Investing in rural people

Executive Board

President's memorandum
Proposed additional financing to
Republic of Rwanda
Rwanda Dairy Development Project - Phase 2 (RDDP2)

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Action: The Executive Board is invited to approve the recommendation for the proposed additional financing contained in paragraph 64.

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Financing summary

Initiating institution:	IFAD
Borrower/recipient:	Republic of Rwanda
Executing agency:	Ministry of Agriculture and Animal Resources
Total project cost:	US$128.37 million
Amount of original IFAD loan 1 (performance-based allocation system [PBAS]):	EUR 7.76 million (equivalent to US$8.44 million)
Terms of original IFAD loan 1:	Super highly concessional: 50 years, including a grace period of 10 years, with a service charge of 0.10 per cent per annum (adjustments for single-currency loans)
Amount of original IFAD loan 2 [PBAS]	EUR 1.94 million (equivalent to US$2.11 million)
Terms of original IFAD loan 2:	Highly concessional: 40 years, including a grace period of 10 years, with a service charge of 0.75 per cent per annum (adjustments for single-currency loans)
Amount of original IFAD loan 3 (Borrowed Resource Allocation System [BRAM]):	EUR 9.2 million (equivalent to US$10 million)
Terms of original IFAD loan 3:	Ordinary: 30 years, including a grace period of 9 years, subject to interest at a rate equal to the IFAD reference interest rate, including a variable spread
Amount of additional IFAD financing [PBAS]:	EUR 21.61 million (equivalent to US$24.19 million)
Amount of additional IFAD loan 1:	EUR 17.28 million (equivalent to US$19.35 million)
Terms of additional IFAD loan 1:	Super highly concessional: 50 years with a grace period of 10 years and a service charge of 0.10 per cent per annum (adjustments for single-currency loans)
Amount of additional IFAD loan 2:	EUR 4.32 million (equivalent to US$4.84 million)
Terms of additional IFAD loan 2:	Highly concessional: 40 years, including a grace period of 10 years, with a service charge of 0.75 per cent per annum (adjustments for single-currency loans)
Cofinancier(s):	OPEC Fund for International Development (OPEC Fund), Green Climate Fund (GCF) Dairy Interventions for Mitigation and Adaptation (DaIMA), Equity Bank, Heifer International
Amount of original cofinancing:	OPEC Fund: US$20 million GCF DaIMA: US$8.5 million Equity Bank: US$10 million Heifer International: US$6 million
Terms of original cofinancing:	OPEC Fund: Loan GCF: Loan and grant

	Equity Bank: Loan Heifer International: Grant
Amount of additional GCF cofinancing:	US$3 million
Original contribution of borrower:	US$17.64 million
Additional contribution of borrower:	US$4.7 million
Original contribution of beneficiaries:	US$9.52 million
Additional contribution of beneficiaries:	US$4.28 million
Amount of original IFAD climate finance:	US$7.164 million
Amount of additional IFAD climate finance:	US$14.139 million
Cooperating institution:	Directly supervised by IFAD

I. Background and project description

A. Background

1. The Rwanda Dairy Development Project (RDDP) was designed in 2016 with the main rationale of helping the country meet the rapidly growing demand for milk by improving cattle productivity, milk quality and processing capacity and strengthening the institutional framework. Implementation commenced in December 2016, and the project closed on 31 December 2023.

2. In 2022, considering the successes of RDDP and the willingness of the Government of Rwanda to further develop the dairy sector, the process of designing a second phase began. The Rwanda Dairy Development Project – Phase 2 (RDDP2) builds on RDDP successes and lessons and replicates them nationwide, introduces major innovations such as digitalization and places more emphasis on climate change adaptation and mitigation and sustainable financing.

3. RDDP2 was designed in 2022 and 2023, approved on 16 November 2023 and became effective in March 2024. Its completion date is 30 March 2030.

4. Total project costs were estimated at US$100.37 million at design, including the financing from IFAD, composed of EUR 9.7 million (US$10.547 million) from the performance-based allocation system (PBAS) and EUR 9.2 million (US$10.00 million) from the Borrowed Resource Access Mechanism (BRAM), US$20 million from the OPEC Fund for International Development (OPEC Fund), US$8.5 million from the Green Climate Fund (GCF)-funded Dairy Interventions for Mitigation and Adaptation (DaIMA) project, US$10 million from Equity Bank Rwanda, a US$6 million grant from Heifer International, US$17.64 million from the Government of Rwanda and US$9.52 million from the beneficiaries. At design, the project had a financing gap of US$8.16 million.

5. In June 2024, the Government of Rwanda requested additional financing of EUR 21.61 million (US$24.19 million), with no modification of completion and closing dates. The proposed additional financing would be provided as super highly concessional (80 per cent) and highly concessional (20 per cent) loans from the PBAS under the Twelfth Replenishment of IFAD's Resources (IFAD12). The objectives of the proposed additional financing are to fill the financing gap and replicate and advance RDDP2 operations.

B. Original project description

6. The goal of RDDP2 is to reduce the poverty level of targeted rural households and mitigate the impact of the dairy sector on climate change. The project's development objective is to enhance the income, nutrition and resilience of rural households through a more inclusive, sustainable, digitalized and competitive dairy sector.

7. The project comprises three components aimed at achieving three outcomes: (i) increasing productivity and resilience of dairy smallholder production systems; (ii) increasing dairy value chain efficiency through scaled-up investments, improved market access and consumption of dairy products; and (iii) policy support and project management, monitoring and evaluation, and knowledge management.

II. Rationale for additional financing

A. Rationale

8. RDDP2 was designed with a US$8.16 million financing gap, budgeted from year 4. The project will not be able to operate fully during the second half if the gap is not filled and no opportunities for cofinancing have emerged since design.

9. In addition, the Government has requested an additional US$16.03 million to replicate some key activities. This request is justified by ongoing changes in the market, driven by the recent opening of a major milk processing plant that will

increase national processing capacity and the demand for raw milk sixfold. The Government also wishes to increase domestic milk consumption, and one of the means envisioned is through the school milk programme. Increasing production will require significant investments in genetics, feeding and water, which are the main purposes of the additional financing. To increase milk supply, a ministerial order on land use in the Eastern Province was recently issued, requiring all farmers to shift from the current pasture-based system to an intensive zero grazing system. This shift will require investments at the farm level in water supply, fodder production and conservation, cattle housing and genetics.

10. To achieve the objectives in cattle genetics, a regional cattle breeding centre is being established to make the country independent in terms of semen, embryos and breeding stock and also to serve the region. RDDP initiated the establishment of this centre with the construction of a state-of-the-art semen production unit, but plans also include an embryo transfer unit, breeding farm and training centre.

11. Ensuring an adequate supply of milk for the new processing plant will require strengthening the national network of milk collection centres (MCCs), as well as milk collection points (MCPs). Its collection capacity currently accounts for just 17 per cent of domestic production. RDDP2 will build new MCCs, along with MCPs to supply them, which will bring total daily collection capacity close to processing capacity. Rehabilitation of some existing MCCs and MCPs is also necessary.

12. The "One Cup of Milk per Child" programme is under the joint responsibility of the Ministry of Education and the Ministry of Agriculture and Animal Resources. With a stunting rate of 33 per cent,[1] children's nutrition is a top priority of the Government of Rwanda, which is committed to launching the programme. IFAD was asked to contribute to this initiative by initially piloting it in two districts.

B. Special aspects relating to IFAD's corporate mainstreaming priorities

13. In line with IFAD's mainstreaming commitments, the project has been validated as:

☒ Including climate finance

☒ Nutrition-sensitive

☒ Youth-sensitive

☒ Including adaptive capacity

C. Description of geographical area and target groups

14. The RDDP2 additional financing will add approximately 12,500 direct beneficiaries, which will result in a new total direct outreach figure of 187,500 households. Under the additional financing, RDDP2 will allocate funds to support 175 schools that equate to approximately 175,000 schoolchildren in the school milk feeding programme.

15. The geographical area remains unchanged and consists of 27 districts. The only districts not covered by RDDP2 are the three urban districts of Kigali City.

D. Components, outcomes and activities

16. The additional financing will be implemented with the same components as the original financing.

17. **Component 1: Increasing productivity and resilience of dairy smallholder production systems** focuses on the production level, including services for production.

[1] National Institute of Health, 2020.

18. **Subcomponent 1.2: Access to services, inputs and technical innovations enhancing availability of quality feed and water to strengthen climate resilience.** Additional support will aim at increasing the productivity, production and climate resilience of production systems and will help farmers in the Eastern Province transform their production systems to comply with the ministerial order on zero grazing. The additional investments will consist of expanding support for consistent access to water and quality feed and upgrading public infrastructure for the delivery of breeding services.

Investments in productivity and climate resilience

19. **Damsheets.** Under RDDP, "damsheets" were introduced in the Eastern Province to increase water availability in this drought-prone area. Damsheets are storage ponds with impluvium, waterproofed with a liner. Initial assessments have shown that damsheets are cost-effective and help farmers cope with dry spells without affecting underground resources. A total of 1,000 damsheets are planned under RDDP2, but their number will be increased by an additional 1,500 with the additional financing.

20. **Fodder processing, conservation and storage.** Enforcement of the zero grazing regulations will require farmers to adopt "cut and carry" systems where fodder is collected and brought to the cowshed. Also, fodder conservation has become a necessity to cope with seasonal fodder deficits and reduce the seasonality of production. Finally, the quality of fodder needs to be improved to boost productivity and reduce emissions. Under the additional financing, support will be provided for farmers to acquire: (i) 500 fodder storage hangars; and (ii) 1,000 fodder choppers to process silage and improve the digestibility of fodder.

21. **Cattle housing.** Under the additional financing, 1,000 farmers will receive assistance to construct improved cowsheds that will enable them to comply with the new regulations and improve animal welfare, health and manure management.

22. **Milk quality at the farm level.** At the farm level, only capacity-building is planned under RDDP2, and quality issues are related to the lack of appropriate containers for milk between farm and MCCs. The additional financing will thus subsidize the acquisition of 5,000 milk cans for farmers.

23. **Implementation.** These investments will be supported through partial subsidies, to encourage access to sustainable finance and not distort the market. The level of subsidy will be 40 per cent for cowsheds and 60 per cent for other investments.

Infrastructure for provision of breeding services

24. Because of the small size of herds, artificial insemination (AI) is the most appropriate reproduction method for dairy cattle. RDDP has invested in a state-of-the-art AI centre and bull station, where local semen is now produced at a competitive cost. This facility is unique in the region and has the potential to become a regional centre of excellence. The additional financing will build on the existing investments to establish in addition to the AI centre: (i) a breeding farm that will house an elite nucleus herd to produce bulls, heifers and embryos; (ii) a reproduction centre for embryo production and transplantation; and (iii) a training centre for farmers and AI technicians.

25. **Component 2: Increasing dairy value chain efficiency through scaled-up investments, improved market access and consumption of dairy products** focuses on increasing the operational efficiency of the dairy value chain.

26. **Subcomponent 2.1: Increasing the dairy value chain efficiency.** MCPs and MCCs play a key role in the structure of the dairy value chain. RDDP2 has planned and budgeted for the rehabilitation of 69 MCPs and 29 MCCs and for the construction of 29 MCPs and 26 MCCs. However, 21 additional MCPs and 35 MCCs will also require upgrading to meet national standards; this will be funded with the additional financing. Furthermore, the costs of MCPs and MCCs in RDDP2's initial design will need to be higher to cope with inflation and facilitate compliance with the new

standards, which are more stringent than at design. Finally, the financing rule for the rehabilitation of MCPs and MCCs needs to be amended to align it with other government projects financing the same investments. A budget for capacity-building in the management and governance of cooperatives that will be managing the additional MCPs and MCCs will also be allocated.

27. The budget for MCC and MCP rehabilitation, initially financed by Equity Bank and replaced by PBAS funds under the additional financing, will be used to finance seven additional small-scale processing units and rehabilitate seven more.

28. **Subcomponent 2.3: Improving milk consumption and nutrition awareness.** The Government aims to implement the School Milk Programme in all primary and secondary schools, which represents around 3.5 million children. The project will pilot three different models in two districts and 175 schools: (i) a model based on milk distributed, packaged and processed to schools; (ii) a model in which milk is pasteurized in selected MCCs and then distributed loose but refrigerated to schools; and (iii) a model where milk is pasteurized and refrigerated at the school level. The economic performance, benefits to farmers and food safety implications will be evaluated to replicate the most suitable model. The project will only finance investments for collection, processing, transport and refrigeration. Milk purchases will be financed by the Government.

E. Costs, benefits and financing

Project costs

29. The overall cost of the project with the requested additional financing is estimated at US$128.372 million, disbursed over six years. Of this total financing, IFAD's contribution amounts to EUR 9.7 million (US$10.547 million) from Rwanda's IFAD12 PBAS, EUR 9.2 million (US$10 million) already confirmed from IFAD's BRAM and additional financing of EUR 21.61 million (US$24.19 million), for a total of EUR 40.51 million (US$44.74 million). In addition, US$20 million will be cofinanced by the OPEC Fund. The project will leverage financing from a regional GCF operation covering Rwanda, including DaIMA, estimated at US$11.5 million (US$8.5 million in the original budget). Equity Bank will participate in the project by financing US$10 million. Heifer International will provide US$6 million. The Government of Rwanda's contribution is estimated at US$22.34 million (US$17.64 million in the original budget), with US$11.56 million as a cash contribution and US$10.78 million as an in-kind contribution. Finally, the beneficiaries will contribute US$13.79 million to the project (US$9.52 million in the original budget).

30. Project components 1 and 2 are partially counted as climate finance, under the same rationale as in the original design. As per the multilateral development banks' methodology for tracking climate change adaptation and mitigation finance, the total amount of IFAD climate finance in the original design is estimated at US$7,164,000.

31. The total amount of additional IFAD climate finance in the proposed additional financing is estimated at US$14,139,000.

Table 1
Original and additional financing summary
(Thousands of United States dollars)

	*Original financing**	*Additional financing*	*Total*
IFAD loan (PBAS)	10 547	24 190	34 737
IFAD loan (BRAM)	10 000	-	10 000
Equity Bank	10 000	-	10 000
Heifer International	6 000	-	6 000
OPEC Fund	20 000	-	20 000
GCF DaIMA	8 500	3 000	11 500
Beneficiaries	9 516	4 275	13 791
Government	17 644	4 700	22 344
Financing gap	8 163	(8 163)	-
Total	**100 371**	**28 002**	**128 372**

See tables 1 and 2 in EB 2023/LOT/P.2 for a detailed breakdown.

Table 2
Project costs by component and financier
(Thousands of United States dollars)

	IFAD BRAM		IFAD PBAS		Additional IFAD PBAS		Equity Bank		Heifer International		OPEC Fund		GCF DaIMA		Beneficiaries			Government			Total
Component	*Amount*	*%*	*Amount*	*%*	*Amount*	*%*	*Amount*	*%*	*Amount*	*%*	*Amount*	*%*	*Amount*	*%*	*Cash*	*In-kind*	*%*	*Cash*	*In-kind*	*%*	*Amount*
1. Increasing productivity and resilience of dairy smallholder production systems	2 607	4	5 937	10	12 468	21	-	-	6 000	10	6 329	10	6 899	11	5 120	8 258	22	7 051	-	12	60 669
2. Increasing dairy value chain efficiency through scaled-up investments, improved market access and consumption of dairy products	7 393	13	13	-	8 492	15	10 000	17	-	-	12 671	22	3 460	6	413	-	1	4 208	10 785	26	57 435
3. Policy support and project management, monitoring and evaluation, and knowledge management	-	-	4 597	45	3 230	31	-	-	-	-	1 000	10	1 141	11	-	-	-	300	-	3	10 268
Total	**10 000**	**8**	**10 547**	**8**	**24 190**	**19**	**10 000**	**8**	**6 000**	**5**	**20 000**	**16**	**11 500**	**9**	**5 533**	**8 258**	**11**	**11 559**	**10 785**	**17**	**128 372**

Table 3
Project costs by expenditure category and financier
(Thousands of United States dollars)

	IFAD BRAM		IFAD PBAS		Additional IFAD PBAS		Equity Bank		Heifer International		OPEC Fund		GCF DaIMA		Beneficiaries			Government			Total
Expenditure category	*Amount*	*%*	*Amount*	*%*	*Amount*	*%*	*Amount*	*%*	*Amount*	*%*	*Amount*	*%*	*Amount*	*%*	*Cash*	*In-kind*	*%*	*Cash*	*In-kind*	*%*	*Amount*
Investment costs																					
Works	-	-	-	-	11 808	36	1 425	4	511	2	5 686	17	1 672	5	4 686	1 507	19	5 825	-	18	33 119
Vehicles	84	3	-	-	144	5	2 687	91	-	-	-	-	-	-	-	-	-	50	-	2	2 965
Equipment and materials	264	1	866	4	480	2	3 320	17	91	-	1 255	6	1 120	6	536	-	3	1 012	10 747	60	19 691
Goods and services, and inputs	3 180	7	4 585	10	7 161	16	2 568	6	3 481	8	8 589	19	3 260	7	200	6 751	16	4 672	38	11	44 485
Consultancies	2 234	23	2 923	30	1 787	18	-	-	13	-	469	5	2 436	25	-	-	-	-	-	-	9 862
Training and workshops	2 102	18	1 514	13	1 038	9	-	-	1 904	16	3 002	26	2 203	19	-	-	-	-	-	-	11 763
Grants and subsidies	303	33	112	12	-	-	-	-	-	-	-	-	384	42	112	-	12	-	-	-	910
Total investment costs	**8 166**	**7**	**10 000**	**8**	**22 418**	**18**	**10 000**	**8**	**6 000**	**5**	**19 000**	**15**	**11 075**	**9**	**5 533**	**8 258**	**11**	**11 559**	**10 785**	**18**	**122 794**
Recurrent costs																					
A. Salaries and allowances	2 065	42	-	-	1 771	36	-	-	-	-	999	21	29	1	-	-	-	-	-	-	4 865
B. Operating costs	316	44	-	-	1	-	-	-	-	-	1	-	396	55	-	-	-	-	-	-	713
Total recurrent costs	**2 381**	**43**	**-**	**-**	**1 772**	**32**	**-**	**-**	**-**	**-**	**1 000**	**18**	**425**	**8**	**-**	**-**	**-**	**-**	**-**	**-**	**5 578**
Total	**10 547**		**10 000**		**24 190**		**10 000**		**6 000**		**20 000**		**11 500**		**5 533**	**8 258**		**11 559**	**10 785**		**128 372**

Table 4
Project costs by component and project year (PY)
(Thousands of United States dollars)

Component	PY1		PY2		PY3		PY4		PY5		PY6		Total
	Amount	*%*	*Amount*	*%*	*Amount*	*%*	*Amount*	*%*	*Amount*	*%*	*Amount*	*%*	*Amount*
1. Increasing productivity and resilience of dairy smallholder production systems	5 104	8	16 785	28	15 843	26	9 076	15	8 979	15	4 883	8	60 669
2. Increasing dairy value chain efficiency, through scaled-up investments, improved market access and consumption of dairy products	6 032	11	21 038	37	17 587	31	7 873	14	3 017	5	1 887	3	57 435
3. Policy support and project management, monitoring and evaluation and knowledge management	1 745	17	1 346	13	1 679	16	1 869	18	1 744	17	1 884	18	10 268
Total	**12 881**	**10**	**39 169**	**31**	**35 110**	**27**	**18 818**	**15**	**13 740**	**11**	**8 654**	**7**	**128 372**

Financing and cofinancing strategy and plan

32. Total project costs, including physical and price contingencies, are estimated at US$128.37 million, with US$110.91 million representing the base cost and US$17.46 million the contingency allowances. Taxes and foreign exchange respectively represent 12 and 42 per cent of total project cost. The largest portion is for component 1 (US$60.67 million), followed by component 2 (US$57.43 million) and finally, component 3, (US$10.27 million).

Disbursement

33. The project will be disbursed over six years. The financial plan allocates 10 per cent, or roughly US$12.88 million, in year 1; 31 per cent, or roughly US$39.17 million, in year 2; 27 per cent, or roughly US$35.11 million, in year 3; 15 per cent, or roughly US$18.82 million, in year 4; 11 per cent, or roughly US$13.74 million, in year 5; and finally, 7 per cent, or roughly US$8.65 million in the final year.

34. There will be no change in the flow of funds arrangements included in the design documents and the approved President’s report.

35. All donor-funded project bank accounts are included in the Treasury single account mechanism. Therefore, IFAD’s additional financing for RDDP2 will flow through the designated account and the operating account already opened at the National Bank of Rwanda. Both the designated account and the project account are basket accounts, and specific account codes will be assigned to each financing instrument to segregate the sources and uses of funds.

36. Disbursements will be based on the submission of quarterly interim financial reports, which shall be submitted to IFAD within 30 days of each quarter’s end.

Summary of benefits and economic analysis

37. The financial analysis shows that the targeted activities are sound, while the economic analysis confirms that the project is economically viable. The economic internal rate of return is 20.03 per cent and the net present value US$118.89 million. The project is sensitive to changes in some of the model’s variables (variations in benefits and costs, lags in the realization of benefits and adoption rates), confirming that sustainable dairy value chain investments are key to project success.

Exit strategy and sustainability

38. The overall exit strategy of RDDP2 remains unchanged, as all activities under the additional financing are already present in the original design. Key exit and sustainability aspects related to the additional financing activities are as follows.

39. **Milk aggregation facilities (MCCs and MCPs).** RDDP lessons revealed that the cooperatives managing MCCs lack adequate management and governance capacity.

RDDP2 has therefore adapted its strategy and allocated significant means to reinforce the governance and management of cooperatives. Under the additional financing, a specific budget will be allocated for building cooperative capacity to manage the additional MCCs and MCPs.

40. **Subsidies for productivity and resilience.** Under RDDP, a matching grant was established to support investments at the production and post-production levels. Managing this system proved very challenging and led to high dependence on grants. RDDP2's strategy is based on sustainable financing mechanisms, and matching grants have been phased out. However, some investments at the production stage, particularly those required for adaptation to climate change or compliance with the new regulations, may not be profitable enough in the short term to be financed entirely by credit. Subsidies have therefore been introduced under the additional financing to partially finance these particular investments. The subsidy rate remains low, which will encourage farmers to obtain loans to complement and initiate sustainable collaboration with financial institutions.

41. **Breeding and reproduction centre.** This major investment will generate significant operational costs that will be covered, at least partially, by the income generated by the sale of animals, semen, embryos and milk. Because the station is not financially autonomous, the envisaged management model will be a public-private partnership (PPP). However, since some of the services can be considered public goods, either partially or entirely, some of the cost will be covered by the Government, and this will be specified in the PPP contract.

42. **School milk.** The project that includes the additional financing will only finance investment costs of processing and distributing milk to schools but not the purchase of milk, which entails much higher costs. These costs will be borne by the Government under the One Cup of Milk per Child programme, with contributions from international partners.

III. Risk management

A. Risks and mitigation measures

43. **Sustainability risks.** The main sustainability risks were identified during the original design of RDDP2. The only added sustainability risk related to the additional financing is management of the breeding station, which will be mitigated by the adoption of a PPP mechanism.

44. **Environmental risks** are described in detail in the revised integrated project risk matrix and the Social, Environmental and Climate Assessment Procedures (SECAP) note. The main additional risk is related to the construction of the breeding station and includes the management of farm effluents, the creation of an irrigated area for fodder production, the water management system and the future of the Indigenous Inyambo herd housed on the farm. An environmental and social impact assessment (ESIA) has already been conducted but will be updated to comply with SECAP requirements. Appropriate mitigation measures will be detailed in the ESIA and the Environmental, Social and Climate Management Plan.

45. **Social risks.** The main social risks are related to working conditions on the breeding station construction site and the relocation of livestock activities to create a biosecurity buffer zone around the station. These risks will be identified in the ESIA and mitigated through appropriate measures.

46. **Market risks.** The Government's strategy for developing the dairy sector relies heavily on the potential of one major processing facility to absorb significant additional production. The profitability and sustainability of this facility, which targets the international market, will be subject to the volatility of the global market. The project strategy to address this risk will be to support market diversification with support for the construction of small-scale processing units and

the creation of "milk zones" that will not be subject to international market fluctuations.

B. Environment and social category

47. **The environmental and social category is "significant,"** given the potential risks related to environmental and biodiversity degradation, pollution, occupational safety and health, public health issues and economic displacement. Appropriate mitigation measures, such as sustainable waste management and the creation of water management systems, are essential for improving natural resource management and mitigating environmental risks.

48. **The climate risk category is "moderate."** Dairy farming is highly vulnerable to climate change, which impacts feed and water availability, as well as animal health and welfare, and hence, production. Although the country is on the road to responding effectively to climate change, the adaptation needs and urgency to act are greater. Climate change adaptation and mitigation strategies will be integrated along the value chain and include improving breeding, animal feed and on-farm water availability, with implications for increased climate resilience and the reduction of both direct and indirect greenhouse gas emissions.

IV. Implementation

A. Compliance with IFAD policies

49. The original project and the additional financing align with the continued efforts of the country to increase agricultural productivity, as well as the livestock investment and production outlined in the National Strategy for Transformation (NST1). Increased climate investments under the additional financing will contribute to meeting the country climate adaptation goals set out in the United Nations Framework Convention on Climate Change (2018), the updated Nationally Determined Contribution 2020, and the Green Growth and Climate Resilience Strategy (2011). Upscaling the school milk programme under the additional financing will contribute to the National Comprehensive School Feeding Policy 2019.

50. The additional financing is fully aligned with IFAD's Strategic Framework 2016-2025, as well as the country strategic opportunities programme 2019-2024, which involves: (i) sustainably increasing agricultural productivity (strategic objective [SO] 1), and (ii) improving post-harvest processes and strengthening market linkages (SO2).

51. Increased climate investments under the additional financing will improve RDDP2 alignment and integration with the DaIMA project currently in preparation by IFAD, the Food and Agriculture Organization of the United Nations and the Global Dairy Platform.

B. Organizational framework

Management and coordination

52. There are no changes from the original design in terms of implementation arrangements, including financial management and procurement. RDDP2 is implemented by the single project implementation unit (SPIU) under the Rwanda Agriculture and Animal Resources Development Board (RAB), the implementing agency of the Ministry of Agriculture and Animal Resources. The SPIU oversees core functions of financial management, procurement and the management information system, leveraging its long-standing experience with IFAD. The SPIU has also created a dedicated RDDP2 project management team, which is fully operational.

Financial management, procurement and governance

53. **Procurement.** The additional financing will involve granting partial subsidies for investment in production and resilience. To ensure the transparency of the entire

process and that subsidies reach the intended beneficiaries, the creation of an ad hoc technical evaluation committee has been proposed to evaluate applications and recommend who should receive subsidies. Equipment suppliers will be selected using the usual competitive procurement methods.

54. The additional financing will also involve a significant investment in infrastructure for the Songa Breeding Centre. A feasibility study had already been prepared for this station, but IFAD identified gaps and requested that RAB revise it. Similarly, an ESIA has been prepared but will be revised. Thereafter, RDDP2 will award a tender to conduct a detailed study and prepare structural drawings and bills of quantities.

55. **Financial management.** The RDDP2 additional financing is expected to use the financial management arrangements adopted for the original financing and ongoing IFAD portfolio in Rwanda, which is fully aligned with country systems. The budget planning process will be generated by the RDDP2 management team and included in the borrower’s fiscal budget.

56. Accounting and financial reporting will be performed through the integrated financial management information system. RDDP2 accounting will follow national regulations, which are transitioning to the accrual standards of the International Public Sector Accounting Standards. Annual financial statements will be audited by the Office of the Auditor General in accordance with the IFAD Handbook for Financial Reporting and Auditing of IFAD-financed Projects.

C. Monitoring and evaluation, learning, knowledge management and strategic communication

57. The set-up of the RDDP2 monitoring and evaluation (M&E) plan and system and the necessary arrangements have been outlined in the design documents. Clear guidance was provided in the project implementation manual through the provision of templates on M&E and knowledge management (KM) planning and systems. Furthermore, at design, the project was allocated an adequate M&E and KM budget with the IFAD requirement that it be sufficient to cover the new additional financing activities.

58. **Additional financing logical framework.** Some of the RDDP2 logframe indicators and targets have been revised to reflect the new activities, and two new project-level output indicators have been added. The changes are as follows: (i) total outreach has increased from 175,000 to 187,500 direct beneficiaries; (ii) IFAD core outcome and output indicators on markets/storage and processing facility targets have been revised to reflect the addition of the 35 MCCs and 21 MCPs that will be rehabilitated; (iii) due to the additional infrastructure and activities, the IFAD core outcome indicator on persons with new jobs/employment opportunities has been revised; (iv) an indicator and targets for the production of AI semen doses at the breeding station have been added; and (v) an indicator to reflect additional investment in the number of schools to be supported in the school feeding programme has been added.

59. **Knowledge management and strategic communication.** As per the design, the RDDP2 team will develop a project-specific KM and communication strategy that will: (i) provide project beneficiaries with the necessary material to sustain the technical knowledge acquired and continuously assess its adoption; (ii) generate shared knowledge based on the information collected as part of results monitoring or thematic studies; and (iii) share this knowledge with the technical departments of the ministry, IFAD, other donors and implementing partners. In achieving policy engagement, the KM and communication strategy will aim to develop and create channels for policy dialogue through the preparation of policy briefs.

D. Proposed amendments to the financing agreement

60. The original financing agreement will be amended to incorporate the additional financing of EUR 21.61 million (US$24.19 million) from the IFAD PBAS and

increased contributions of US$3 million from DaIMA (GCF), US$4.27 million from the beneficiaries and US$4.7 million from the Government of Rwanda, which together with the original financing amounts to US$128.37 million contributed by IFAD, the beneficiaries, the Government of Rwanda and other cofinanciers.

V. Legal instruments and authority

61. An amendment to the original financing agreement between the Republic of Rwanda and IFAD will constitute the legal instrument for extending the proposed additional financing to the borrower.

62. The Republic of Rwanda is empowered under its laws to receive financing from IFAD.

63. I am satisfied that the proposed additional financing will comply with the Agreement Establishing IFAD and the Policies and Criteria for IFAD Financing.

VI. Recommendation

64. I recommend that the Executive Board approve additional financing in terms of the following resolution:

> RESOLVED: that the Fund shall provide a loan on super highly concessional terms to the Republic of Rwanda in an amount of seventeen million two hundred eighty thousand euros (EUR 17,280,000) (US$19,352,742) and upon such terms and conditions as shall be substantially in accordance with the terms and conditions presented herein.
>
> RESOLVED FURTHER: that the Fund shall provide a loan on highly concessional terms to the Republic of Rwanda in an amount of four million three hundred twenty thousand euros (EUR 4,320,000) (US$4,838,186) and upon such terms and conditions as shall be substantially in accordance with the terms and conditions presented herein.

Alvaro Lario
President

Updated logical framework incorporating the additional financing

Results Hierarchy	Indicators: Name	Base line	Mid-term	Initial End Target	Adjusted AF End Target	Means of Verification: Source	Frequency	Responsibility	Assumptions
Outreach Total Project Outreach	**1 Persons receiving services promoted or supported by the project**					Project M&E System	Annually	SPIU	Maintained existing RDDP beneficiaries and identification of new RDDP2 beneficiaries in the new targeted districts. Regarding additional financing and filling the financing gap, 12500 new direct beneficiaries have been added to be reflected on the end targets reflecting the design deficit.
	Males - Males	0	78750	96250	103125				
	Females - Females	0	43750	78750	84375				
	Young - Young people	0	26500	43750	46875				
	Total number of persons receiving services	0	122500	175000	187500				
	Male - Percentage (%)	0	55	55	55				
	Female - Percentage (%)	0	25	45	45				
	Young - Percentage (%)	0	15	25	25				
	1.b Estimated corresponding total number of households members								
	Household members - Number of people	0	490000	700000	750000				
	1.a Corresponding number of households reached								
	Households - Households	0	122500	175000	187500				
Project Goal Reduce poverty level of targeted rural households and mitigate impact of the dairy sector on climate change	**Households reporting an increase in income**					Project M&E System	Baseline, Mid Term, Completion	SPIU	Direct beneficiaries are reporting an increase in income and are able to attribute it to project interventions. Project beneficiaries will be adopting the use of technologies and practices that avoid/sequester carbon emissions. Baseline was conducted and for the AF adjustments, the changes have been kept the same.
	Households - Number	0	52500	140000	140000				
	Households - Percentage (%)	0	30	80	80				
	Total number of household members	0	210000	560000	560000				
	Reduction in emission intensity (kg CO2e/kg protein)					FAO GLEAM-i Report	Ex-Ante, Ex-Post	FAO, IFAD	
	Milk emission intensity (kg CO2e/kg protein) (number) - Number	94		66	66				
	Milk emission intensity (kg CO2e/kg protein) (% change) - Percentage (%)	0		-30	-30				
	Meat emission intensity (kg CO2e/kg protein) (number) - Number	101		88	88				
	Meat emission intensity (kg CO2e/kg protein) (% change) - Percentage (%)	0		-13	-13				
Development Objective Enhance income, nutrition and resilience of rural households through a more inclusive, sustainable, digitalized and competitive dairy sector	**1.2.8 Women reporting minimum dietary diversity (MDDW)**					COI survey	Baseline, Mid Term, Completion	SPIU	With specific planned nutrition targeted interventions, the MDDW scores will increase and households will be able to report this accordingly. The main services delivered by the public/private entities (MCCs, Fis, etc.) supported by the project will adequately meet target groups' productive/business/employment and livelihood needs. Interventions will create an environment where households that participate in project-supported groups/organizations (MCCs, L-FFS) will report influence over decisions taken in the project-supported group/organization or local authorities. 60 percent of 1066 Rural enterprises (55 MCCs, 11 SMME processors, 1000 Milk Collectors) supported through the project, whether formal or informal will see an increase in profit due to project interventions.
	Women (%) - Percentage (%)		35	45	45				
	Women (number) - Females		61250	78750	78750				
	Households (%) - Percentage (%)		35	45	45				
	Households (number) - Households		61250	78750	78750				
	Household members - Number of people		245000	315000	315000				
	SF.2.1 Households satisfied with project-supported services								
	Household members - Number of people	0	280000	628000	750000				
	Households (%) - Percentage (%)	0	40	90	90				
	Households (number) - Households	0	70000	157000	168750				
	SF.2.2 Households reporting they can influence decision-making of local authorities and project-supported service providers								
	Household members - Number of people		140000	420000	450000				
	Households (%) - Percentage (%)		20	60	60				
	Households (number) - Households		35000	105000	112500				
	2.2.2 Supported rural enterprises reporting an increase in profit								
	Number of enterprises - Enterprises	0	320	640	640				

Results Hierarchy	Indicators: Name	Base line	Mid-term	Initial End Target	Adjusted AF End Target	Means of Verification: Source	Frequency	Responsibility	Assumptions
	Percentage of enterprises - Percentage	0	30	60	60				
Outcome Outcome 1. Increased productivity and resilience of dairy smallholder production systems	**2.2.1 Persons with new jobs/employment opportunities**					COI survey	Baseline, Mid Term, Completion	SPIU	Interventions are effectively designed and implemented to provide the necessary resources, training and support to increase productivity. The project will enable persons, especially youth to gain new full-time or recurrent seasonal on-farm and off-farm jobs either as self-employed in business, employees of Cooperatives or SMMEs. Specific emphasis will be jobs created in MCCs, MCPs, Milk Collectors and Milk Kiosks. 300 Jobs have been targeted for production component and 3191 for VC development component. As part of the AF, additional 35 jobs will be created under MCC milk truck deliveries, moreover 270 jobs will be created at the MCC management level and 119 at MCP level. Project beneficiaries will be trained in environmentally sustainable practices and/or the management of climate-related risks, and will claim that they: (a) have fully mastered these practices; and (b) are now routinely using these technologies and practices. Beneficiary LFFS households will receive project-supported activities (e.g. trainings, input provision, and climate-smart practices) and will report they have helped them increase milk, animal and fertility production, compared to the pre-project situation.
	Males - Males	0	558	1396	1566				
	Females - Females	0	838	2095	2349				
	Young - Young people	0	698	1746	1958				
	Total number of persons with new jobs/employment opportunities - Number of people	0	1396	3491	3915				
	3.2.2 Households reporting adoption of environmentally sustainable and climate-resilient technologies and practices								
	Total number of household members - Number of people	0	151200	360000	360000				
	Households - Percentage	0	22	51	51				
	Households - Households	0	37800	90000	90000				
	1.2.4 Households reporting an increase in production								
	Total number of household members - Number of people	0	315000	525000	582500				
	Households - Percentage	0	45	75	75				
	Households - Households	0	78750	131250	140625				
Output Output 1.1 Enhanced capacities, production assets and community organization of smallholder dairy farmers	**1.1.4 Persons trained in production practices and/or technologies**					Project M&E System	Annually	SPIU	Effective trainings in production practices will be provided to the targeted beneficiaries of L-FFS groups formed in the new districts and those targeted to strengthen this training in existing districts. Beneficiaries in LFFS, MCCs and Milk collectors will be provided with access to renewable energy sources helping to reduce carbon emissions and secure carbon sequestration. LFFS Individuals will receive advice or training during the considered period with a view to changing their land-use practices in areas of improved livestock and manure management.
	Men trained in livestock	0	44280	55350	59297				
	Women trained in livestock	0	29520	36900	39486				
	Young people trained in livestock	0	22140	27675	29672				
	Total persons trained in livestock	0	73800	92250	98813				
	3.1.3 Persons accessing technologies that sequester carbon or reduce greenhouse gas emissions								
	Males		40500	49500	49500				
	Females		22500	40500	40500				
	Young		13500	22500	22500				
	Total persons accessing technologies		63000	90000	90000				
Output Output 1.2. Enhanced availability of quality feed, water for livestock, delivery of public and private services in the animal health and breeding domains	**1.1.3 Rural producers accessing production inputs and/or technological packages**					Project M&E System	Annually	SPIU	Timely provision of production inputs (e.g. improved seeds, stocked livestock, veterinary medicines, etc.) and technological packages (e.g. processing equipment, farming tools, animal health and artificial insemination kits) will be provided to project beneficiaries. Small scale water harvesting facilities, individual dam sheets, individual boreholes and rehabilitated valley dams' activities will be fully implemented and conditioned by a clear assessment of management capacities. As part of the AF, an additional 7500 direct beneficiaries will be added to receive production inputs pertaining to
	Males		41760	57420	61545				
	Females		31320	46980	50355				
	Young		15660	26100	27975				
	Total rural producers - Number of people		73080	104400	111900				
	Number of livestock doses produced for beneficiaries at the Rwanda Songa Breeding Station supported by IFAD								
	Number - Doses	180000	250000		300000				
	Households reporting farm access to new livestock water facilities constructed/rehabilitated								
	Males - Number	0	5136	6420	6870				

Results Hierarchy	Indicators					Means of Verification			Assumptions
	Name	Base line	Mid-term	Initial End Target	Adjusted AF End Target	Source	Frequency	Responsibility	
	Female - Number	0	11984	14980	16030				fodder, milk cans and cowsheds. In addition, 1500 households will benefit from water access facilities in damsheets.
	Young - Number	0	2568	3210	3435				
	Total Households - Number	0	17120	21400	22900				
Outcome Outcome 2. Increased dairy value chain efficiency, investments, market access, and consumption of dairy products	**2.2.6 Households reporting improved physical access to markets, processing and storage facilities**					COI Survey	Annually	SPIU	The construction and rehabilitation of market facilities (MCCs), processing facilities (SMMEs) and storage facilities (MCPs) will result in beneficiaries reporting improved access to facilities. Households will be fully satisfied with and are using the financial products and services facilitated by the project and will invest in a productive or income-generating activity. Rural producers' organizations (MCCs) will establish contractual or other types of arrangements with other VC stakeholders and/or public entities, with project support. These will include upstream and downstream arrangements (e.g. input provision or selling arrangements) and partnerships with public and/or private entities. Women and Men will gain and report empowerment in one of the following areas from targeted interventions (i) Intrinsic agency: autonomy in income, self-efficacy and attitudes about intimate partner violence, (ii) Instrumental agency: input in productive decisions, control over use of income, and work balance; and (iii) Collective agency: being a member of influential groups.
	Households reporting improved physical access to markets - Percentage	0	34	60	70				
	Households reporting improved physical access to processing facilities - Percentage	0	34	60	60				
	Households reporting improved physical access to storage facilities - Percentage	0	21	38	50				
	Households reporting improved physical access to markets - Households	0	29700	54000	57750				
	Households reporting improved physical access to processing facilities - Households	0	29700	54000	57750				
	Households reporting improved physical access to storage facilities - Households	0	18315	33300	33300				
	Total size of households (number of people)	0	310860	565200	592200				
	1.2.5 Households reporting using rural financial services								
	Total number of household members		170364	340692	340692				
	Households - Percentage		24	48	48				
	Households		42591	85173	85173				
	2.2.3 Rural producers' organizations engaged in formal partnerships/agreements or contracts with public or private entities								
	Percentage of POs - Percentage		60	70	70				
	Number of POs - Organizations		33	38	63				
	Women in leadership position - Females		15	30	30				
Output Output 2.1 Strengthened capacity of dairy cooperatives and farmers in governance and business management, and financial literacy	**2.1.1 Rural enterprises accessing business development services**					Project M&E System	Annually	SPIU	Milk Collectors (1000), SMMEs (25) and MCCs (90) targeted will increase their knowledge in business and financial management
	Rural enterprises - Enterprises		1040	1066	1115				
Output Output 2.2 Reinforced and strengthened structures and mechanisms for collection, aggregation transportation, cold storage and distribution of dairy products	**2.1.6 Market, processing or storage facilities constructed or rehabilitated**					Project M&E System	Annually	SPIU	Market facilities (MCCs), processing facilities (SMMEs) and storage facilities (MCPs) that have been fully constructed or rehabilitated by the project during the considered period will be fully implemented.
	Total number of facilities - Facilities	0	139	164	234				
	Market facilities constructed/rehabilitated	0	41	55	90				
	Processing facilities constructed/rehabilitated	0	7	11	25				
	Storage facilities constructed/rehabilitated	0	91	98	119				
Output Output 2.3 Digitalized systems for monitoring milk production, aggregation, transportation, and marketing developed	**Number of MCCs equipped with digitalized milk transaction management system**								MCCs have access to electricity/power and the manual milk in registers will be replaced with digitalized systems that will be fully functioned to monitor, aggregate, transport and market milk production and fully adopted.
	MCCs - Number		61	95	130				

Results Hierarchy	Indicators					Means of Verification			Assumptions
	Name	Base line	Mid-term	Initial End Target	Adjusted AF End Target	Source	Frequency	Responsibility	
Output Output 2.4 Tailored financial products and services, including climate finance and insurance developed for dairy value chain actors	**1.1.5 Persons in rural areas accessing financial services**					Project M&E System	Annually	SPIU	Cost of accessing finance remains affordable for small producers and other value chain stakeholders; No extremely negative price fluctuation in the market. Direct beneficiaries will access a financial product or service specifically promoted/supported by the project and its partner financial service provider (FSP), at least once during the considered period (annual reporting).
	Women in rural areas accessing financial services - savings		19166	38332	38332				
	Young people in rural areas accessing financial services - savings		10647	21295	21295				
	Men in rural areas accessing financial services - savings		23420	46841	46841				
	Men in rural areas accessing financial services - credit		23420	46841	46841				
	Women in rural areas accessing financial services - credit		19166	38332	38332				
	Young people in rural areas accessing financial services - credit		10647	21295	21295				
	Total persons accessing financial services - savings		42586	85173	85173				
	Total persons accessing financial services - credit		42586	85173	85173				
	Total persons accessing financial services - insurance		42586	85173	85173				
	Men in rural areas accessing financial services - insurance		23420	46841	46841				
	Women in rural areas accessing financial services - insurance		19166	38332	38332				
	Young people in rural areas accessing financial services - insurance		10647	21295	21295				
Output Output 2.5 Milk consumption and nutrition awareness improved	**1.1.8 Households provided with targeted support to improve their nutrition**					Project M&E System	Annually	SPIU	Targeted beneficiaries will directly participate in project-supported activities designed to help improve nutrition during the period. specifically, the nutrition-sensitive activities from the Project will not be generic but will be tailored to address context-based nutrition problems in the Country. As part of the AF, RDDP2 aims to support more children in schools in the milk school feeding programme that is more significant to the initial design target, hence RDDP2 will report on the number of schools reached as part of the justification to the AF.
	Total persons participating	0	36750	70000	70000				
	Males	0	23625	38500	38500				
	Females	0	13125	31500	31500				
	Households	0	36750	70000	70000				
	Household members benefitted	0	147000	280000	280000				
	Young	0	11025	21000	21000				
	Number of schools supported in the School Feeding Programme								
	Schools - Number				175				
Outcome Outcome 3. Strengthened policy and institutional environment for sustainable and inclusive growth of the dairy sector	**Policy 3 Existing/new laws, regulations, policies or strategies proposed to policy makers for approval, ratification or amendment**					KM qualitative survey at midline and endline	Mid-term, completion	SPIU	Through Component 3 and KM activities, the Project will be able to formally influence policy in the dairy sector through evidence-based policy products and initiatives.
	Number	0	1	2	2				
Output Output 3.1 Formulation and review of national policies, strategies and legislations supported	**Policy 1 Policy-relevant knowledge products completed**					Project M&E System	Annually	SPIU	Policy analyses, research papers, working papers, studies, strategies, pieces of legislation, by-laws or other policy-related material will be produced by the Project team (with data evidence from M&E and KM activities) as part of the Project's policy goals.
	Number - Knowledge Products	0	2	4	4				

Updated summary of the economic and financial analysis

The initial sixteen financial models from the formulation were updated to reflect the revised targets and unit costs. These financial models include thirteen models for agribusiness and Small-Scale Enterprises (SMEs) and three models for livestock activities. The financial analysis shows that the targeted activities are sound, while the economic analysis confirms that the project is economically viable. The Economic Internal Rate of Return (EIRR) for the overall project is 20.03 per cent, and the Net Present Value (NPV) is US$118.89 million. The Project is sensitive to changes in some of the model's variables (variations on benefits and costs, various lags in the realization of benefits and adoption rates), confirming that sustainable dairy value chain investments are key to project success

Table A
Financial cash flow models

Models' net incremental benefits -NIB (in RWF)

FINANCIAL ANALYSIS	Livestock models			Agri-business / small-medium enterprises (SME) / service provider models			
	Cattle - Zero grazing system - cross breed for new farmers	Cattle - Zero grazing system - cross-breed cows for existing farmers	Cattle - Grazing system for existing farmers	MCP category 1	MCP category 2	MCP category 3	MCC category 1
PY1	-400,362	-223,786	-30,550	-13,812,540	-21,415,040	-88,159,500	-128,261,000
PY2	-225,817	-54,060	-229,148	1,673,560	4,739,560	15,152,000	20,469,000
PY3	-162,916	-6,117	-151,657	2,396,060	5,880,560	17,294,500	24,729,000
PY4	-17,101	52,128	-96,885	2,858,560	6,761,560	19,152,000	28,444,000
PY5	61,272	117,838	96,284	3,068,560	6,971,560	19,337,000	28,839,000
PY6	144,148	188,822	151,432	2,637,560	6,540,560	18,783,000	27,034,000
PY7	152,411	188,507	304,644	2,858,560	6,761,560	19,152,000	28,444,000
PY8	163,766	188,976	291,756	3,068,560	6,971,560	19,337,000	28,839,000
PY9	174,521	189,936	274,782	3,093,560	6,996,560	19,387,000	28,914,000
PY10	184,491	191,508	256,434	2,858,560	6,761,560	19,152,000	28,444,000
PY11	195,263	192,553	238,091	2,858,560	6,761,560	19,152,000	28,444,000
PY12	207,333	93,586	220,330	2,858,560	6,761,560	19,152,000	28,444,000
PY13	220,521	194,665	203,301	2,858,560	6,761,560	19,152,000	28,444,000
PY14	234,647	195,802	186,956	2,858,560	6,761,560	19,152,000	28,444,000
PY15	249,695	197,004	171,178	2,858,560	6,761,560	19,152,000	28,444,000
PY16	265,707	198,274	155,831	2,858,560	6,761,560	19,152,000	28,444,000
PY17	282,744	199,616	140,791	2,858,560	6,761,560	19,152,000	28,444,000
PY18	300,872	201,031	125,946	2,858,560	6,761,560	19,152,000	28,444,000
PY19	320,162	202,521	111,204	2,858,560	6,761,560	19,152,000	28,444,000
PY20	340,688	204,088	96,487	2,858,560	6,761,560	19,152,000	28,444,000
B/C	1.00	1.15	1.22	0.99	1.02	0.99	0.99
NPV (RWF) @ [illegible]	258,757	572,897	319,266	810,710	12,069,387	12,032,361	17,852,315
IRR	14%	31%	27%	18%	29%	20%	20%

FINANCIAL ANALYSIS	MCC category 2	MCC category 3	Processing unit	Milk retail point/kiosk	Seed production	Harvesting service	Vet service	Milk trader (ebike)	Milk transporter (cold truck)
PY1	-156,580,000	-190,995,800	-249,110,730	-4,508,040	811,263	-29,440,000	-2,138,016	-1,074,600	-111,819,100
PY2	39,665,000	67,940,200	104,858,484	2,407,860	1,288,400	9,438,000	1,448,912	358,400	45,371,400
PY3	47,140,000	81,100,200	137,801,298	2,407,860	1,288,400	9,438,000	1,448,912	358,400	45,371,400
PY4	53,645,000	91,790,200	170,744,112	2,407,860	1,288,400	9,438,000	1,448,912	183,400	45,371,400
PY5	53,615,000	90,260,200	203,686,926	2,407,860	1,288,400	9,438,000	1,448,912	358,400	45,371,400
PY6	52,235,000	90,380,200	236,629,740	2,407,860	1,228,400	9,438,000	1,448,912	358,400	45,371,400
PY7	53,645,000	91,790,200	236,629,740	2,407,860	1,288,400	9,438,000	1,448,912	183,400	45,371,400
PY8	53,615,000	90,260,200	236,629,740	2,407,860	1,288,400	9,438,000	1,448,912	358,400	45,371,400
PY9	54,115,000	92,260,200	236,629,740	2,407,860	1,288,400	9,438,000	1,448,912	358,400	45,371,400
PY10	53,645,000	91,790,200	236,629,740	2,407,860	1,298,000	9,438,000	1,448,912	183,400	45,371,400
PY11	53,645,000	91,790,200	236,629,740	2,407,860	1,298,000	9,438,000	1,448,912	183,400	45,371,400
PY12	53,645,000	91,790,200	236,629,740	2,407,860	1,298,000	9,438,000	1,448,912	183,400	45,371,400
PY13	53,645,000	91,790,200	236,629,740	2,407,860	1,298,000	9,438,000	1,448,912	183,400	45,371,400
PY14	53,645,000	91,790,200	236,629,740	2,407,860	1,298,000	9,438,000	1,448,912	183,400	45,371,400
PY15	53,645,000	91,790,200	236,629,740	2,407,860	1,298,000	9,438,000	1,448,912	183,400	45,371,400
PY16	53,645,000	91,790,200	236,629,740	2,407,860	1,298,000	9,438,000	1,448,912	183,400	45,371,400
PY17	53,645,000	91,790,200	236,629,740	2,407,860	1,298,000	9,438,000	1,448,912	183,400	45,371,400
PY18	53,645,000	91,790,200	236,629,740	2,407,860	1,298,000	9,438,000	1,448,912	183,400	45,371,400
PY19	53,645,000	91,790,200	236,629,740	2,407,860	1,298,000	9,438,000	1,448,912	183,400	45,371,400
PY20	53,645,000	91,790,200	236,629,740	2,407,860	1,298,000	9,438,000	1,448,912	183,400	45,371,400
B/C	1.03	1.05	1.13	1.01	2.45	1.01	1.02	1.00	1.01
NPV (RWF) @ [illegible]	107,490,482	249,210,344	708,382,616	7,639,850	6,830,917	19,885,808	5,088,389	434,497	120,988,828
IRR	31%	43%	61%	53%	#NUM!	32%	68%	28%	41%

Table B
Project/programme costs

Component	**Total Costs US$ million**
1. Increasing productivity and resilience of dairy smallholder production systems	60.67
2. Increasing dairy VC efficiency, through scale-up investments, improved market access, and consumption of dairy products	57.44
3. Policy Support and Project Management, Monitoring and Evaluation (M&E), and Knowledge Management (KM)	10.27
Total	128.37

Table C
Main assumptions and shadow prices

Conversion factor	
CF for tradeable goods	0.90
CF for milk	1.05
CF for labour	0.87
CF for non-tradeable goods	1.00
Social discount rate	6%

Table D
Beneficiary adoption rates and phasing

	Unit	Y1 2024	Y2 2025	Y3 2026	Y4 2027	Y5 2028	Y6 2029	TOTAL
Livestock models								
Zero grazing		*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Star-up package intervention - new farmers	farmers	1,000	1,750	1,750	2,250	2,750	1,000	10,500
Upgrade package intervention - existing farmers	farmers	40,275	34,200	-	-	34,200	-	108,675
Grazing system								
Package of intervention - existing farmers	farmers	4,475	3,800	-	-	3,800	-	12,075
								131,250
Agricultural model								
Forage and seed multiplicators	producers (1 ha/produ	0	50	50	0	0	0	100
Agribusiness /Small-Medium Enterprises (SME) and Service Provider models								
Rehabilitation and new construction of MCP								
MCP - category 1	units	0	25	40	7	0	0	72
MCP - category 2	units	0	7	4	21	0	0	32
MCP - category 3	units	0	10	5	0	0	0	15
Rehabilitation and new construction of MCC								
MCC - category 1	units	0	4	10	4	1	0	19
MCC - category 2	units	40	18	7	2	0	0	67
MCC - category 3	units	0	2	2	0	0	0	4
Rehabilitation and new construction of processing unit								
Milk processing units - one category	units	0	5	11	7	2	0	25
Youth /service provider	0	0	0	0	0	0	0	-
Milk retail point/kiosk	units	-	500	1,500	1,000	-	-	3,000
Service provider - Veterinary services	units	-	50	50	50	50	-	200
Service provider - Harvesting services (tractor) mechanization	coops	5	5	5	5	1	-	21
Service provider - Milk collectors: ebike	units	250	250	250	250	-	-	1,000
Service provider - Milk transporter: cold truck	units	-	12	12	3	-	-	27

Primary Project beneficiaries are: (i) livestock smallholders; (ii) different SMEs (MCPc, MCCs, processing units, mechanization services, etc.). The Project will target 187,500 households (HHs) of which 145,000 HHs will be involved in dairy farming (mostly zero grazing) and 42,500 HHs in agribusiness /SME along the dairy value chain, representing 750,000 the total number of beneficiaries.

Economic costs associated with livestock and agri-business activities were estimated at US$218.15 million. To calculate the economic costs accurately, the investment costs, for the main project interventions (MCCs, MCPs, processing units, etc.) represented in the EFA and considered in COSTAB, have been excluded. The reason for removing these costs is to prevent duplicate counting or inclusion of the same expenses more than once. The economic costs have then been deducted from the overall economic benefit stream to obtain the Project's net incremental benefit stream. The economic analysis shows satisfactory results, with a NPV at US$118.89 million and an EIRR of 20.03 per cent, suggesting that the overall Project is economically profitable.

Table E
Economic cash flow

		NET AGGREGATED INCREMENTAL BENEFITS (US$)																		
		Cattle - Zero grazing system - cross breed for new farmers	Cattle - Zero grazing system - cross-breed cows for existing farmers	Cattle - Grazing system for existing farmers	MCP category 1	MCP category 2	MCP category 3	MCC category 1	MCC category 2	MCC category 3	Processing unit	Milk retail point/kiosk	Seed production	Harvesting service	Vet service	Milk trader (ebike)	Milk transporter (cold truck)	Total Ec. NIB (US$)	NET INCR. ECONOMIC COSTS (US$)	Cash Flow (US$)
ECONOMIC ANALYSIS	PY1	(417,004)	(2,627,739)	990,497	0	0	0	0	-5,104,480	0	0	0	0	-118,844	0	-213,839	0	(7,491,408)	*11,043,802*	(18,535,210)
	PY2	(807,857)	(2,017,811)	1,513,390	-244,847	-111,911	-703,564	-410,214	-802,168	-284,627	-594,080	-368,255	31,678	-78,270	-69,566	-136,145	-967,128	(6,051,376)	*25,728,192*	(31,779,568)
	PY3	(836,865)	1,256,466	1,173,353	-307,660	-19,648	-198,684	-919,780	1,556,038	-134,300	-442,948	260,554	84,265	-37,696	1,423	-58,452	-299,965	1,076,097	*19,107,104*	(18,031,008)
	PY4	(1,128,376)	1,441,143	1,343,340	167,192	-258,540	249,967	-23,896	2,832,721	325,150	2,111,635	4,724,762	105,173	2,877	72,412	-16,361	1,092,544	13,041,746	*10,115,242*	2,926,503
	PY5	(1,212,681)	(1,704,139)	3,013,413	298,475	220,519	278,129	444,359	3,339,898	370,888	4,486,428	8,191,908	105,173	138,527	-975,472	275,171	1,501,116	18,771,713	*9,270,194*	9,501,520
	PY6	165,108	2,622,682	2,826,736	326,947	248,072	289,042	627,060	3,343,465	388,875	5,890,593	8,191,908	105,173	170,410	618,706	275,171	1,501,116	27,591,064	*6,134,191*	21,456,873
	PY7	1,007,302	3,001,443	3,061,300	328,628	264,526	285,083	643,210	3,377,012	388,875	6,782,899	8,191,908	102,732	170,410	618,706	239,569	1,501,116	29,964,718	*9,767,847*	20,196,871
	PY8	1,190,290	3,398,577	3,189,718	319,619	268,317	285,628	637,631	3,403,020	392,130	7,496,744	8,191,908	102,732	170,410	618,706	275,171	1,501,116	31,441,717	*9,767,847*	21,673,870
	PY9	1,300,487	3,830,062	3,655,613	328,996	262,582	289,042	644,898	3,414,876	388,875	7,817,974	8,191,908	105,173	170,410	618,706	275,171	1,501,116	32,795,890	*9,767,847*	23,028,043
	PY10	1,371,567	4,314,596	3,717,411	337,905	267,124	289,998	651,782	3,404,550	388,875	7,889,358	8,191,908	105,173	170,410	618,706	239,569	1,501,116	33,460,049	*9,767,847*	23,692,202
	PY11	1,443,708	4,657,816	3,767,360	334,462	269,801	288,086	652,930	3,398,430	392,130	7,889,358	8,191,908	105,564	170,410	618,706	239,569	1,501,116	33,921,355	*9,767,847*	24,153,508
	PY12	1,510,765	4,837,247	3,786,458	326,813	269,036	287,129	649,487	3,395,753	392,130	7,889,358	8,191,908	105,955	170,410	618,706	203,967	1,501,116	34,136,239	*9,767,847*	24,368,392
	PY13	1,566,198	5,033,653	3,789,887	325,474	265,020	287,129	647,957	3,394,988	392,130	7,889,358	8,191,908	105,955	170,410	618,706	168,364	1,501,116	34,348,255	*9,767,847*	24,580,408
	PY14	1,600,809	5,250,355	3,786,568	325,474	265,020	287,129	647,575	3,394,988	392,130	7,889,358	8,191,908	105,955	170,410	618,706	168,364	1,501,116	34,595,867	*9,767,847*	24,828,020
	PY15	1,610,005	5,250,355	3,786,568	325,474	265,020	287,129	647,575	3,394,988	392,130	7,889,358	8,191,908	105,955	170,410	618,706	168,364	1,501,116	34,605,063	*9,767,847*	24,837,216
	PY16	1,610,005	5,250,355	3,786,568	325,474	265,020	287,129	647,575	3,394,988	392,130	7,889,358	8,191,908	105,955	170,410	618,706	168,364	1,501,116	34,605,063	*9,767,847*	24,837,216
	PY17	1,610,005	5,250,355	3,786,568	325,474	265,020	287,129	647,575	3,394,988	392,130	7,889,358	8,191,908	105,955	170,410	618,706	168,364	1,501,116	34,605,063	*9,767,847*	24,837,216
	PY18	1,610,005	5,250,355	3,786,568	325,474	265,020	287,129	647,575	3,394,988	392,130	7,889,358	8,191,908	105,955	170,410	618,706	168,364	1,501,116	34,605,063	*9,767,847*	24,837,216
	PY19	1,610,005	5,250,355	3,786,568	325,474	265,020	287,129	647,575	3,394,988	392,130	7,889,358	8,191,908	105,955	170,410	618,706	168,364	1,501,116	34,605,063	*9,767,847*	24,837,216
	PY20	1,610,005	5,250,355	3,786,568	325,474	265,020	287,129	647,575	3,394,988	392,130	7,889,358	8,191,908	105,955	170,410	618,706	168,364	1,501,116	34,605,063	*9,767,847*	24,837,216

ENPV@ 6 % (million US$)	**118,885,072**
EIRR	**20.03%**

Results were tested for sensitivity to variations in benefits and costs and for various lags in the realization of benefits. A delay of 2 years in the generation of benefits or a decline of 30 per cent relative to the base scenario would reduce the EIRR to 13.56 per cent and 12.46 per cent respectively, substantially above the discount rate. Cost overruns would have very moderate impact, with EIRR falling to 14.50 per cent with a 30 per cent increase. All scenarios show robust results under all hypothetical scenarios.

Table F
Sensitivity analysis

Scenario	**EIRR (%)**	**NPV (million US$)**
base scenario	**20.03%**	**118,885,072**
costs +10%	18.04%	105,622,277
costs +20%	16.21%	92,359,482
costs +30%	14.50%	79,096,687
benefits +10%	22.00%	144,036,374
benefits +20%	23.78%	169,187,676
benefits -10%	17.83%	93,733,770
benefits -20%	15.34%	68,582,468
benefits -30%	12.46%	43,431,166
benefits delayed 1 year	16.44%	94,469,219
benefits delayed 2 years	13.56%	71,435,397