reduce the volume of water collected. A common rainwater harvesting system comprises a roof of any size and any structures, gutters, downspout and pipes underground and backup on the top of the tank. The construction and installation of household-level, MCCs and processing plant rainwater harvesting equipment (tin roofs, gutters, plastic tank and Ferro-cement storage tanks) is an activity that can be done locally and generate incomes for people trained for and specialized in this work. The following table presents the available rainwater harvesting systems according to the dairy value chain level and associated constraints.

Table 2: Potential water management solutions along the dairy value chain

<i>Stage of the dairy value chain</i>	<i>Bottleneck in the dairy value chain</i>	<i>Potential solutions / technologies</i>	<i>Practices/uses</i>
At farm level	Insufficient access to water resources/ long distances to water points/ No access to national water network	Water tanks and/or cisterns linked to rooftop gutters so as to capture rainwater	Livestock watering Hygiene Domestic use
MCCs/ collections centres	Insufficient access to water resources/ insufficient access to national water network/ lack of water quality	Water tanks/ cisterns Calculation of rooftop runoff water Installation/ Construction of Ferro-cement water tanks and rooftop rainwater harvesting equipment coupled with filters such as sand bed filter, popUp filter or stabilization tank. Water heating facilities	Cleaning equipment/ Hygiene
Processing plant level	Insufficient access to water sources/ national water network High consumer of water for processing cheese, sour milk and yoghurt	Water tanks Calculation of rooftop runoff water Installation/ Construction of ferro-cement water tanks and rooftop rainwater harvesting equipment coupled with filters such as sand bed filter, popUp filter or stabilization tank Water heating and sterilization facilities	Processing milk into dairy products Purification of water Cleaning and sanitation

Improved waste management and energy-use efficiency

20. A climate-smart livestock approach acknowledges the environmental impacts of the livestock sector and encourages intrinsic adaptation and mitigation potential. Indeed livestock is an important provider of human nutrients as well as manure for crop production and soil fertility restoration. Due to continuous and more intensive cropping on limited arable lands, soil nutrient have been dramatically reduced, with latent negative impact on food security (Wambugu et al., 2014). Therefore, dairy livestock is essential for restoring soil nutrient through the use of organic manure that reduces or eliminates the need of chemical fertilizers, which are expensive and contribute to GHG emissions. To date, lot of manure nutrients are lost through the vaporisation process that occurs when manure is left exposed to the sun and thus contributes to GHG emissions. To mitigate the negative impact of the livestock development sector, there are affordable and efficient treatments of manure. Indeed, the level of nutrients can be increased through composting manure and crop residuals. However, it requires good management practices so as to reduce loss of nutrients into the atmosphere or erosion during rainy season. Cow sheds and houses must be integrated concrete floor to facilitate the collection of manure and urine commonly used as organic fertilizer and/or feed for biogas digester.

21. For example, applying manure in the root zone below the ground surface enable reduction of evaporation as well as vaporization process, thus allowing a persistent release of required nutrients during the entire period of the crop growth. Hence, the project must propose capacity building modules on the best options to handle and use manure so as to enhance soil fertility.

22. **Biogas systems.** Livestock waste is more than a potential source of nutrients for soil fertility improvement; the urine, dung, waste feed and bedding can be used as a feedstock for the generation of biogas - methane. There are several types of biogas system: (i) float-drum type (Indian digester); (ii) fixed dome type (Chinese digester) and (iii) tubular rigid and flexible plastic types. The choice of a specific model depends on the use, initial investment capital, volumes of animal dungs and site size for installing such system. The float-drum and tubular plastic types are easily installed at lower cost and with less labour but present a shorter life-span. The fixed domes require a higher initial investment capital, demands a high level and technical capacity for construction and labour , but if well-made have a bigger capacity and longer life span Although often cheaper and easier to install the float drum and tubular biogas system are more sensitive to low night temperature than concrete dome system.

23. In Rwanda, biogas systems have been promoted under the National Domestic Biogas Programme (NDBP) implemented by the national energy supplier, Rwanda Energy Group (REG). Despite national endeavours to disseminate the technology across rural areas, the uptake of the biogas systems at MCCs or small-scale enterprises is low. The biogas technology is most efficient under a zero-grazing system that enables easy collections of livestock dung and urine for later placement in the bio-digester for undergoing anaerobic decomposition process. It is a cost-effective investment when it is well constructed, effectively operated and closely maintained through good monitoring strategies. Hence, the project will ensure the adoption of such cost-effective system by assessing constraints related to technical, ecological, economic and behavior changes aspects.

24. Biogas can be used to operate farm and MCCs machinery such as chaff-cutters, feed milling, water pumps, small scale milk processing units and surplus biogas can be used at household level. The adoption of biogas digester will lessen the women's burden of herding livestock and fetching firewood. The time saved would enable them to become more involved in income generating activities. In addition to the methane gas, the bio-digester produces slurry which is high quality manure that release nutrients that are easily absorbed by crops. The following table presents the available biogas systems according to the dairy value chain level and associated constraints :

Table 3: Potential energy use efficiency solutions along the dairy value chain

<i>Stage of the dairy value chain</i>	<i>Bottleneck in the dairy value chain</i>	<i>Potential solutions / technologies</i>	<i>Practices/uses</i>
At farm level	No access to electrical grids Firewood collections for domestic purposes which increase women workload and prevent the development of income generating activities Limited access to technology Insufficient capital Lack of information	Small size float drum biogas system or tubular plastic biogas system	Heating water for milking/ cleaning bucket milking equipment Cooking at household level
MCCs/ collections centres	No or low access to electrical grid Large volume of animal dungs, in the presence of a cowshed Low access to credits No heating system for cleaning milking storage and chilling equipment Insufficient use of milk processing equipment Lack of information	Medium or large float drum biogas system or tubular plastic biogas system Fixed-dome biogas system	Water heating for cleaning and sterilize milk storage and chilling equipment Small scale milk processing equipment
Processing plant level	Low or disturbed access to electrical grid Limited access to adequate technology Low access to credit Lack of information	Fixed-dome biogas system Large scale float-drum biogas system or tubular plastic biogas system	Water heating and sterilization equipment Medium to large scale milk processing equipment

25. **Solar energy.** An alternative to biogas is solar energy, which can be used as a supplementary energy source for heating water for milking, cleaning milk storage and handling equipment as well as operating a small –scale chilling systems. As Rwanda is situated close to the

equator, the country has access to solar energy twelve hours per day and throughout the year. Thus, this source of energy is cheap, in abundance and environmental friendly.

26. At farm level, milk collected at night is usually conserved for domestic consumption because unpasteurized milk is a highly perishable product and needs to be chilled rapidly in order to be able to store it and transport it. The introduction of small solar powered equipment for chilling milk at farm or collection centres and MCCs levels, will allow farmers to increase milking periods and consequently their incomes.

27. Solar powered milk chilling includes solar panels, solar charge controller, batteries and a refrigerator. The size of panels, batteries and refrigerators must be adapted to the farmer's needs. However, a high initial investment is need for the installation of the solar equipment.

28. **Waste management:** In both prevalent grazing systems, smallholder farmers must adopt organic practices such as cover crops, crop residues retention, mulching and composting so as to better cope with drought and be more resilient to extreme events. The compost can be made from household as well as livestock waste and kept in a concrete storage tanks. The composting processes participate to both environmental protection and sustainable agricultural production.

C. Multi-benefit approaches

29. An integrated approach has to be promoted throughout project components as climate –smart measures have to be mainstreamed at every stage of the dairy value chain from production to markets. Even if cattle's rearing is a secular tradition, there are several bottlenecks that constrain the development of the dairy value chain in Rwanda. While improved livestock breeds will yield more milk than traditional breeds, they are not adapted to local conditions and are more sensitive to walking long distances for water and grazing. Thus, water availability has to become a priority for all smallholder dairy farmers. To date, cattle herds are not drinking enough water and forage quality is not sufficient to ensure sustained increase in milk production throughout the year. The project proposes to increase rainwater facilities coupled with purification filters so as to enhance water quality and quantity at both farm, cow shed and MCC levels. Climate smart dairy production intensification implies enhancing animal feeding practices, promoting cow sheds to cope with heat stress in both extensive grazing and zero grazing system, improving energy use efficiency along the dairy value chain as well as manure and waste management. Improving pasture productivity and quality by enhancing the composition of forage varieties, conservation and better pasture management coupled with low carbon source of energy for chopping and milling forage systems, cooling and dairy processing plant are important means to improve food security, adapt to climate change and reduces both direct and indirect GHG emissions

30. Fundamentally, the whole country is suitable for cattle rearing and milk production; however, most of the cattle are located in the semi-arid rangelands of the eastern province where water is scarce. The local traditional livestock breeds typically walk long distances every day for water and grazing. This is in contrast to the modern, improved livestock breeds that can yield more milk and meat than traditional herds when well fed and watered, but are unable to walk long distances for water and are more susceptible to heat stress and diseases. Water development is hence a challenge for livestock production in both the extensive grazing and zero grazed systems. In addition, the flooring and alleys of cattle houses or sheds must be in concrete to allow better cleaning and facilitate manure collection.

31. As a mean to improve cow productivity, the project intends to enhance the artificial insemination services through training and capacity building of veterinary officers. In addition, the project will assist in preparing and implementing a breeding programme for dairy cows which will include the identification of optimum crossbreeding level and the preservation of local breeds as a means to ensure biodiversity and access to a gene pool of cattle highly adapted to the Rwandese environment.

D. Participatory processes

Early Warning Message tailored to the dairy value chain

32. Climate information services are proven to be effective options to cope with climate variability and climate change effects. Indeed, receiving climate information on a timely basis coupled with advisory services support farmers' planning and decision making processes. The project will encourage the communication and dissemination of meteorological bulletins tailored to climate risks and vulnerabilities specific to the dairy value chain. SPIU agro-meteorologist should continue the work initiated within PASP project and collect data on quantity of rainfall; length of rainy season as well as dry season; sunrise and sunset times so as to better organize milking periods, milk collection and transportation. The bulletins should be distributed to all relevant stakeholders along the dairy value chain. The mode of communication must also consider innovative channels to reach more people, timing of communication and also overcome gender specific obstacles related to responsibilities and roles in agricultural production and livestock herding.

E. Monitoring and Evaluation

33. Climate risk management is a cross cutting issue as climate risks are observed at each dairy value chain node. Therefore, the project must continuously assess the constraints that affect the dairy production intensification and tackle them accordingly in project implementation. Therefore, the M&E team must ensure that project activities are:

- facilitating adaptation through synergies with existing or planned initiatives,
- combining mitigation (reductions in greenhouse gas emissions), adaptation and biodiversity conservation
- delivering additional development benefits, and/or
- exploiting potentially beneficial changes in climatic or environmental conditions
- exploiting opportunities for climate change financing and/or carbon markets
- ensuring that project activities are not leading to maladaptation
- cost-effectiveness of the proposed measures/options

Monitoring and evaluating the adoption of renewable energy systems along the dairy value chain

34. To assess and ensure the adoption of renewable energy systems (rainwater harvesting systems, biogas generation units, solar energy systems, etc.) at farm, MCC and processing plant level the project must elaborate mechanisms and systems for monitoring and assist farmers in taking over and maintain adopted renewable technologies and practices.

35. The following table proposes scope of research that must be fine-tuned during project implementation through a participatory method confronting dairy farmers' needs and existing technical skills and capacity.

Table 4: Potential research questions to assess the adoption of renewable energy systems in rural

Research dimension	Areas for assessment
Technical	<ul style="list-style-type: none"> • Optimizing feeding methods and types of organic substrate • Optimizing water availability • Appropriate delivery mechanisms (technical training manuals and post-sales services) • Assess opportunities to harvest water (especially during dry season). For example, potential of communal groundwater pumping stations (powered by solar energy) or consider a rooftop that can harvest rainwater), which can serve different purposes
Ecological	<ul style="list-style-type: none"> • Livestock numbers, veterinary services, fodder and water availability, and alternative organic inputs/substrate assessed at landscape/district level • Quantification of reductions in firewood consumption, deforestation and GHG emissions where possible or average estimations based on baseline surveys on quantities of firewood used before and after adoption of biogas • Recycling of water and decrease of water harvest from rivers and streams

	<ul style="list-style-type: none"> • Manure and Bio slurry application and influence on soil fertility • Water uses at farm and MCCs levels and influence on water quality and quantity in streams and rivers
Economics	<ul style="list-style-type: none"> • Knowledge management products that demonstrate the multiple benefits of the technology or climate services • Engaging women in self-help groups for multiplying finance and sharing knowledge • Health benefits (less coughing, eye infections recorded) and opportunity cost of the time saved from collecting firewood • Increased agricultural production from use of bio slurry in vegetable gardens • Increased of animal watering and hygiene at farm and MCCs level
Behavioural change	<ul style="list-style-type: none"> • Promote farmer-to-farmer exposure for knowledge-sharing on cooking practices • Engaging youth and children in the deployment process for creating the next generation of users • Assess the difficulties in changing the mind-set of cooking with firewood and using rainwater • Identification of impacts on other livelihood systems such as charcoal and firewood suppliers and defining alternatives
Policy	<ul style="list-style-type: none"> • Assess institutional arrangements and policies required to accelerate up-take of biogas and solar in rural areas (customs, regulations and import taxes) • Review subsidy schemes and linkage with MFIs is to promote biogas digesters.

Note: Adapted from an original working paper on Biogas Development in Kirehe district in Rwanda, formulated by Karan Sehgal (2015)

IV. Institutional analysis

A. Institutional framework

36. The **National Strategy on Climate change and Low-Carbon Development (NCCLCD)** underlines the need to manage the implications of climate variability for the social, environmental and economic development of the country. The strategy recognizes that even slight changes, in, for example, rainfall patterns, have a significant impact on crop and livestock production. To achieve better resource efficiency, the Green Growth Strategy advocates the use of renewable energy, such as solar panels and biogas digesters, for post-harvest handling and dairy processing.

37. The recent endorsed the **Intended Nationally Determined Contributions (INDCs)** is built upon the National Green Growth Strategy and advocate for a climate resilient economy. The framework aims at achieving energy security and low carbon energy supply that support the development of green industry and services, sustainable land use and water resource management, appropriate urban development as well as biodiversity and ecosystem services. The development of dairy sector participates to several pillars such as integrated approach to sustainable land use planning and management; sustainable forestry and agro-forestry and biomass energy; sustainable small scale energy installation and integrated water resources management and planning , to name a few.

B. Capacity building

38. Climate risk management must be integrated in L-FFS modules and toolkit through a participatory approach so as to ensure a horizontal learning and exchange process amongst project beneficiaries.

39. In addition, the project must build synergies with ongoing project that compounds dairy development and scale up best-practices (e.g. climate information services provided by both Heifer and PASP project).

V. Further information required to complete screening, if any

40. Ex-ACT Green Gases emissions Analysis (FAO tool) must be undertaken prior to project implementation. Indeed, the dairy sector is a critical sector with regard to GHG emissions and therefore, the project activities must ensure that dairy production intensification do not result in a higher GHG production.

Attachment 1

Dairy value chain related climate risks and RDDP suggested climate –smart activities

<i>Vulnerable project targeted districts</i>	<i>Climate risks</i>	<i>Affected chain nodes in the dairy value chain</i>	<i>RDDP suggested climate –smart activities for prevalent dairy farming system</i>
West, Southwest, North Rutsiro, Rubavu, Nyabihu, Musanze, Burera, Gicumbi	<p>Heavy rains, floods, frequent landslides and landslips</p>	<p>Agriculture</p> <ul style="list-style-type: none"> Erosion that affects agriculture and forage production (especially crop destruction and silting up in swamps and shallows) <p>Water resources</p> <ul style="list-style-type: none"> Water pollution and invasion of aquatic pollutants plants River, lake, reservoir sedimentation <p>Soil</p> <ul style="list-style-type: none"> Loss of soil fertility by leaching of arable lands Local risks of landslides, irreversible land leaching, soil erosion and degradation Muddy road which make transport more difficult <p>Infrastructure</p> <ul style="list-style-type: none"> Destruction of livestock infrastructure (MCCs, Processing units, Cow sheds, water installations, etc.) Seasonal fluctuations in rain water distribution that entails low hydroelectric production and affects availability and use of electricity in the milk cold chain 	<p>Extensive grazing system:</p> <ul style="list-style-type: none"> introduction of flood/or drought and nutritional tolerant forage and fodder varieties, agro-forestry and intercropping to prevent soil erosion and enhance provision of animal feed Better rotational and grazing management plan Manure management and composting to increase soil fertility and crop yields which will participate to increasing beneficiaries incomes (acknowledgment of farm as multi-entreprises) Establishment of cow-sheds to ease milking process and protect animals from heat stress (Flood prone areas) small dams and water ponds for increasing water accessibility and availability at grazing land area and hygiene when cleaning milking equipment small-scale choppers, chilling and dairy machineries powered by biogas and solar energy sources (in drought prone areas) Boreholes, well, and small-scale dams to increase water availability and accessibility (in drought prone areas) Charcoal evaporative cooling systems for transport as well as at farm level to avoid milk spoilage Climate information service on weather forecast to assist farmers with cattle keeping planning //L-FFS Waste management at farm and processing units levels Identify and develop evaporative cooling systems during transport (coolers boxes, etc...) Advocate for investments in climate resilient infrastructures (withstand higher winds, heavy rains increased temperature, etc..) along the dairy value chain
East & Southeast Ruhango, Nyanza, Huye,	<p>Increase of temperature, dry spells, prolonged drought and high evapotranspiration</p>	<p>Agriculture and ecosystems</p> <ul style="list-style-type: none"> Cereal and leguminous production especially become more difficult to cultivate because of the lack of water Increase of animal diseases/parasites Pastures without perpetual water or from irrigation might be threaten and become extinct Poor quality of forage and fodder leading to acidity of milk <p>Water resources</p> <ul style="list-style-type: none"> Drying up of water sources Competition for water resources from different sector (agriculture, processing, animal nutrition and hygiene) Low levels of water of lakes and rivers 	<p>Zero-grazing system:</p> <ul style="list-style-type: none"> introduction of improved flood or drought and nutritional forage and fodder varieties, agro-forestry species and intercropping to enhance provision of animal feed rainwater harvesting systems to increase animal water consumption and hygiene at farm level as well as MCCs level

<p>Rwamagana Kayonza, Nyagatare,</p>		<p>Market supply</p> <ul style="list-style-type: none"> • Prolonged exposure to hot sun (associated with poor secondary road conditions and poor cold chain facilities) might lead to milk spoilage <p>Energy source</p> <ul style="list-style-type: none"> • Reduction of hydroelectricity production due to low level of water in rivers and streams • Limited forest resources and exposed to direct and indirect drought effects (bush fire) • High energy demand for milk chilling (at MCCs, retail), pasteurization, storage (processor) and transportation which affect milk quality (spoilage) and loss • Use of fuel which increase operational cost 	<ul style="list-style-type: none"> - Biogas which will allow heating water for washing milking equipment and thus enhance hygiene at farm level - Manure management and composting to increase soil fertility and crop yields which will participate to increasing beneficiaries incomes (acknowledgment of farm as multi-enterprises - (Drought prone areas) Conservation of forage for dry periods - Valorisation of crop residues as animal feed as well as crop by products (sunflower cake, maize bran, rice polish, etc.) - Charcoal evaporative cooling systems at farm and collections points for adding value to evening milk and avoid milk spoilage - (Drought prone areas)Charcoal evaporative cooling facilities for transportation of milk - Climate information service on weather forecast to assist farmers with cattle keeping planning //L-FFS - Waste management at farm and processing levels - Identify and develop evaporative cooling systems during transport (coolers boxes, etc...) - Advocate for investments in climate resilient infrastructures (withstand higher winds, heavy rains, increase in temperatures, ,etc..) along the dairy value chain
--	--	--	--

Source: Authors compilation and adapted from HI report on Dairy Value chain market analysis, national green growth and climate resilient strategies, INDCs, NAMA,

Appendix 13: Rural finance strategy

Rural finance in Rwanda

The Rwanda National Bank (BNR) lists 17 banks as licensed in Rwanda¹. There are about 10 major microfinance institutions² and a large and thriving sector of savings and credit cooperatives (SACCOs) of different size and membership profile. MIX Market lists the larger of the 480 SACCOs currently operating in the country. Altogether, formal and membership based financial institutions well cover the rural landscape of Rwanda and the extent of informal borrowing and lending over and above reciprocal assistance in times of need among friends and relatives is limited³ and mostly tied to value chain internal liquidity financing.

Table 1: Key financial indicators

	2013	2014	2015
Consumer prices (% change, year on year)	2.2	6.8	4.4
GDP Annual Growth Rate	1,649	1,589	1,700
Deposit rate (av; %)	7.1	7.1	7.1
Lending rate (av; %)		17.19	17.49

Source: Trading Economics, Rwanda National Bank BNR

Financial inclusion for rural population

According to the latest available FinScope study⁴, in 2013 42% of the adult population had access to formal financial services, and the Government is planning to increase this to 80% by the end of 2017. The FinScope study found that eligibility is not a barrier to formal financial inclusion. For most financial institutions strict deposit and minimum balance requirements do not apply. The main requirement for opening a basic entry level type of account is merely proof of identity. Carrying of the national identity card is obligatory to every Rwandan 16 years or older. A significant barrier to uptake of formal financial products and services, however, is consumers' lack of awareness or understanding of how the uptake and usage of financial products would improve their lives. For mutual forms of financing and economic cooperation such as SACCOS and producer and marketing cooperatives, access is restricted in many cases to the non-poor members of the village society because of high (and increasing) share values of these cooperatives and limited financial means of poor people to purchase shares of more than 500 USD equivalent as is the norm in many rural producer coops.

IFAD supported rural finance initiatives

IFAD has supported a number of agricultural and rural development programmes with the Ministry of Agriculture and Animal Resources (MINAGRI), the most recent ones being first **KWAMP**, the Kirehe Community-Based Watershed Management Project. A value chain development fund and a warehouse receipt financing pilot were part of this recently closed project. KWAMP introduced a value chain perspective focusing on key crops to be supported under the Government Crop Intensification Programme (C.I.P.).

The "Project for Rural Income through Exports" (**PRICE**) had total project costs at start-up of USD 56.1 million, with coffee and tea development taking up two thirds of the base costs. Sericulture

¹ After separation of the BRD Development, BRD operates as two banks with BRD Commercial separately listed. BPR is once again separately licensed, although in practice, BRD Commercial has been amalgamated with BPR and BRD Development now operates as a standalone rural development bank

² MIX Market 2015

³ Rotating savings and credit associations (ROSCAs) are locally called *tontines* and *ikibinas*

⁴ FinScope 2013: Financial Inclusion in Rwanda

development, horticulture development and Financial Services account for 7%, 6% and 13% of base costs. PRICE modified the Rural Investment Fund (RIF) facility of the World Bank with matching grants to supplement investment loans in certain priority areas of the programme. The Business Development Foundation (BDF) managed the payment of grants that matched loans financed out of commercial bank own resources. Under PRICE, banks could use one third of the matching grant to directly offset loan exposures, whilst 2/3 of the matching grant would be kept by the lending financial institution in an interest bearing account until the outstanding loan amount is equal to 2/3 of the grant, by which time the bank will offset the outstanding loan amount. PRICE established a comprehensive collaboration with BDF not just for matching grants, but also for the management of partial individual credit guarantees to those loan applicants without sufficient collateral cover. Direct equity was also placed by the project in tea factories.

The recently-approved Climate-Resilient Post-harvest and Agribusiness Support Project (**PASP**) promotes climate smart investments in post-harvest infrastructure such as warehouses, cooling tanks, transport, etc. The project operates with matching grants specifically for investments that are proven climate smart and with grant complements to loans increasing for investments considered more climate smart. The subsidy character of the matching grant was thus focused on green investments and the subsidy mechanism to participating banks no more as apparent as under PRICE. Matching grant amounts under PASP into the loan account through which the respective bank receives loan payment instalments from the HUB/business operator, only after the loan is successfully serviced up to the agreed threshold of the bank financing. Under PASP, experience was gained in larger volume and specific project financing type of lending transactions between banks and aggregators with reach to the ultimate IFAD target group. These borrowers can be both cooperatives or farmer associations, but also private sector individuals.

General and strategic considerations and guiding proposals

RDDP is proposed to support all levels of dairy value chains in Rwanda. A difference is made between (i) the dairy farmer at the producer end of the supply chain; and (ii) different types of intermediators and aggregators.

At the level of the **dairy producer**, the strategy focuses on improving the access to financial services. Financial services activities will promote access to livestock insurance services and to formalize existing informal savings and credit services within dairy hubs and the creation of SACCO windows. Access to loans will be facilitated through financial literacy trainings as well as through improved financing to aggregators in dairy value chains.

At the level of the different **dairy value chain aggregators**, the support strategy focuses on cementing the already existing access to financial institutions that this target segment has through promoting the right type of financial services that are required to accelerate the flow of investment and working capital in different dairy value chains.

At the supply side, RDDP would partner with a range of financial institutions. Selection criteria would include their current presence and target group reach or vicinity, and their medium to long term sustainability prospects, as well as minimum level of assured supervision and pursuit of standards and relevant regulations. The project supported financial services would contribute to an improved coverage of costs and risks of partner financial institutions and would. At the retail level, focus on the creation, establishment and strengthening of cooperative savings and credit structures (primarily SACCOS). For firms currently operating within the different dairy processing value chains, the project would facilitate the capacity development of partner financial institutions to better enable them to identify, process and analyse loan requests from dairy aggregators such as processors, collection center operators, transporters and milk traders and other produce buyers. Investment and working capital requirements would be serviced with a range of different options for financial instruments used, utilizing the comparative variety and sophistication of existing financial institutions,

Demand for rural finance

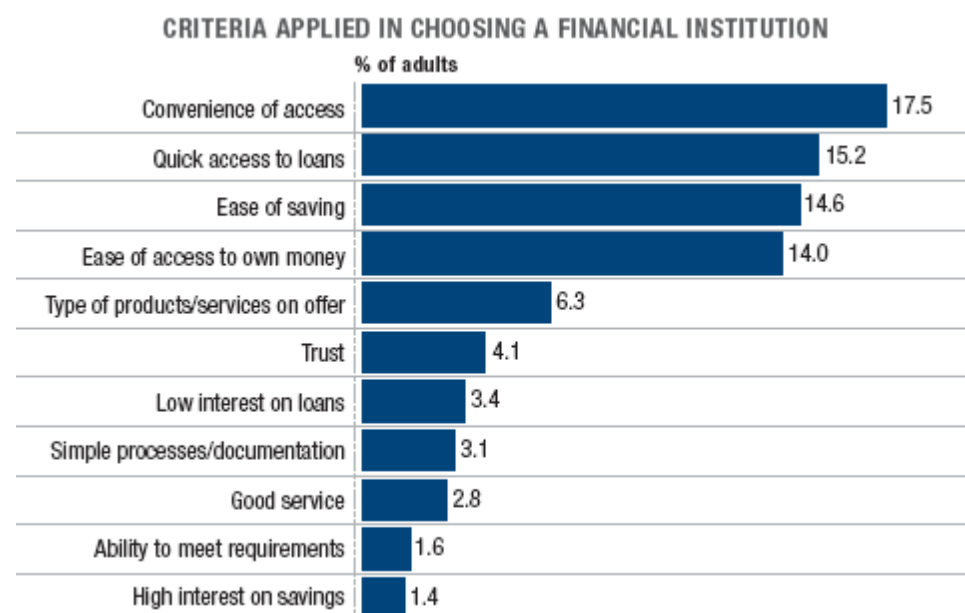
Data base

The most comprehensive set of data were generated by the FinScope survey for Rwanda, 2013. The survey measures the access to financial services amongst adults throughout the rural and more urbanized parts of the country. Information indicates what services people do and not use and why; what barriers prevent more use, and what is different region-to-region. For the most recent survey with the objective of being nationally representative of the entire adult population (>16 years), a total of 6,150 interviews were conducted in Rwanda with adults taking part in the survey.

Demand profiles of Rwandan population

A considerable 87% of the adult population is engaged in some type of farming activity, and this in many cases involves possession of cows. At the end of 2012, 72.9% of the adult population had finished at least primary school, so literacy constitutes some type of barrier of access to financial services. 68% (3 million) of Rwandan adults save or put money away. Financial institutions are perceived to be less accessible than other facilities such as markets, sector offices, schools and health care facilities. Issues related to public transport such as affordability, reliability and distance to access points, further serve to restrict access to financial institutions for rural communities. Rwandan adults regard convenience of access as one of the most important criteria when choosing a financial institution. The overview below ranks the different criteria used in selecting financial institutions as perceived by the Rwandan population:

Table 2: FinScope National Survey 2013: Criteria applied in choosing a financial institution



Source: FinScope Rwanda, 2013 p. 7

It should be noted that from the perspective of the users of financial services, the ease and convenience of access to services figures much more prominently than the costs of these services: only 3.4 per cent of the interviewed population saw low interest rates for loans as a major criterion for or against using a particular type of financial institution and even less so for choosing an institution to deposit their savings.

Attitude to savings. A notable 86% of Rwandans prefer to save for something rather than to take loans to buy it. Encouraging and facilitating regular saving of small amounts therefore responds to a felt need of the large part of the population that views any type of borrowing sceptically (see next section below). Rwandans in rural locations trust SACCOs most as a safe place for their savings. Banks are second, and all other types of MFIs or informal finance institutions are ranked far behind. Table 3 shows the survey results:

Table 3: FinScope National Survey 2013: Criteria applied in choosing a financial institution

Who do Rwandans trust most with their savings?				
% adults	Kigali City	Other urban	Rural	Total adult population
Bank	60.3	33.8	27.5	33.0
Umurenge SACCO	29.1	45.9	53.9	49.4
Non-umurenge SACCO or a MFI	2.8	3.3	2.3	2.5

Source: FinScope Rwanda, 2013 p. 8

Attitude to borrowing. On the one hand, 56% borrowed money or were indebted at some stage during the 12 months period prior to the FinScope interviews. On the other hand, 68% of adults have a sceptical attitude to taking loans. They stated that they avoid borrowing if they can; 62% regard being able to borrow when they need to as more important than the amount they have to pay back.

The FinScope survey in Rwanda has not covered the importance of the growing mobile money transactions for rural clients. Mobile money services increase the outreach of financial services considerably and they are increasingly easy to obtain also in remote and agricultural locations. A USAID supported initiative has used the cell phone availability among farmers to operate a phone based price data base for all major agricultural commodities. This system is still widely used by farmers.

Specific demand profiles of different actors in the dairy value chains

Two major studies were conducted to assess demand profiles of Rwandan dairy producers and their general needs. This was done in the context of introduction of dairy as a special value chain under PASP, but the study results also have some implications for the design of proposals under RDDP. The “**Dairy Value Chain and Market Analysis in Rwanda**” Study by Heifer International provides an overview of the dairy sector and contains a functional analysis of dairy value chains in the country. Among other things, the study highlights that most of the total of 90 to 100 milk chilling centers (MCCs) as the main aggregation point between farmer producers and processors operate far below their capacity, and the same is observed for most of the dairy processors in Rwanda: total capacity utilization of the major Rwandan dairies combined amounts to merely 48%. Altogether there are 7 larger processors behind the market leader Inyange and another 25 smaller or micro-processors. The study describes a total of about 12 large milk traders in the country who supply the milk kiosk in the capital and in other locations.

A short section in this study deals with constraints to accessing financial services. These are summarized in table 4, taken from the Heifer study (p. 41):

Table 4: Value chain financing constraints in Rwanda – Study Overview

Value chain Finance Constraints
Low capacity utilisation and low market prices not attractive to FIs for prospective new loans.
Low returns leads to inability of dairy farmers cooperatives repay credit.
Rwandan Dairy sector perceived as a high risk investment by Financial Institution
Low financial institution's literacy in dairy value chain leads to inadequate or inexistence of risk analysis and management strategies.
Financial data records at MCC are lacking which limits capacity of FIs to conduct appraisals smoothly.
High interest rate of 18% to 20% makes long term financing very expensive to the chain actors
Zero or partial ownership of MCCs by dairy cooperatives leads to limited collateral.
No incentives along the chain to create business models that could potentially offer alternative finance to chain actors (e.g. Contract farming).

In sum, access constraints relate to missing collateral at farmer and MCC level, absence of specialized appraisal skills of dairy chain actors among financial institutions, and low financial returns from operations making the servicing of production loans for dairy farmer cooperatives difficult.

A second study “**Business Development Service Assessment - Report on Dairy Operations**” contains a few proposals on improving links to financing institutions at the end. These are

- To encourage cooperatives to operate with retained earnings and thus build up their asset base, which would, in turn, augment the available collateral available for debt financing through commercial banks

This is correct in principle. With the simple approach of cooperatives of setting their share values, basically operating without share splits or additional capital offerings, this will result in even higher share values and thus higher access barriers to new cooperators. For this reason, it will be important to supplement a surplus retention policy with flexible entry stipulations such as partial or split payments of initial shares or similar.

- To base financial relation between suppliers in the dairy value chain and financial institutions to a larger extent on contracts

This is again useful in principle but the very nature of the supply chain in Rwanda with 70% of milk supply through informal channels limits this approach. Contracts also work more credibly with larger off-takers or produce buyers such as Inyange. More capacity building for financial institutions is required to

- Formalize the existing informal savings groups (*Ibimina*) among dairy farmers and provide a secure place for savings deposits through SACCOs or similar formal institutions

This proposal is taken up directly in the rural finance project proposals below.

Dairy value chain financing support proposals

Approach to providing financial services in RDDP

Rwanda has a good coverage of a wide variety of different financial institutions. Many of the project investment capital requirements – for motorcycles, bankable micro projects, investments of VC aggregators and large scale investments for transformation of MCCs – can be financed through different types of financial instruments. Two examples, the largest and smallest types of investment foreseen are detailed to illustrate this.

Case 1: A transformation of an existing milk chilling center to a processing unit with fresh milk and yoghurt could be carried out for total costs of USD 1.2 mn., out of which 600,000. are planned to be externally financed. The options are the following:

- **equity**, suggested through an investment company or directly through the Business Development Foundation (BDF)
- **guarantees** as partial individual types of guarantees for loans provided by a commercial bank and back up by a guarantee of the Business Development Foundation
- **debt finance** with amounts financed through a wholesale line of credit up to the same extent as the standard leverage ratio of guarantees of BDF i.e., 50%

The amounts expended by the project for guarantees or partial coverage of the debt financing requirements would be equal i.e., 50% of USD 1 mn or USD 500,000. In both cases, the balance amount would be financed out of resources of partner commercial banks

Case 2: A micro project would finance the purchase of a feed processing unit (feed mill only) of USD 2,400 total costs with USD 2,000 external financing requirement. For this small asset, two types of financing are feasible:

- **leasing** of the standard type where the possession of the asset remains with the leasing company for the lease period and is then transferred to the lease taker based on the remaining economic value of the asset
- **debt finance**, in this case preferably through a SACCO or an MFI in close proximity to the client to keep transaction costs in relation to loans received manageable

For component 1, promotional activities at the dairy producer level, the different types of financial service requirements are laid out in the technical annex: bankable micro projects. motorcycles (with different levels of external financing required between animal health workers and private sector service providers) and dairy cow insurance. For component 2, the requirements are indicative and need to be firmed up based on a financial services demand assessment proposed in year 1 of the project. Table 5 contains the different options that the financial sector in Rwanda offers in overview:

Table 5: Value chain financing instruments and types of financing required

Instrument	Leasing	guarantees	loans	grants	equity	Insurance
<i>Component 1</i>						
Motorbike acquisition	X		x			
		x	x			
Climate smart MPs				x		
Dairy cow insurance						X
<i>Component 2</i>						
WK support VCs			x			
Investment support VC	X	x	X			
Large scale processing inv.					x	

Management of financial services: the Business Development Foundation (BDF) would manage the activities related to the financing of investment and working capital requirements of dairy producers and value chain actors.

Guarantees: these would be provided by BDF following their standard practices for partial individual guarantee coverage. Guarantees could be extended to financial institutions that have signed an MoU with BDF and have undergone principal fit and proper criteria of BDF for collaboration.

Leasing: for small-scale lease financing such as the motorcycles for animal health workers and other private sector service providers, the preferred option would be to have this done through leasing. In discussion with one of the leading lease financing agencies it became however apparent that implementation experience so far has not been promising. The systems and procedures and legal requirements are in place, but leased items tend not to be treated with the same care by the lessees. Against this background. Final decisions on the use of this instrument or substitution through a straight line of credit need to be considered at start-up. It is also proposed to discuss the issues with the Central Bank to get their views on the future of this financing instrument in Rwanda.

Loans: BDF is to sign MoUs with banks following two principal models. (i) in the case of financial institutions like BRD Development, BDF would finance loan exposures under the project up to 50% through externally; (ii) in the case of full service commercial banks with their own deposit mobilization in place such as BPR, the project would only provide potential eligible loan applicant lists and the banks would finance the required loan exposures under their own resources. For case (i) project loan resources, a subsidiary loan agreement up to ten years would be signed between the BDF and participating banks with loan tenors up to 5 years. Resources remaining after the 10 year period would be transferred back to the government budget.

Grants: These refer to non-repayable financing climate smart projects and would be managed by BDF in collaboration with the SPIU.

Equity: BDF would directly manage any equity financing contributions with an exit strategy for the placements that are in line with the project implementation period. Remaining resources would be transferred back to the government budget.

Insurance: Discussions are ongoing with one company, ACRE Africa, offering dairy cow insurance services on a pilot scale to dairy producers. For start-up, it is recommended to include an insurance expert and to take a final decision on direct procurement or alternatively, on a prequalified tender, if there is more than one company capable of implementing the pilot projects under RDDP as designed.

Appendix 14: Contents of Project Life File

Policy related

- EADD, 2008. Dairy Industry in Rwanda – Value Chain Analysis
- EADD, 2009. Revise Rwanda Strategic Interventions
- EADD, 2011c. Market Models EADD-Rwanda.
- FAO, 2004. Employment generation through small-scale dairy marketing and processing. Experiences from Kenya, Bangladesh and Ghana.
- FAO, 2005. Congo, Democratic Republic of. Livestock Sector Brief.
- FAO, 2011. Dairy Development Institutions in East Africa: Lessons Learned and Options.
- FAO, 2013. Milk and dairy products in human nutrition.
- GoR, 2013. Northern Province, Burera District Development Plan: 2013-2018. www.burera.gov.rw/index.php?id=604 (Accessed 25 September, 2014).
- IFAD, Sep. 2015. Concept Note on Rwanda Dairy Development Project.
- KENYA, 2013. Sessional Paper No.5 of 2013 on the National Dairy Development Policy. Ministry of Agriculture, Livestock and Fisheries.
- MINAGRI, 2004. Animal Resources Policy
- MINAGRI, 2009. Updating the Master Plan of the Milk Chain in Rwanda
- MINAGRI, 2009. Animal Nutrition Strategy .
- MINAGRI, 2013. Strategic Plan for the Transformation of Agriculture in Rwanda (PSTA III).
- MINAGRI, 2013. Rwanda National Dairy Strategy (2013-2018).
- MINAGRI/RAB, 2014. Charter for 'One Cup of Milk Per Child' Programme.
- MINAGRI/RAB, 2015. Concept Note on Sustainability and Scalability Plan for the 'One Cup of Milk per Child' Programme
- MINAGRI, Oct. 2015. Strategic Plan for Mastitis Prevention and Control in Rwanda.
- MINAGRI, Nov. 2015. Rwanda Breeding Policy and National Herd Book
- MINALOC, 2011. Decentralisation Implementation Plan (2011-2015): devolved planning to Districts and Sectors and implementation via performance contracts).
- MINICOM, 2010. Small and Medium Enterprises Development Policy.
- MINICOM, 2010. Rwanda Quality Policy
- MINICOM, 2011. Rwanda SMEs Cluster Selection

- MINICOM/One-UN UNIDO, Aug. 2015. Inception Report: Support to Burera Dairy CPC Project.
- MINICOM/One-UN UNIDO, Nov. 2015. Preliminary Findings, Farming Household Baseline Survey. Support to Burera Dairy CPC Project.
- RNDP, 2014. Five Years Strategic Plan for the Rwanda National Dairy Platform.
- RNDP, 2014. Finance and Administrative Procedures Manual for the RNDP.
- RWANDA, 2000. Vision 2020 (Rwanda).
- RWANDA, 2013. Economic Development and Poverty Reduction Strategy (2012-2018)
- SNV, 2012. Proposal Concept Note. Gishwati Milkshed Development Project (GMDP).
- UGANDA, 2011. National dairy Strategy
- UNIDO, 2011. ONE UN Programme Livestock Resources Value Chain Development Project: Preliminary Mission Findings Brian Dugdill and Proposals for Stakeholder and Partners Meeting (24-28 October, 2011)
- USAID, 2008. The Tipping Point: Positioning Rwanda's Dairy Industry, Local and Regional Competitiveness. Strategic Plan for Dairy Sector Competitiveness Project.
- USAID, 2011. Request for Applications (RFA) Number RFA-698-11-0000003: Rwanda Dairy Competitiveness Programme II
- Young, E. and L. Quinn (2002) Writing Effective Public Policy Papers: A Guide To Policy Advisers in Central and Eastern Europe, Budapest: LGI.

SECAP

- Bingi S. & Tondel F., 2015, *Recent developments in the dairy sector in Eastern Africa Towards a regional policy framework for value chain development*, European Centre for Development policy Management, Briefing note, n. 78,
- Bendito A. & Twomlow S., 2014, *Promoting climate smart approaches to post-harvest challenges in Rwanda*, International Journal of Agricultural Sustainability, 19p.
- Dawson IK, Carsan S, Franzel S, Kindt R, van Breugel P, Gaudal L, Lillesø J -PB, Orwa C, Jamnadass R. 2014. *Agroforestry, livestock, fodder production and climate change adaptation and mitigation in East Africa: issues and options*. ICRAF Working Paper No.178. Nairobi, World Agroforestry Centre.
- Downing, T., Watkiss, P., Dyszynski, J.; et al, 2009, Economics of Climate Change in Rwanda, Stockholm Environment Institute
- Food and Agriculture Organization of the United Nations (FAO), 2013, *CLIMATE SMART AGRICULTURE Sourcebook*, Rome.
- Franzel S., Carsan S., Lukuyu B., Sinja J., Wambugu C., 2014, *Fodder trees for improving livestock productivity and smallholder livelihoods in Africa*, Opinion in Environmental Sustainability, 6, 98-103

- Gerber, P.J., Steinfeld, H., Henderson, B., Mottet, A., Opio, C., Dijkman, J., Falcucci, A. & Tempio, G. 2013, *Tackling climate change through livestock – A global assessment of emissions and mitigation opportunities*, Food and Agriculture Organization of the United Nations (FAO), Rome.
- National Institute of Statistics Rwanda, 2014, *Integrated Household Living Conditions Survey (EICV4) 2013/2014*, Kigali, Rwanda
- Niyonzima T., Stage J., Uwera C, 2013, *The value of access to water: livestock farming in the Nyagatare District, Rwanda*, SpringerPlus, 2:644-
- Rwanda Environmental Management Authority (REMA), 2011, *Green Growth and Climate Resilience, National Strategy for Climate Change and Low Carbon Development*, Kigali, Rwanda
- Steinfeld H, Mack S. 2014. *Livestock development strategies. Food and Agriculture Organization of the United Nations (FAO)*, Rome.
- United Republic of Rwanda, 2006, *National Adaptation Programmes of Action. to Climate Change*, Kigali, Rwanda

Documents on the dairy-sector

- East African Community (EAC), *The EAC Livestock & Fisheries Sector: Overview*. http://www.eac.int/agriculture/index.php?option=com_content&view=article&id=77&Itemid=108, 2011.
- FAO 2011, *Dairy Development Institutions in East Africa: Lessons Learned and Options*, Rome, Food and Agriculture Organisation
- FAO 2014, *FAO Statistical Year Book 2014, Africa Food and Agriculture*, Accra, Food and Agriculture Organisation, Rome
- Heifer International-Rwanda, 2016, Dairy Value chain and market analysis report, report on ongoing dairy operations within the MINAGRI-IFAD Climate resilient Post-Harvest and Agribusiness project, Kigali.
- Heifer International-Rwanda, 2016, Business Development Service “BDS” Assessment, Assessment Report on Dairy Operations within the MINAGRI-IFAD Climate Resilient Post-harvest and Agribusiness Support Project “PASP”, Kigali.
- Inspired International 2012, Rwanda's Dairy Value Chain from a Financier's Perspective– Analysis and Opportunities. RDCP II – Land O Lakes, Kigali, Rwanda
- Inspired International 2014, Deep Dive Phase II Report – Investment Scenarios in Rwanda's Dairy Value Chain. RDCP II – Land O Lakes, Kigali, Rwanda
- Makoni, N; Mwai, R; Redda, T; Zijpp, A. van der; Lee, J. van der. 2013. White Gold; Opportunities for Dairy Sector Development Collaboration in East Africa. Centre for Development Innovation, Wageningen UR (University & Research centre). CDI report CDI- 4-006. Wageningen.
- Makoni, N; Mwai, R; Redda, T; Zijpp, A. van der; Lee, J. van der. 2013. White Gold; Opportunities for Dairy Sector Development Collaboration in East Africa. Centre for Development Innovation, Wageningen UR (University & Research centre). CDI report CDI-14-006. Wageningen.
- Minagri 2013. Rwanda National Dairy Strategy 2013 – 2018, Kigali, Rwanda.

- Ministry of Agriculture and Animal Resources (MINAGRI), National Dairy Strategy, MINAGRI, Government of Rwanda, Kigali, Rwanda, 2013.
- National Institute of Statistics of Rwanda (NISR), Statistical Year Book 2014. Published in 2015. Kigali
- Susan B and Fabien T. Recent developments in the East African dairy sector, towards a regional policy framework for value chain. Briefing note No. 78 – September 2015.

Poverty, gender and youth

- Government of Rwanda, Vision 2020 Document, 2002
- MINAGRI, Republic of Rwanda, Agriculture Gender Strategy 2012.
- Ministry of Gender and Family Promotion (2010) National Gender Policy
- Ministry of Local Government (2016) *Ubudehe* categories
- National Institute of Statistics of Rwanda 2015 Integrated Household Living Conditions Survey Rwanda Poverty Profile, 2013/14
- The Republic of Rwanda, Economic Development and Poverty Reduction Strategy II, 2013-2018, May 2013
- UNAIDS (2015) Rwanda gets closer to having an AIDS-free generation
- UNDP (2015) Human Development Report 2015, Rwanda
- WFP (2015) Comprehensive Food Security and Vulnerability Analysis and Nutrition Survey (CFSVA/NS)

Nutrition

- Arsenio, L., Caronna, S., Cioni, F. & Dall'Aglio, E. 2010. Homo sapiens and milk: A valuable food in the past and in the future. *Med. J. Nutrition Metab*: 3(2): 99–103.
- Black, R.E., Allen, L.H., Bhutta, Z.A., Caulfield, L.E., de Onis, M., Ezzati, M., Mathers, C. & Rivera, J. 2008. Maternal and child undernutrition. Global and regional exposures and health consequences. *Lancet*, 371(9608): 243–260.
- Comprehensive Africa Agriculture Development Program (CAADP), 2013. Nutrition Country Paper (Draft) for Rwanda – East and Central Africa Regional CAADP Nutrition Program Development Workshop.
- Comprehensive Africa Agriculture Development Program (CAADP): Nutrition Country Paper - Rwanda (Draft) 2013.
- East Africa Dairy Development, 2012. Draft Nielsen Usage & Attitudes and Segmentation Reports.
- FAO, 2011. The state of food and agriculture 2010-2011: Women in agriculture – closing the gender gap for development. Rome.
- Hoddinott, J., D. Headey, and M. Dereje. 2013. Cows, missing milk markets and nutrition in rural Ethiopia. Presentation at the Farm production and nutrition workshop, World Bank, June 7, 2013.

- Hoppe, C., Andersen, G.S., Jacobsen, S., Mølgaard, C., Friis, H., Sangild, P.T. & Michaelsen, K.F. 2008. The use of whey or skimmed milk powder in fortified blended foods for vulnerable groups. *J. Nutr.*, 138(1): 145S–161S.
- Iannotti, L. 2012. Milk and dairy programs affecting nutrition in Milk and dairy products in human nutrition (FAO, 2013).
- IFAD (2014). Results and Impact Management System RIMS - FIRST- AND SECOND-LEVEL RESULTS HANDBOOK
- MINAGRI, Republic of Rwanda, Nutrition Action Plan (2013-2018).
- MINAGRI, Republic of Rwanda, Agriculture Gender Strategy 2012.
- MINAGRI, Republic of Rwanda, the Rwanda National Dairy Strategy of 2013.
- MINAGRI, Republic of Rwanda, (2015), Operational and M&E Plan of MINAGRI Nutrition Action Plan (NAP), Jan 2015-June 2016.
- MINSANTE, Republic of Rwanda, Economic Development and Poverty Reduction Strategy (EDPRS) 2.
- MINSANTE, Republic of Rwanda, Third Rwandan Health Sector Strategic Plan (HSSP III, 2012-2018).
- MINSANTE, Republic of Rwanda, National Nutrition Policy 2005.
- MINSANTE, Republic of Rwanda, National Joint Supervision on District Plan to Eliminate Malnutrition (DPEM) Draft Report, June 2012.
- Murphy, S. P., and L. H. Allen. 2003. Nutritional importance of animal source foods. *Journal of Nutrition*, 133(11S-II): 3932S-3935S.
- Republic of Rwanda, Comprehensive Joint Action Plan to Eliminate Malnutrition (2010-2013)
- Republic of Rwanda, National Food and Nutrition Policy (NFNP 2013-2018).
- Stanton, C., McMahon, D., and Mills, S. Dairy components, products and human health in Milk and dairy products in human nutrition (FAO, 2013).
- Victora, C., Adair, L., Fall, C., Hallal, P., Martorell, R., Richter, L. & Sachdev, H. 2008. Maternal and child undernutrition. Consequences for adult health and human capital. *Lancet*, 371 (9609): 340–357.
- Wilson, T., A. Pearson, N. Bradbear, A. Jayasuriya, H. Laswai, L. Mtenga, S. Richards, and R. Smith. 2005. Livestock products—Valuable and more valuable. Pages 109–126 in *Livestock and Wealth Creation: Improving the Husbandry of Animals Kept by Resource-Poor People in Developing Countries*. E. A. Owen, A. Kitalyi, N. Jayasuriya, and T. Smith. ed. Nottingham Univ. Press, Nottingham, UK.
- WFP. Comprehensive Food Security and Vulnerability Analysis and Nutrition Survey (CFSVA/NS) 2006.
- WFP. Comprehensive Food Security and Vulnerability Analysis and Nutrition Survey (CFSVA/NS) 2009.

- WFP. Comprehensive Food Security and Vulnerability Analysis and Nutrition Survey (CFSVA/NS) 2012
 - WFP: Comprehensive Food Security and Vulnerability Analysis and Nutrition Survey (CFSVA/NS) 2014
 - WFP: Comprehensive Food Security and Vulnerability Analysis and Nutrition Survey (CFSVA/NS) 2015
-