
President's memorandum
Proposed additional financing to
Republic of Rwanda
Kayonza Irrigation and Integrated Watershed
Management Project – Phase II

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Action: The Executive Board is invited to approve the recommendation for the proposed additional financing contained in paragraph 57.

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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\$206.11 million
Amount of original IFAD loan (performance-based allocation system):	SDR 15.3 million (equivalent to approximately US\$21.77 million)
Terms of original IFAD financing:	Highly concessional
Amount of additional IFAD loan 1:	US\$50.90 million
Terms of additional IFAD financing:	Super highly concessional: 50 years, including a grace period of 10 years, with a service charge of 0.10 per cent per annum in special drawing rights (adjustments for single-currency loans)
Amount of additional IFAD loan 2:	US\$12.73 million
Terms of additional IFAD financing:	Highly concessional: 40 years, including a grace period of 10 years, with a service charge of 0.75 per cent per annum in special drawing rights (adjustments for single-currency loans)
Cofinanciers:	Government of Spain Interchurch Coordination Committee Development Aid (ICCO, now CORDAID) Food and Agriculture Resilience Mission Pillar 3 (FARM P3)
Amount of original cofinancing:	Government of Spain: US\$28.0 million CORDAID: US\$0.65 million
Terms of original cofinancing:	Government of Spain: loan CORDAID: grant
Amount of additional cofinancing:	FARM P3: US\$0.52 million
Terms of additional cofinancing:	Grant
Original contribution of borrower/recipient:	US\$8.08 million
Additional contribution 1 of borrower/recipient:	US\$0.09 million
Additional contribution 2 of borrower/recipient:	US\$17.76 million
Original contribution of beneficiaries:	US\$2.14 million
Additional contribution 1 of beneficiaries:	US\$0.49 million
Additional contribution 2 of beneficiaries:	US\$4.28 million
Original contribution of private sector:	US\$0.37 million
Additional contribution of private sector:	US\$2.32 million

Financing gap:	US\$56.0 million
Amount of original IFAD climate finance:	US\$4.72 million
Amount of additional IFAD climate finance:	US\$51.8 million
Cooperating institution:	Directly supervised by IFAD

I. Background and project description

A. Background

1. The Government of the Republic of Rwanda and IFAD signed a financing agreement for the Kayonza Irrigation and Integrated Watershed Management Project – Phase II (KIIWP2) on 17 December 2021, following the approval by the IFAD Executive Board on 1 October 2021.¹ The financing agreement entered into force on 5 April 2022, with a project completion date of 30 June 2028, and financing closing date of 31 December 2028.
2. The initial project costs were estimated at US\$61.024 million, including IFAD original financing of US\$21.776 million under the performance-based allocation system (PBAS) cycle for the Eleventh Replenishment of IFAD's Resources (IFAD11), parallel cofinancing from the Government of Spain of US\$28.0 million, US\$8.084 million from the Government of Rwanda, US\$2.143 million from beneficiaries, an Interchurch Coordination Committee Development Aid (CORDAID) contribution of US\$0.650 million and US\$0.372 million from the private sector.
3. On 29 July 2025, supplementary funds from pillar 3 of the Food and Agriculture Resilience Mission (FARM P3) were approved as a new cofinancing source, providing a grant of US\$0.521 million expected to leverage an additional US\$0.492 million from cooperatives and small and medium-sized enterprises, bringing the total original KIIWP2 cost to US\$62.123 million.
4. On 12 May 2025, the Government of Rwanda issued an official request for US\$92.669 million, fully committing Rwanda's original IFAD13 PBAS allocation, of US\$35 million, for KIIWP2. Subsequently, upon learning of the possibility of accessing additional PBAS resources, the Government issued a formal request for an additional US\$74.5 million. Of the total requested, IFAD has approved US\$63.633 million to be financed under this additional financing (AF) proposal. The proposed AF would be provided as a super highly concessional loan (for 80 per cent of the amount) and highly concessional loan (for 20 per cent) from IFAD13. The proposed AF's objectives are to replicate and advance KIIWP2 operations, while also covering the financing gap resulting from the increased cost of construction. The AF request includes a three-year extension of the implementation period, aimed at completion of all activities covered under the AF.

B. Original project description

5. KIIWP2 was designed as a partnership project implemented by the Rwanda Agriculture and Animal Resources Development Board (RAB), and jointly funded by IFAD and Government of Spain, with CORDAID as a key implementing partner.
6. The overarching goal of the project is to contribute to poverty reduction in the drought-prone Eastern Province. The project development objective is to sustainably improve the food security and incomes of at least 40,000 rural households and boost their climate resilience.
7. KIIWP2 comprises three components: (i) strengthening resilience to droughts; (ii) support for farm business development; and (iii) institutional development and project coordination.

II. Rationale for additional financing

A. Rationale

8. This AF's aim will be to increase and expand project impacts in order to achieve the project development objective by enhancing and expanding irrigation infrastructure, implementing innovative scheme management models to sustain

¹ [EB 2021/133/R.28](#).

investments, and strengthening the production and marketing linkages in order to enhance financial returns to smallholder farmers.

9. Limited irrigation remains a key constraint to rural livelihoods in Rwanda. Irrigation is seen as critical for increasing productivity and mitigating climate-driven drought risks. Rwanda largely depends on rainfed agriculture, with 71,585 ha irrigated (2023) versus a potential of 596,810 ha (Fifth Strategic Plan for Agriculture Transformation). The Government has ambitious irrigation targets and plans to bring 220,000 ha under irrigation by 2050 (Rwanda Irrigation Master Plan). This AF investment is a critical contribution to realizing this goal, a fact that is highlighted by the large amount of resources requested by the Government, which exceeds availability of IFAD funds, and further underscored by the Government's willingness to contribute an estimated US\$17.76 million in additional cofinancing for this AF (adding to their original US\$8.084 million contribution).
10. The lack of effective models to manage existing irrigation schemes remains a concern to the Government. Developing sustainable irrigation infrastructure management and business models is critical for achieving targeted production and income levels. Part of the AF will support the establishment and strengthening of local institutions, which are essential for long-term sustainability of irrigation schemes. In addition, this financing will support professionalizing scheme management by implementing appropriate management and business models, and supporting the hiring of highly skilled staff for the schemes, in the initial years of operation.
11. KIIWP2 therefore qualifies for receipt of AF from IFAD and meets the necessary criteria:
 - The AF objectives, activities, approaches and components remain consistent with the original project design;
 - Rwanda is part of the list of countries eligible for core funding under IFAD13, with an allocation of US\$63.633 million;
 - The activities to be financed comply with all relevant IFAD policies at the time of the additional finance request, including Social, Environmental and Climate Assessment Procedures (SECAP), targeting policies and performance indicators; and
 - The Government of Rwanda issued a formal request for an AF of US\$109.5 million.

Special aspects relating to IFAD's corporate mainstreaming priorities

12. In line with IFAD's mainstreaming commitments, the project has been validated as:
 - ☒ Including climate finance
 - ☒ Nutrition-sensitive
 - ☒ Youth-sensitive
13. **Climate.** The KIIWP2 AF addresses climate risks in Kayonza, where communities face erratic rainfall, droughts, floods and rising temperatures. The project enhances climate resilience by scaling up climate-smart irrigation and erosion control infrastructure, promoting stress-tolerant crops and climate-smart agriculture practices, and restoring degraded landscapes through land husbandry and afforestation. It expands access to localized climate and weather information via agrometeorological stations and early warning systems (EWS), while strengthening institutional capacity for climate risk management. Additionally, agricultural insurance schemes are provided to help buffer farmers against climate shocks. Through performance-based grants and inclusive agribusiness support, the project promotes low-emission, and resource-efficient technologies that reduce

post-harvest losses and build adaptive capacity among smallholders, youth and cooperatives.

14. **Youth.** Youth will be targeted through dedicated interventions such as technical and entrepreneurship training, mentorship, and support for business start-ups and market integration. The project aims to create at least 30 per cent of new jobs to benefit youth, in line with youth outreach targets.
15. **Nutrition.** Nutrition will continue to be mainstreamed through: (i) promotion of climate-smart and nutrient-rich crop varieties; (ii) nutrition education delivered via farmer field schools (FFS); and (iii) strengthening market linkages between schools and farmers' cooperatives to facilitate the supply of fresh and locally produced nutritious food commodities.

B. Description of geographical area and target groups

16. **Geographical coverage.** KIIWP2 originally covered 9 drought-prone sectors out of the 12 sectors in Kayonza District. Through the AF, the project coverage will be extended to include the remaining 3, thereby covering all 12 sectors.
17. **Outreach.** Under the AF, KIIWP2 is expected to reach an additional 27,138 rural households (approximately 122,121 household members) across Kayonza District, covering three additional sectors. This will bring the overall project outreach to 302,121 persons across 12 sectors.
18. **Targeting.** Under the AF, the KIIWP2 will continue to focus on poor and food-insecure rural households with economic potential, consistent with the current implementation approach and IFAD's targeting strategy. The poverty categorization under the AF will follow the new national Imibereho Social Registry System. In line with the design and implementation path, the AF will maintain its participation targets of 50 per cent women and 30 per cent youth. Additionally, at least 40 per cent of the targeted households will be vulnerable households, with 10 per cent coming from the poorest category.

C. Components, outcomes and activities

19. The AF will be implemented within the same components as the original financing. Specifically, it will be implemented through components A to C, with component D devoted solely to implementing the FARM P3 grant. The AF activities under components A to C will be as follows:

Component A. Strengthening resilience to droughts

20. **Subcomponent A.1. Catchment rehabilitation and protection.** To enhance sustainability of irrigation infrastructure, land husbandry interventions will be expanded to the catchments of the new irrigation schemes, covering an additional 1,900 ha. A further 1,400 ha will be reforested with over 1.2 million trees and 75 ha of buffer zones will be established. Training and soil fertility enhancement supplies will reach 3,000 more farmers, while catchment management committees will be strengthened. To boost preparedness and resilience, three agrometeorological stations will be installed to generate localized EWS for flood and drought, with local staff trained in operations and maintenance.
21. **Subcomponent A.2. Irrigation development and management.** The AF will: (i) cover cost overruns caused by price escalations resulting from the COVID-19 pandemic and the war in Ukraine; (ii) enhance the original designs of existing irrigation schemes for greater effectiveness and climate resilience, covering the original 2,285 ha and an additional 515 ha within the same schemes; (iii) scale up irrigation development to two new irrigation schemes (2,285 ha) and upgrade an existing 1,300 ha orchard scheme; and (iv) strengthen and professionalize scheme management organizations while supporting them in

adopting innovative and sustainable irrigation scheme management and business models.

22. **Subcomponent A.3. Enhancing climate-smart agriculture practices and technologies.** The AF will expand FFS to 9,000 additional farmers through 400 new FFS groups, providing a start-up input package for those in newly developed irrigation schemes and upper catchments, with project participants covering 20 per cent of costs. Management organizations in each scheme will be provided with a basic mechanization kit and post-harvest machines. The AF will also scale up efforts to promote workload-reducing small-scale mechanization that is adapted to the needs of smallholders.

Component B. Support to farm business development

23. **Subcomponent B.1. Developing Farming as a Business (FaaB).** The AF will establish and strengthen 20 cooperatives, ensuring they are inclusive and market-ready. FaaB training will be provided to the additional 9,000 farmers in new irrigation schemes, alongside support to develop business plans for investments in post-harvest infrastructure through matching grant facilities that use a modality already defined under the current financing. To foster inclusive growth, the project will support youth-led agribusinesses using the matching grant mechanism, and implement tailored training and incubation models to build skills and create employment.
24. **Subcomponent B.2. Supporting backward and forward market linkages.** The AF will scale up interventions by establishing multi-stakeholder platforms and by supporting investments in farm-level marketing infrastructure and post-harvest management. The project will engage with the private sector and advocate for public-private partnerships in developing off-farm post-harvest investments. The project will scale up financial literacy training to 9,000 new farmers and support about 700 village savings and loan associations.

Component C. Institutional development and project coordination

25. **Subcomponent C.1. Policy and institutional development.** The AF will pilot school feeding programmes through 20 school gardens in partnership with unions of producers and schools, while promoting kitchen gardening and nutrition among 750 vulnerable households. Nutrition campaigns will also be extended to new sectors and include social and behaviour change communication messages. In terms of policy engagement, the AF will support national agricultural policies relevant to development.
26. **Subcomponent C.2. Project coordination and management.** The AF will finance operational costs for project coordination during the additional three years. The project will provide support to RAB and district staff to improve their skills on technical aspects related to the project.

D. Costs, benefits and financing

Project costs

27. The total cost of the AF is estimated at US\$143.985 million, to be disbursed over six years (from 2026 to 2031) and allocated to components A to C as outlined in table 2 below. Of this amount, IFAD will contribute US\$63.63 million, and the Government is expected to contribute US\$17.76 million, mainly in the form of tax exemptions. The private sector will be contributing US\$2.32 million, while beneficiaries will provide US\$4.28 million through both cash and in-kind contributions. As part of this AF, a financing gap of US\$56.00 million has been added to reflect the remaining funds requested by the Government that IFAD is unable to provide at this time.
28. Project components A to C are partially counted as climate adaptation finance, with component A accounting for the largest share. In line with the multilateral

development banks' methodologies for tracking climate change adaptation and mitigation finance, the total amount of IFAD climate finance for this project is estimated at US\$56,487,000. Of this, US\$4,718,000 was already counted under the original design, while the additional IFAD climate finance attributable to this AF proposal is estimated at US\$51,769,000, which is 81.4 per cent of the total IFAD project costs.

29. While the additional IFAD climate finance is counted as adaptation finance, several activities also generate mitigation co-benefits. Adaptation-relevant investments include the development of climate-resilient irrigation schemes and erosion control infrastructure, afforestation, land husbandry in vulnerable catchments, and the expansion of localized climate and weather information services. The project also promotes the adoption of stress-tolerant crops and climate-smart agriculture practices. In addition, performance-based grants support inclusive, climate-smart agribusinesses and post-harvest systems that enhance resilience to climate shocks. Institutional support is also provided for disaster risk reduction and climate risk management. Together, these measures strengthen farmers' adaptive capacity, safeguard productive assets and reduce climate-related risks across agroecosystems.
30. The recurrent cost amounts to US\$9.31 million, representing 4.5 per cent of the total project costs, while the investment costs total US\$196.78 million, accounting for 95.5 per cent of the overall budget. Recurrent cost under the IFAD loan will be 5.1 per cent of the IFAD financing.

Table 1

Original and additional financing summary

(Thousands of United States dollars)

	<i>Original financing*</i>	<i>Additional financing 1</i>	<i>Additional financing 2</i>	<i>Total</i>
IFAD loan	21 776	-	63 633	85 409
Government of Spain	28 000	-	-	28 000
Private sector	372	-	2 320	2 692
FARM P3	-	521	-	521
CORDAID	650	-	-	650
Beneficiaries cash	1 646	492	3 827	5 965
Beneficiaries in-kind	497	-	450	947
Government of Rwanda	8 084	85	17 755	25 924
Financing gap	-	-	56 000	56 000
Total	61 024	1 098	143 985	206 108

* See tables 1 and 2 in document EB 2021/133/R.28 for detailed breakdown.

Table 2

Additional financing: project costs by component and financier

(Thousands of United States dollars)

Component	Additional														
	Additional IFAD loan 1		Additional IFAD loan 2		Private sector		Financing gap		Beneficiaries			Borrower/recipient			Total
	Amount	%	Amount	%	Amount	%	Amount	%	Cash	In-kind	%	Cash	In-kind	%	Amount
A. Strengthening resilience to droughts	40 620	35	10 155	9	-	0	44 611	39	1 847	450	2	16 882	-	15	114 566
B. Support to farm business development	3 888	32	972	8	2 320	19	2 177	18	1 980	-	16	725	-	6	12 062
C. Institutional development and project coordination	6 398	37	1 600	9	-	0	9 212	53	-	-	0	148	-	1	17 357
Total	50 906	35	12 727	9	2 320	2	56 000	39	3 827	450	3	17 755	-	12	143 985

Table 3

Additional financing: project costs by expenditure category and financier

(Thousands of United States dollars)

Expenditure category	Additional														
	Additional IFAD loan 1		Additional IFAD loan 2		Private sector		Financing gap		Beneficiaries			Borrower/recipient			Total
	Amount	%	Amount	%	Amount	%	Amount	%	Cash	In-kind	%	Cash	In-kind	%	Amount
Investment costs															
A. Technical assistance and consultancies	3 647	31	912	8	2 320	20	3 450	30	320	198	4	752	-	6	11 599
B. Grants and subsidies	2 292	43	573	11	-	0	725	14	1 753	-	33	-	-	0	5 344
C. Goods, services and inputs	7 492	40	1 873	10	-	0	7 916	42	1 195	252	8	223	-	1	18 949
D. Training, workshops and meetings	790	43	198	11	-	0	839	46	-	-	0	-	-	0	1 827
E. Civil work	31 736	34	7 934	9	-	0	35 670	39	559	-	1	16 660	-	18	92 560
F. Unallocated	3 386	35	847	9	-	0	5 447	56	-	-	0	-	-	0	9 680
Total investment costs	49 344	35	12 336	9	2 320	2	54 047	39	3 827	450	3	17 635	-	13	139 959
Recurrent costs															
A. Salaries and allowances	1 346	40	336	10	-	0	1 682	50	-	-	0	-	-	0	3 364
B. Operating costs	217	33	54	8	-	0	271	41	-	-	0	120	-	18	661
Total recurrent costs	1 562	39	391	10	-	0	1 953	49	-	-	0	120	-	3	4 026
Total	50 906	35	12 727	9	2 320	2	56 000	39	3 827	450	3	17 755	-	12	143 985

Table 4

Project costs by component and project year

(Thousands of United States dollars)

<i>Component</i>	<i>2026/2027</i>		<i>2027/2028</i>		<i>2028/2029</i>		<i>2029/2030</i>		<i>2030/2031</i>		<i>Total</i>
	<i>Amount</i>	<i>%</i>	<i>Amount</i>	<i>%</i>	<i>Amount</i>	<i>%</i>	<i>Amount</i>	<i>%</i>	<i>Amount</i>	<i>%</i>	<i>Amount</i>
A. Strengthening resilience to droughts	18 251	16	41 741	36	34 447	30	17 590	15	2 536	2	114 566
B. Support to farm business development	4 434	37	4 472	37	1 660	14	1 189	10	307	3	12 063
C. Institutional development and project coordination	2 637	4	2 584	4	4 053	12	4 053	12	4 028	68	17 356
Total	25 323	16	48 797	33	40 160	27	22 832	15	6 872	10	143 985

Financing and cofinancing strategy and plan

31. The total cost of the AF is estimated at US\$143.985 million, to be disbursed over six years. The new financing gap of US\$56 million will be sourced through subsequent PBAS cycles or through the Borrowed Resource Access Mechanism (under financing terms to be determined and subject to internal procedures and subsequent Executive Board approval), or by cofinancing identified during implementation.

Disbursement

32. All donor-funded project bank accounts are integrated into the treasury single account system. As such, the AF from IFAD will be channelled through the existing designated account at the National Bank of Rwanda. This account is linked to a dedicated project operational account in Rwandan francs (RWF), which is managed by the single project implementation unit (SPIU). However, this arrangement poses challenges in segregating the use of funds by financing instrument within the Integrated Financial Management Information System (IFMIS). To address this issue, the project will open separate operational accounts in RWF for each IFAD loan. Disbursements will be based on the submission of quarterly interim financial reports, which will be submitted to IFAD within 30 days following the end of each quarter.

Summary of benefits and economic analysis

33. The financial analysis confirms that the planned AF activities are technically and economically viable solutions to address current production constraints and – with a net present value of the net benefit stream over the 20-year timeframe, discounted at 13.3 per cent – amount to RWF 80,920 million (US\$56.391 million), which yields an economic internal rate of return of 28.6 per cent. The financial analysis also shows the set of incentives the target population may have while participating in the project. Profitability results were tested in the sensitivity analysis to measure variations due to unforeseen factors, hence identifying those variables affecting results the most. With the AF, the project is not highly sensitive to increases in costs or reductions in benefits.

Exit strategy and sustainability

34. KIIWP2's exit and sustainability strategy has been considered at different levels and is embedded in its implementation through government institutions at the national and sector/district levels. The SPIU will work with district extension agents on annual workplan and budget preparation and on the oversight and monitoring of implementation progress.
35. The community-led catchment protection and rehabilitation, and scheme-level water users' associations will be key features of ensuring ownership and maintenance of sustainable irrigation infrastructure and land management practices. The landscape approach, including regenerative agriculture, watershed management activities and climate-resilient infrastructure development, will ensure the environmental sustainability of KIIWP2 interventions. Sustainability will also rely on business-oriented training and mutually beneficial market linkages between project participants and market actors, which are key to KIIWP2's exit strategy.
36. The AF is creating environments to crowd in private sector involvement in the implementation process through innovative public-private-producer partnerships. This will bring farmers/producers and key stakeholders together to promote business linkages, financial inclusion and achieve financial independence for farmers and major actors. It will also empower women farmers to engage in high-value business transactions on equal footing with big firms. In addition, private sector management of irrigation schemes or public-private partnerships based on water users' groups are being explored as scheme management models.

37. Lastly, the policy-related interventions will contribute to ensuring that the needed supportive environment is in place during and after project implementation.

III. Risk management

A. Risks and mitigation measures

38. The key risks facing the KIIWP2 AF are similar to those facing the KIIWP2 project in its current form, and are presented in the updated integrated project risk matrix. The risks that are rated as substantial to high include “environment and climate context”, “project scope”, “environment, social and climate impact” and “stakeholders”. From a technical standpoint, key risks relate to the appropriateness of designs, cost accuracy, affordability of irrigation system maintenance and replacement, and agronomic challenges stemming from poor crop rotation and limited access to profitable markets. Additional risks concern the adequacy of scheme management models, including limited technical, governance, and institutional capacity of participants, and environmental and social risks. To mitigate these risks, the project will strengthen design oversight, promote climate-resilient cropping systems, build the capacity of farmers’ organizations and finalize sustainable scheme management models with clearly defined governance and operations and maintenance frameworks. Detailed information on the identified risks and corresponding mitigation measures, including fiduciary risks, is provided in the integrated project risk matrix.

B. Environment and social category

39. The project is classified as having high environmental and social risk. This classification reflects the type, scale and location of the proposed interventions, which involve the expansion of irrigation infrastructure and watershed development in sensitive ecological and social areas. Several of the project’s sites are located near protected wetlands, biodiversity corridors and the buffer zone of Akagera National Park, raising the potential for significant environmental impacts, including habitat degradation, biodiversity loss, agrochemical run-off and human-wildlife conflict. These will be addressed through site-specific environmental and social impact assessments and tailored environment and social management plans for each project site. Key mitigation measures include adherence to integrated pest management, maintenance of environmental flow requirements and creation of buffer zones to protect sensitive habitats. Thematic plans, such as biodiversity management plans, pesticide management plans and buffer zone management plans, will further reinforce environmental safeguards.
40. On the social front, while the project avoids large-scale physical resettlement, it carries substantial risks of economic displacement, land access disputes, resource competition and inequitable benefit distribution, compounded by customary land tenure complexities and uneven institutional capacity across districts, which could lead to elite capture or community tensions if not properly managed. To mitigate these risks, participatory resettlement action plans will be prepared and multi-level grievance redress mechanisms (GRMs) will be operationalized at community, sector and district levels to support timely and accessible conflict resolution. Dedicated training on the prevention and handling of sexual exploitation, abuse and harassment will be included as part of the GRM training package, and women from local GRM committees will be trained as focal points to handle gender-based violence cases. Furthermore, considering the risk of uneven working conditions, child labour, and occupational health and safety issues, the development of a labour management plan is recommended.
41. In line with IFAD’s SECAP requirements, the project will finalize site-specific safeguard plans and conduct regular environmental and social audits to ensure compliance. Financial intermediaries will be screened for safeguard compliance, in close coordination with national agencies such as the Rwanda Environment

Management Authority, Rwanda Development Board and RAB. District environmental officers will be essential for enforcing safeguards effectively and ensuring long-term sustainability.

C. Climate risk classification

42. The project is classified as having moderate climate risk. This classification reflects the presence of significant, yet manageable, climate-related hazards in the project area, including rising temperature extremes, flooding, droughts and occasional landslides. Climate projections suggest that average maximum temperatures may increase by 1.3° C to 1.9° C by 2050, while annual rainfall could rise by up to 20 per cent, accompanied by greater variability and intensity. These trends pose risks to agricultural productivity, rural infrastructure and ecosystem integrity.
43. Despite these challenges, the project emphasizes adaptation and resilience through the development of climate-resilient infrastructure, the promotion of tolerant crop varieties, the strengthening of climate and weather information services, and support for community-based adaptation initiatives. These measures are expected to substantially reduce the project's residual vulnerability to climate impacts.
44. The project will be informed by national and regional climate assessments, including Rwanda's National Adaptation Plan and findings from the Intergovernmental Panel on Climate Change. Although some uncertainty remains, particularly regarding localized projections, identified hazards are well understood and can be addressed through technically and institutionally feasible interventions. A targeted literature review of climate assessments will further guide detailed design and risk management.
45. Furthermore, the project contributes to climate change mitigation. An Environmental Externalities Accounting Tool analysis conducted for KIIWP2 estimates that project activities will result in 312,345 TCO₂eq reduced or sequestered.

IV. Implementation

A. Compliance with IFAD policies

46. There will be no alterations to the original design of KIIWP2. The project continues to be aligned with Rwanda's Fifth Strategic Plan for Agriculture Transformation, the Government's flagship investment programme for the agriculture sector. KIIWP2's AF is consistent with both the IFAD Strategic Framework 2016–2025, and IFAD's Strategy and Action Plan on Environment and Climate Change 2019–2025. KIIWP2's AF is also aligned with the overall country strategic opportunities programme (2025–2030), which was endorsed by the Executive Board in September 2025, including its goal to strengthen sustainable food security and nutrition in vulnerable rural households, with the objectives of enhanced production, market access and nutrition practices, and of increased efficiency and investments across agrifood systems.

B. Organizational framework

Management and coordination

47. The implementation modalities will remain unchanged under the AF. The project will be implemented through the SPIU under RAB. In line with the ongoing practices, the already established project steering committee will be responsible for guidance and checks on the overall KIIWP2 implementation. The project has established partnerships with decentralized entities to support activities under the direct coordination of districts. Similar partnerships have also been formed with relevant specialized technical agencies of the Government.

Financial management, procurement and governance

48. **Financial management.** The AF is expected to utilize the same financial management arrangements as the original financing and the broader IFAD portfolio in Rwanda, which are fully aligned with national systems. KIIWP2 will adhere to national accounting regulations, currently transitioning towards accrual-based International Public Sector Accounting Standards. Accounting and financial reporting will be conducted through IFMIS. However, the SPIU will be responsible for actively addressing existing IFMIS limitations, including the treatment of advances, segregation of funds by financing instruments and the recording of in-kind contributions. Internal audit will be performed by the internal audit unit within the SPIU. The annual financial statements will be audited by the Office of the Auditor General, in line with the IFAD Handbook for Financial Reporting and Auditing of IFAD-financed Projects. The Government will finance all taxes and duties.
49. **Procurement.** Arrangements will continue to follow the national procurement regulations, to the extent that they are aligned with the IFAD procurement guidelines and carried out by the SPIU/RAB using the national e-procurement system. A dedicated procurement role needs to be assigned for KIIWP2. The Ministry of Agriculture and Animal Resources (MINAGRI), with various implementing partners, will include procurement reporting in a standardized template and procurement for implementing MINAGRI's activities will follow national procurement regulations. The SPIU will prepare an action plan with timelines for procurement of irrigation infrastructure to ensure timely completion of downstream activities. SECAP risks related to procurement should be adequately considered, given the current SECAP risk category of "substantial". The project procurement arrangement letter will be amended to align with the thresholds as per the latest IFAD Procurement Handbook.

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

50. A custom-made monitoring and evaluation management information system (MIS), planned under existing financing, will ensure systematic, consistent and digitalized data collection and management across all components. The feasibility of linking the project-level MIS with MINAGRI's Agriculture Management Information System will be jointly explored with the service provider and MINAGRI.
51. The KIIWP2 logical framework has been revised to incorporate the interventions planned under the AF, with corresponding adjustments to indicators and target values to reflect the expanded scope. KIIWP2 conducted a baseline survey under the original financing in 2021, and the midterm survey for the original financing is currently under way. With the AF expanding the project to three new sectors, a light baseline survey will be carried out to establish benchmark values for relevant logical framework indicators. A final endline survey, covering both the original and the AF, will be conducted in the final year of implementation.
52. **Learning, knowledge management and strategic communication.** Building on the knowledge management systems established under the original financing, the AF phase will expand and deepen field-based learning and multi-stakeholder engagement. The integrated knowledge management and communication strategy will be updated to support the objectives of the AF. The existing knowledge management and communication function will be further strengthened through additional technical consultancy support to deliver ad hoc assistance as needed.

D. Proposed amendments to the financing agreement

53. An amendment to the current financing agreement between the Republic of Rwanda and IFAD will be necessary to formalize the additional allocation of

US\$50,906,400 on super highly concessional terms and US\$12,726,600 on highly concessional terms, as per table 2. The amendment will also extend the project completion and financing closing dates by 36 months, targeting completion in June 2031 and closure in December 2031. There will be no other changes to the financing agreement.

V. Legal instruments and authority

54. A financing agreement between the Republic of Rwanda and IFAD will constitute the legal instrument for extending the proposed financing to the borrower/recipient. The signed financing agreement will be amended following approval of the additional financing.
55. The Republic of Rwanda is empowered under its laws to receive financing from IFAD.
56. 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

57. 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 fifty million nine hundred and six thousand four hundred United States dollars (US\$50,906,400) 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 twelve million seven hundred and twenty-six thousand six hundred United States dollars (US\$12,726,600) 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				Additional target	Revised target	Means of Verification			Assumptions
	Name	Baseline	Mid-Term	End Target			Source	Frequency	Responsibility	
Outreach	1.b Estimated corresponding total number of households members					M&E System	Semi- annual/Annual	SPIU, M&E Unit, Implementation Partners, Component leads		
	Household members - Number of people	0	90000	180000	122121	302121				
	1.a Corresponding number of households reached					M&E System	Semi- annual/Annual	SPIU, M&E Unit, Implementation Partners, Component leads		
	Women-headed households - Households	0	2549	6371	5,428	11799				
	Non-women-headed households - Households	0	10194	25486	28711	54197				
	Households - Households	0	20000	40000	27138	67138				
	1 Persons receiving services promoted or supported by the project					M&E System	Semi- annual/Annual	SPIU, M&E Unit, Implementation Partners, Component leads		
	Males - Males	0	10000	20000	37624	57624				
	Females - Females	0	10000	20000	39550	59,550				
	Young - Young people	0	6000	12000	23152	35152				
	Total number of persons receiving services - Number of people	0	20000	40000	77174	117174				
Project Goal Contribute to poverty reduction in the drought-prone Eastern province of Rwanda and increase households' resilience to economic and climate related shocks and improve adaptive capacity in the face of recurring drought conditions	Households experiencing upward economic mobility (proxied by asset indicators i.e. household and productive assets)					COI Survey	Baseline, Completion	SPIU, M&E Unit (Baseline, Mid-term and Impact assessment contractors)	Increased income will be used on household improvements and that stable political, macro-economic environment is maintained in the country. Food security and incomes increase through a combined effect of increased crop production and improved market access	
	Household - Percentage ()	0	10	20	20	20				
	Household - Number	0	3186	6371	5428	11799	COI Survey	Baseline, Completion		SPIU, M&E Unit (Baseline, Mid-term and Impact assessment contractors)
	Households reporting an increase in resilience measured through the ability to recover from shocks (ATR)									
	Household - Percentage ()	0	10	25	25	25				
	Household - Number	0	3186	7964	6785	14749				
Development Objective Improve food security and incomes of beneficiary households on a sustainable basis	Reduction in the prevalence of food insecurity measured with Food insecurity experience scale (FIES)					COI Survey (FIES methodology)	Baseline, Completion	SPIU, M&E Unit (Baseline, Mid-term and Impact assessment contractors)	National statistics, poverty & gender studies, CFSVA	
	Percent reduction - Percentage ()	0	5	15	15	15				
	Households with improved incomes					COI Survey	Baseline, Completion	SPIU, M&E Unit (Baseline, Mid-term and Impact assessment contractors)		
	Households with improved incomes - Percentage ()	0	30	60	60	60				

Results Hierarchy	Indicators				Additional target	Revised target	Means of Verification			Assumptions
	Name	Baseline	Mid-Term	End Target			Source	Frequency	Responsibility	
	Households with improved incomes - Number	0	15	19114	16,283	35397				
Outcome Outcome 1: Improved soil and water management practices, and adoption of climate-resilient inputs and technologies to enhance productivity, climate adaptation and resource efficiency	1.2.4 Households reporting an increase in production						COI Surveys	Baseline, Midterm, Completion	SPIU/RAB, M&E Unit (Baseline, Mid-term and Impact assessment contractors)	Food security and incomes increase through a combined effect of increased crop production and improved market access
	Total number of household members - Number of people	0	9639	24098	43241	67338				
	Households - Percentage (%)	0	40	75	75	75				
	Households - Households	0	2142	5355	9609	14964				
	CI 1.2.2: Households reporting adoption of new/improved inputs, technologies or practices									
	Total number of household members - Number of people	0	9639	24098	43,241	67,338				
	Households - Percentage (%)	0	40	75	75	75				
	Households - Households	0	2142	5355	9,609	14,964				
	3.2.2 Households reporting adoption of environmentally sustainable and climate-resilient technologies and practices						COI Surveys	Baseline, Midterm, Completion	SPIU/RAB, M&E Unit (Baseline, Mid-term and Impact assessment contractors)	
	Total number of household members - Number of people		72000	135000	70,187	205,187				
	Households - Percentage (%)		40	75	75	75				
	Households - Households		16000	30000	15,597	45,597				
	1.2.8 Women reporting minimum dietary diversity (MDDW)						COI Surveys	Baseline, Midterm, Completion	SPIU/RAB, M&E Unit (Baseline, Mid-term and Impact assessment contractors)	
	Women (%) - Percentage (%)	0	20	70	30					
	Women (number) - Females	0	1210	12100	2,700	14,800				
	Households (%) - Percentage (%)	0	5	30	30	30				
	Households (number) - Households	0	2000	12100	2,700	14,800				
	Household members - Number of people	0	9000	54450	12,150	66,600				
	An average 20 Increase in the renewable energy consumption ratio						COI Survey	Baseline, Completion	SPIU/RAB, M&E Unit (Baseline, Mid-term and Impact assessment contractors)	
	Ratio - Percentage	0	20	20	20	20				
Output Output 1.1 Catchment rehabilitation and protection systems	3.1.4 Land brought under climate-resilient management						M&E System	Semi-annual/Annual	SPIU/RAB, M&E Unit, Implementation Partners, Component leads	Climate-resilient management will be complemented by RWFA reforestation (A)
	Hectares of land - Area (ha)	0	2000	5350	3,375	8,725				
Output Output 1.2: Infrastructure development	1.1.2 Farmland under water-related infrastructure constructed/rehabilitated						M&E System	Semi-annual/Annual	SPIU/RAB M&E Unit, Implementation Partners, Component leads	
	Hectares of land - Area (ha)	0	1230	2285	4,100	6,385				
Output Output 1.3 : Infrastructure management institutions strengthened	3.1.1 Groups supported to sustainably manage natural resources and climate-related risks						M&E System	Semi-annual/Annual	SPIU/RAB, M&E Unit, Implementation Partners, Component leads	
	Total size of groups - Number of people	0	200	496	10,250	10,746				
	Groups supported - Groups	0	20	55	6	61				
	Males - Males	0	100	248	5,125	5,373				
	Females - Females	0	100	248	5,125	5,373				
	Young - Young people	0	60	150	3,075	3,225				

Results Hierarchy	Indicators				Additional target	Revised target	Means of Verification			Assumptions
	Name	Baseline	Mid-Term	End Target			Source	Frequency	Responsibility	
Output Output 1.4: Enhanced CSA and AH practices and technologies	1.1.4 Persons trained in production practices and/or technologies					M&E System	Semi-annual/Annual	SPIU/RAB, M&E Unit, Implementation Partners, Component leads	Increased production combined with targeted capacity building will lead to improved diets and nutrition	
	Men trained in crop - Males	0	4444	6050	4,500					10,550
	Women trained in crop - Females	0	4356	6050	4,500					10,550
	Young people trained in crop - Young people	0	2613	3630	2,700					6,330
	Total persons trained in crop - Number of people	0	8800	12100	9,000					21,100
	CI 1.1.3: Rural producers accessing production inputs and/or technological packages					M&E System	Semi-annual/Annual	SPIU/RAB, M&E Unit, Implementation Partners, Component leads		
	Males - Number	0	3,736	9,340	4,690					14,030
	Females - Number	0	3,736	9,340	4,690					14,030
	Young - Number	0	2,242	5,604	2,814					8,418
	Total rural producers - Number of people	0	7,472	18680	9,380	28,060				
	Installed capacity of renewable energy technologies to support agricultural productivity and climate resilient agriculture					M&E System	Semi-annual/Annual	SPIU/RAB, M&E Unit, Implementation Partners, Component leads		
	Installed capacity for renewables (KW)	0	41	103	3,870					3,973
	1.1.8 Households provided with targeted support to improve their nutrition					M&E System	Semi-annual/Annual	SPIU/RAB M&E Unit, Implementation Partners, Component leads		
	Total persons participating - Number of people	0	8800	12100	9,000					21,100
	Males - Males	0	4444	6050	4,500					10,550
	Females - Females	0	4356	6050	4,500					10,550
	Households - Households	0	8800	12100	9,000					21,100
	Household members benefitted - Number of people	0	39600	54450	40,500					94,950
	Young - Young people	0	2613	3630	2,700					6,330
Outcome Outcome 2: Increased sales and linkage of producers to services and markets	2.2.5 Rural producers' organizations reporting an increase in sales					COI Surveys	Baseline, Midterm, Completion	SPIU/RAB, M&E Unit (Baseline, Mid-term and Impact assessment contractors)	Favourable economic environment (A) Public or private entities are willing to engage with project (A).	
	Number of Rural POs - Organizations	0	30	64	15					79
	Total number of POs members	0	3000	6400	1,500					7,900
	Women PO members	0	1500	3200	750					3,950
	Men PO members	0	1500	3200	750					3,950
	Young PO members	0	900	1920	450	2,370				
	2.2.3 Rural producers' organizations engaged in formal partnerships/agreements or contracts with public or private entities					COI Surveys	Baseline, Midterm and Completion	SPIU/RAB, M&E Unit (Baseline, Mid-term and Impact assessment contractors)		
	Number of POs - Organizations	0	20	40	15					55
	Total number of POs members	0	2000	4000	1,500					5,500
	Women PO members	0	1000	2000	750					2,750
	Men PO members	0	1000	2000	750					2,750
	Young PO members	0	600	1200	450	1,650				
	1.2.5 Households reporting using rural financial services					COI Surveys	Baseline, Midterm and Completion	SPIU/RAB, M&E Unit (Baseline, Mid-term and Impact assessment contractors)		
	Total number of household members - Number of people	0	37125	56250	33,750					90,000
	Households - Percentage (%)	0	40	31	75					
Households - Households	0	8250	12500	7,500	20,000					
CI 2.2.6: Households reporting improved physical access to markets, processing and storage facilities					COI Survey	Baseline, Completion	SPIU/RAB,M&E Unit (Baseline, Mid-term			

Results Hierarchy	Indicators				Additional target	Revised target	Means of Verification			Assumptions
	Name	Baseline	Mid-Term	End Target			Source	Frequency	Responsibility	
	Households reporting improved physical access to Processing facility - Number	0	1	2	3	5			and Impact assessment contractors)	
	Households reporting improved physical access to Processing facility - Percentage ()	0	40	75	75	150				
	Size of Households (number of people)	0	4	9	14	23				
	Households reporting improved physical access to Storage facility - Number	0	750	1875	6750	8,625				
	Households reporting improved physical access to Storage facility - Percentage ()	0	40	75	75	150				
	Size of Households (number of people)	0	3375	8438	30375	38,813				
	2.2.1 Beneficiaries with new jobs/employment opportunities									COI Survey
	Males -Number	0	1271	3178	641	3,818				
	Females - Number	0	1271	3178	641	3,818				
	Young - Number	0	763	1907	384	2,291				
	Total number of persons with new jobs/employment opportunities	0	2542	6355	1,281	7,636				
Output	2.1.2 Persons trained in income-generating activities or business management						M&E System	Semi-annual/Annually	SPIU/RAB, M&E Unit, Implementation Partners, Component leads	Farmers interested in business skills(A)
Output 2.1: Development of Farming as a Business Skills	Males - Males	0	0	4000	4 500	8 500				
	Females - Females	0	0	4000	4 500	8 500				
	Young - Young people	0	0	2400	2 700	5 100				
	Persons trained in IGAs or BM (total) - Number of people	0	0	8000	9 000	17 000				
Output	2.1.6 Market, processing or storage facilities constructed or rehabilitated						M&E System	Semi-annual/Annually	SPIU/RAB, M&E Unit, Implementation Partners, Component leads	
Output 2.2: Promotion of Farm Mechanization and Post-harvest Facilities	Total number of facilities - Facilities	0	0	62	30	92				
	Processing facilities constructed/rehabilitated - Facilities	0	0	37	4	41				
	Storage facilities constructed/rehabilitated - Facilities	0	0	25	26	51				
	2.1.3 Rural producers' organizations supported									
	Rural POs supported - Number	0	20	50	20	70				
	Total size of POs (number of people)	0	2000	5000	2,000	7,000				
	Females - Number	0	1000	2500	1,000	3,500				
	Males - Number	0	1000	2500	1,000	3,500				
	Young - Number of people	0	600	1500	600	2,100				
Output	1.1.7 Persons in rural areas trained in financial literacy and/or use of financial products and services						M&E System	Semi-annual/Annually	SPIU/RAB, M&E Unit, Implementation Partners, Component leads	Beneficiaries are able to access the services by FSPs
Output 2.3: Supporting backward and forward market linkages	Males - Males	0	3000	6250	4 500	10 750				
	Females - Females	0	3000	6250	4 500	10 750				
	Young - Young people	0	1800	3750	2 700	6 450				
	Persons in rural areas trained in FL and/or use of FProd and Services (total) - Number of people	0	6000	12500	9 000	21 500				
	1.1.5 Persons in rural areas accessing financial services						M&E System	Semi-annual/Annually		

Results Hierarchy	Indicators				Additional target	Revised target	Means of Verification			Assumptions	
	Name	Baseline	Mid-Term	End Target			Source	Frequency	Responsibility		
	Women in rural areas accessing financial services - savings - Females	0	3000	6250	2,500	8,750			SPIU/ICCO, M&E Unit, Implementation Partners, Component leads		
	Young people in rural areas accessing financial services - savings - Young people	0	1800	3750	1,500	5,250					
	Men in rural areas accessing financial services - savings - Males	0	3000	6250	2,500	8,750					
	Men in rural areas accessing financial services - credit - Males	0	3000	6250	1,250	7,500					
	Women in rural areas accessing financial services - credit - Females	0	3000	6250	1,250	7,500					
	Young people in rural areas accessing financial services - credit - Young people	0	1800	3750	750	4,500					
	Total persons accessing financial services - savings - Number of people	0	6000	12500	5,000	17,500					
	Total persons accessing financial services - credit - Number of people	0	6000	12500	2,500	15,000					
	Total persons accessing financial services - insurance - Number of people	0	1000	2500	2,500	5,000					
	Men in rural areas accessing financial services - insurance - Males	0	1000	2500	1,250	3,750					
	Women in rural areas accessing financial services - insurance - Females	0	1000	2500	1,250	3,750					
	Young people in rural areas accessing financial services - insurance - Young people	0	300	750	750	1,500					
	Outcome Outcome 3: Enabling institutional environment	Policy 3 Existing/new laws, regulations, policies or strategies proposed to policy makers for approval, ratification or amendment									M&E System
Number - Number		0	0	6	1	7					
SF.2.1 Households satisfied with project-supported services					COI Surveys	Baseline, Midterm, Completion	SPIU/RAB, M&E Unit (Baseline, Mid-term and Impact assessment contractors)				
Household members - Number of people		0	0	135000					91,591	226,591	
Households - Percentage (%)		0	0	75					75	75	
Households - Households		0	0	30000					20,354	50,354	
SF.2.2 Households reporting they can influence decision-making of local authorities and project-supported service providers					COI Surveys	Baseline, Midterm, Completion	SPIU/RAB, M&E Unit (Baseline, Mid-term and Impact assessment contractors)				
Household members - Number of people		0	0	135000					91,591	226,591	
Households - Percentage (%)		0	0	75					75	75	
Households - Households		0	0	30000					20,354	50,354	
Output 3.1 Dialogue between value chain stakeholders established	Policy 2: Functioning multi-stakeholder platforms supported					M&E System	Relevant legal in-country institutions or through qualitative surveys administered	SPIU/RAB, M&E Unit			
	Multi-stakeholder platforms - Number	0	0	2	2					4	

Results Hierarchy	Indicators				Additional target	Revised target	Means of Verification			Assumptions
	Name	Baseline	Mid-Term	End Target			Source	Frequency	Responsibility	
								to relevant stakeholders.		
	Policy 1: Policy relevant knowledge products completed						M&E System	Relevant legal in-country institutions or through qualitative surveys administered to relevant stakeholders.	SPIU/RAB, M&E Unit	
		0	1	3	4	7				

Updated summary of the economic and financial analysis

Introduction

The KIIWP2 project is expected to generate substantial benefits for rural households and communities living in the project area. KIIWP2 interventions are aimed at: i) boosting agriculture production and productivity through increased access to water, technical assistance and inputs; ii) diversifying productive activities for rural poor, iii) increasing farmers resilience by strengthening adaptation to climate change, iv) facilitating access to finance; v) promoting entrepreneurship and value-addition in agriculture, vi) reducing post-harvest losses; and vii) improving food and nutrition security.

The economic and financial analysis (EFA) of KIIWP2 accounts for benefits and costs directly linked to the above-mentioned interventions. The target group is expected to experience increase in income as a direct result of the: (i) increased water availability for productive use; (ii) diversification of productive activities and sources of income thanks to greater access to technical assistance and inputs; (iii) increased food availability for rural poor, (iv) increased value-added of agricultural outputs; (v) enhanced productivity through improved infrastructure; (vi) improved quality of processed products, thus attracting higher prices at local market; (vii) increased employment opportunity either for hired or family labour, for both on-farm and off-farm activities; and (viii) tax revenues as a result of increased volume of taxable production.

Increase in income would be largely dependent on rural household and rural communities adopting improved technologies which the project will promote through technical assistance and infrastructure investments. The project will also aim at strengthening marketing linkages and creating a favourable economic environment for farmers/rural community to produce more competitive products and expand production.

Due to the COVID-19 pandemic, the EFA for the original financing was prepared remotely. The same EFA has been updated to cater for additional financing, while accounting for households reached during the past years of project implementation before additional financing. The analysis makes use of indicative crop, activity and farm models to assess the economic viability of KIIWP2 as a whole (original and additional financing). The EFA builds upon the precautionary principle, accounting for project benefits in a realistic and conservative manner. A cash-flow analysis is finally carried out to present the "with" and "without" project analysis. The key-indicators used to carry out the analysis are Net Present Values (NPVs), Financial and Economic Internal Rate of Return (FIRR - EIRR), and Benefit-cost ratio (BCR). The original EFA was formulated by using the FARMOD software (v. 5.03). In order to factor in the additional financing, the original EFA was updated using Ms Excel.

Family farming in Rwanda

The agricultural sector in Rwanda is particularly relevant, and contributes to a large extent, to the welfare and food security of its rural population. According to the WFP (2018), albeit contributing to about 31 percent of Rwanda GDP, agriculture is characterized by small-scale, subsistence, rain-fed farming. At national level, the average landholding size is 0.6 ha often divided into three to four sub-plots. About 50 percent of farmers cultivate less than 0.35 ha and 15 percent farm less than 0.1 ha. On average, each rural household cultivate around 3.2 crops per plot.

Land holdings and production vary substantially in each district and they are largely dependent on agro-ecological features as well as population size. Difference in land productivity and crop yields across districts can be remarkable and would largely depend on soil fertility, altitude and climate. Farming characteristics within the project target area of Ndego, in the Kayanza district, differ substantially from national averages.

At national level, mixed farming is the most frequent production systems. Crop production and livestock rearing are carried out simultaneously to sustain household food and cash needs. Rwanda is characterized by three cropping seasons (A, B and C), but in Kayonza district season C is often not seized given the lack of rain and consequent aridity. Rotation of staple annual crops follows the general calendar. According to the WFP (2018), the most common income-generating activity is agricultural production on the household's own farm (practiced by 56 percent of households) and daily labour agricultural work (16 percent).

Project Beneficiaries, costs and indicators

Programme target group and beneficiaries. The primary target group for the Programme will be smallholder farmers - particularly women and youth. It is estimated that the number of direct beneficiaries will be 67,138 households (HHs). The aggregation for production models is based on the number of hectares brought into the new production systems by the target households.

Figure 1: Project costs and outreach

PROJECT COSTS AND INDICATORS FOR LOG FRAME					
TOTAL PROJECT COSTS (in '000 US\$)		209,267			
Beneficiaries	302,121 people	4.5	Households	67,138	
Cost per beneficiary	693 USD x person		3,117 US\$ x HH	Adoption rates	80%
Components and Cost (US\$ million)					
A. Component A: Strengthening resilience to droughts			169,259	812%	
B. Component B: Support to farm business development			22,027	105%	
C. Component C: Institutional development and project coordination			7,380	8.3%	

KIIWP 2, with additional financing, will benefit a total of 67,138 households over nine years of project implementation. This will translate into a cost beneficiary household of USD 3,117 and a cost per beneficiary individual of USD 693 by project completion.

Overall, the project will benefits women, youth and men directly involved in farm and off-farm activities proposed by the project as well as indirect beneficiaries benefitting from the use of common goods and public infrastructures. The inclusion pattern of the EFA models and beneficiaries is based on KIIWP 2 outreach before additional financing, as well as the roll out of the infrastructure investment and rehabilitation works with additional financing, both aligned to the phasing described in the costab.

Key assumptions. The following sources of information gathered during the design mission have been used to set up the analysis: a) National statistics and survey data from the National Institute of statistics of Rwanda; b) International statistics from FAOSTAT and VAM-WFP, c) Research papers, d) technical reports; e) past country/programme evaluation reports, and e) own estimates. In particular, information on labour and input requirements for various operations, capital costs, prevailing wages, yields, farm gate and market prices of commodities, input and farm-to-market transport costs were updated from similar investments in the country. Country data and information from the WFP VAM platform, the E-SOKO platform from the Ministry of Agriculture and FAO price tool were also used for data validation. Conservative assumptions were made for inputs and outputs, and do take account of possible risks.

Exchange rate. The exchange rate used in the analysis is fixed at 1 USD = 1435 RWF, being the official exchange rate prevailing during the design mission.

Numeraire and Prices. The adopted numeraire for the EFA is the domestic price level expressed in local currency unit (RWF). The financial prices for project inputs and products represent average farm-gate and market prices prevailing annual value of prices 2024 as reported by FAOStat. Prices used represent estimates of the average seasonal prices and the analysis is carried out using nominal constant prices.

Labour. Family labour has been valued both in financial and economic analysis. It has been assumed that farm labour is provided by the households and is valued at RWF 2000 per day. Hired labour (skilled) is priced at RWF 10,000 per day, which is the prevailing market rate for on-farm and off-farm activities. In the HHs models that follow, family labour is the main source of workforce. Labour inputs requirements are affected by land size and varies.

Opportunity cost of capital. A discount rate of 16.4 per cent has been used in the financial analysis to assess the viability and robustness of the investments. The value is calculated as the average lending rate in Rwanda over the past 10 years. In the economic analysis this value is reduced to 13.3 per cent consistently with the rate given on 20-year government bonds in Rwanda.

FINANCIAL ANALYSIS

The primary objective of the financial analysis is to determine the financial viability and incentives for the project target group as a result of their engagement in project activities, and hence to determine the economic impact on family labour, cash flow and household incomes. A number of indicative economic activities to be supported by the project were identified during the design and additional financing mission and are presented in the table below.

Table 1: Expected hectareage and crops under KIIWP 2

Agricultural Sectors	Schemes	Scheme Area	Fruits (Ha)			VEGETABLES (Ha)						STAPLES (Ha)					Total area (ha)
			Avocado	Mango	Citrus	Onion	Carrot	French bean	Peppers	Water-melon	Tomato	Rice	Bean	Soy-bean	Maize	Potato	
A	Gishyanga	200	100	100													200
	Kanyaganyaga	450	250	100								40					450
	Kibane	905				100	50	20	20	10	15				300	50	565
	Ihera	909				150	150	50	50	30	29				350	100	909
	Nasho	976				150	100	50	50	10	26			200	200	100	976
	Nide-gi-2	1185				90	100	100	50	80	50		100	150	365	100	1185
	Orduard	1337	400	600	337												1337
	Total	5622	750	800	337	510	420	230	180	130	120	40	100	350	1305	350	5622
B	Gishyanga	200	100	100													200
	Kanyaganyaga	450	250	100								40					450
	Kibane	905				15	20	50	10	20	100				50		565
	Ihera	909				29	50	150	30	50	150		350		100		909
	Nasho	976				26	50	100	10	50	150		200		100	200	976
	Nide-gi-2	1185				50	100	100	80	50	90		365	100	100	150	1185
	Orduard	1337	400	600	337												1337
	Total	5622	750	800	337	120	230	420	130	180	510	40	1305	100	350	350	5622
C	Gishyanga	200	100	100													200
	Kanyaganyaga	450	250	100								1	24	2	7	7	435
	Kibane	905				100	100	50	50	50	15	4	122	9	33	33	490
	Ihera	909				200	150	50	50	100	100	5	158	12	42	42	812
	Nasho	976				200	100	100	50	100	100	6	198	15	53	53	854
	Nide-gi-2	1185				150	300	100	80	100	150	6	186	14	50	50	1,071
	Orduard	1337	400	600	337												1337
	Total	5622	750	800	337	670	670	310	240	350	365	21,072	687,483	52,680,653	184,382	184,382	5,201
		14,866	2,250	2,800	1,011	1,180	1,320	960	550	600	995	101	2,282	503	1,838	88	16,885

The production models for fruits, vegetables and staples are used as building blocks for the elaboration of three household/farm models where differentiation is made both in terms of cultivation patterns, land holding, source of income, production systems and poverty level. Animal husbandry was ignored because KIIWP 2 does not make substantial investments in the promotion of livestock production.

In particular, the analysis employs the Ubudehe categorization system adopted by the Rwandan government to differentiate households according to their income levels – where Ubudehe 1 denotes the poorest category and Ubudehe 4 the wealthiest. In this analysis, only households falling in Ubudehe one to three are considered.

Crop production models

KIIWP 2 promotes the production of 14 crops within the irrigated area. These crops are categorized into staples (maize, rice, beans, soya beans, potatoes), fruits (avocado, mango, citrus), and vegetables (onions, tomatoes, French beans, peppers, water melon, carrots). Models, based on production on 1 hectare of land within the irrigated area, were developed for the 14 different project-promoted crops. Details of the models are discussed below.

Avocado production model

Table 2: Assumptions for the avocado production model on 1 hectare

Assumptions		WOP	WP		Progression				
					Y1	Y2	Y3	Y4	Y5
Production	Kg	5,000	21,000		5,000	9,000	13,000	17,000	21,000
Manure	kg	1,000	5,000		1,000	2,000	3,000	4,000	5,000
Urea	kg	0	100		-	25	50	75	100
KCL	kg	0	15		-	4	8	11	15
Calcium carbide	kg	0	10		-	3	5	8	10
Bags	sack of 50	280	500		280	335	390	445	500
Transport to loca	ton.km	2	2		2	2	2	2	2
Pesticides	lt	3	3		3	3	3	3	3
Tools	lumpsum	1	1		1	1	1	1	1
Basal Fertilizers	Kg	100	500		100	200	300	400	500
Irrigation	pers.day	0	6		-	2	3	5	6
Fertilizer applica	pers.day	5	10		5	6	8	9	10
Weeding	pers.day	40	60		40	45	50	55	60
Pesticides applic	pers.day	0	30		-	8	15	23	30
Harvesting	pers.day	60	80		60	65	70	75	80
Post harvesting	pers.day	10	10		10	10	10	10	10
Land preparation	pers.day	60	90		60	68	75	83	90

This model assumes a production of 5,000 kg per hectare without project, rising to 21,000 kg per hectare with project interventions, over a five-year production period. The low productivity in the WOP situation is due to lack of water for irrigation. With project intervention, the productivity per tree increases. Input costs include manure, fertilizers, herbicides, pesticides and labour for various farming activities. In the with-project scenario, it is assumed that the crop receives adequate water for irrigation throughout the production period. At a discount rate of 16.4, production of avocado on a one-hectare piece of land generates positive NPV of RWF 1.9 million.

Mango production model

Table 3: Assumptions for the mango production model on 1 hectare

Assumptions		WOP	WP		Progression				
					Y1	Y2	Y3	Y4	Y5
Trees per hecta	No	200	300						
Production per	Kg	50	50						
Production	Kg	10,000	15,000		10,000	11,250	12,500	13,750	15,000
Manure	kg	1,000	5,000		1,000	2,000	3,000	4,000	5,000
Urea	kg	0	100		-	25	50	75	100
KCL	kg	0	15		-	4	8	11	15
Calcium carbide	kg	0	10		-	3	5	8	10
Bags	sack of 50	280	500		280	335	390	445	500
Transport to loca	ton.km	2	2		2	2	2	2	2
Pesticides	lt	0	1		-	0	1	1	1
Tools	lumpsum	1	1		1	1	1	1	1
Basal Fertilizers	Kg	100	500		100	200	300	400	500
Irrigation	pers.day	0	6		-	2	3	5	6
Fertilizer applica	pers.day	5	10		5	6	8	9	10
Weeding	pers.day	40	60		40	45	50	55	60
Pesticides applic	pers.day	0	30		-	8	15	23	30
Harvesting	pers.day	60	80		60	65	70	75	80
Post harvesting	pers.day	10	10		10	10	10	10	10
Land preparation	pers.day	60	90		60	68	75	83	90

This model assumes a production of 10,000 kg per hectare without project, rising to 15,000 kg per hectare with project interventions, over a five-year production period, mainly due to increased access to irrigation water for the orchard, as well as increased cropping density. Input costs include manure, fertilizers, herbicides, pesticides and labour

for various farming activities. In the with-project scenario, it is assumed that the crop receives adequate water for irrigation throughout the production period. At a discount rate of 16.4, production of mango on a one hectare piece of land generates positive NPV of RWF 0.24 million.

Citrus production model

Table 4: Assumptions for the citrus production model on 1 hectare

Assumptions		WOP	WP	Progression					
				Y1	Y2	Y3	Y4	Y5	
Trees per hecta	No	300	400						
Production per	Kg	10	30						
Production	Kg	3,000	12,000	3,000	5,250	7,500	9,750	12,000	
Manure	kg	1,000	5,000	1,000	2,000	3,000	4,000	5,000	
Urea	kg	0	100	-	25	50	75	100	
KCL	kg	0	15	-	4	8	11	15	
Calcium carbide	kg	0	10	-	3	5	8	10	
Bags	sack of 50	280	500	280	335	390	445	500	
Transport to loc	ton.km	2	2	2	2	2	2	2	
Pesticides	lt	0	1	-	0	1	1	1	
Tools	lumpsum	1	1	1	1	1	1	1	
Basal Fertilizers	Kg	100	500	100	200	300	400	500	
Irrigation	pers.day	0	6	-	2	3	5	6	
Fertilizer applica	pers.day	5	10	5	6	8	9	10	
Weeding	pers.day	40	60	40	45	50	55	60	
Pesticides appli	pers.day	0	30	-	8	15	23	30	
Harvesting	pers.day	60	80	60	65	70	75	80	
Post harvesting	pers.day	10	10	10	10	10	10	10	
Land preparation	pers.day	60	90	60	68	75	83	90	

This model assumes a production of 3,000 kg per hectare without project, rising to 12,000 kg per hectare with project interventions, over a five year production period, mainly due to increased access to irrigation water for the orchard, as well as increased cropping density. Input costs include manure, fertilizers, herbicides, pesticides and labour for various farming activities. In the with-project scenario, it is assumed that the crop receives adequate water for irrigation throughout the production period. At a discount rate of 16.4, production of citrus on a one hectare piece of land generates positive NPV of RWF 1.7 million.

Onion production model

Table 5: Assumptions for the onion production model on 1 hectare

Assumptions		WOP	WP	Progression					
				Y1	Y2	Y3	Y4	Y5	
Production	Kg	6,400	22,000	6,400	10,300	14,200	18,100	22,000	
Onion seeds	Kg	8	10	8	9	9	10	10	
Manure	kg	5,000	7,500	5,000	5,625	6,250	6,875	7,500	
Urea	kg	400	500	400	425	450	475	500	
Herbicide	Kg	0	9	-	2	5	7	9	
Calcium carbide	kg	0	200	-	50	100	150	200	
Superphosphate	kg	0	200	-	50	100	150	200	
Pesticides	lt	0	1	-	0	1	1	1	
Tools	lumpsum	1	1	1	1	1	1	1	
Basal Fertilizers	Kg	100	500	100	200	300	400	500	
Land preparation	pers.day	80	90	80	83	85	88	90	
Planting	pers.day	60		60					
Irrigation	pers.day	0	40	-	10	20	30	40	
Fertilizer applica	pers.day	30	30	30	30	30	30	30	
Weeding	pers.day	30	40	30	33	35	38	40	
Pesticides appli	pers.day	5	10	5	6	8	9	10	
Harvesting	pers.day	20	40	20	25	30	35	40	
Post harvesting	pers.day	20	30	20	23	25	28	30	

This model assumes a production of 6,400 kg per hectare without project, rising to 22,000 kg per hectare with project interventions, over a five-year production period, mainly due to increased access to irrigation water for the garden, which enables production for more than one season in a year. Input costs include manure, fertilizers, herbicides, pesticides and labour for various farming activities. In the with-project scenario, it is assumed that the crop receives adequate water for irrigation throughout the production period. At a discount rate of 16.4, production of onion on a one hectare piece of land generates positive NPV of RWF 53.4 million.

Carrot production model

Table 6: Assumptions for the carrot production model on 1 hectare

Assumptions		WOP	WP		Progression				
					Y1	Y2	Y3	Y4	Y5
Production	Kg	8,200	32,800		8,200	14,350	20,500	26,650	32,800
Carrot seeds	Kg	4	6		4	5	5	6	6
Manure	kg	5,000	7,500		5,000	5,625	6,250	6,875	7,500
Urea	kg	400	500		400	425	450	475	500
Herbicide	Kg	0	9		-	2	5	7	9
Calcium carbide	kg	0	200		-	50	100	150	200
Superphosphate	kg	0	200		-	50	100	150	200
Pesticides	lt	0	1		-	0	1	1	1
Tools	lumpsum	1	1		1	1	1	1	1
Basal Fertilizers	Kg	100	500		100	200	300	400	500
Land preparation	pers.day	80	90		80	83	85	88	90
Planting	pers.day	60			60				
Irrigation	pers.day	0	40		-	10	20	30	40
Fertilizer applica	pers.day	30	30		30	30	30	30	30
Weeding	pers.day	30	40		30	33	35	38	40
Pesticides applic	pers.day	5	10		5	6	8	9	10
Harvesting	pers.day	20	40		20	25	30	35	40
Post harvesting	pers.day	20	30		20	23	25	28	30

This model assumes a production of 8,200 kg per hectare without project, rising to 32,800 kg per hectare with project interventions, over a five year production period, mainly due to increased access to irrigation water for the garden which enables production for more than one season in a year. Input costs include manure, fertilizers, herbicides, pesticides and labour for various farming activities. In the with-project scenario, it is assumed that the crop receives adequate water for irrigation throughout the production period. At a discount rate of 16.4, production of carrots on a one-hectare piece of land generates positive NPV of RWF 65.2 million.

French beans production model

Table 7: Assumptions for the French bean production model on 1 hectare

Assumptions		WOP	WP	Progression					
				Y1	Y2	Y3	Y4	Y5	
Production	Kg	7,200	29,800	7,200	12,850	18,500	24,150	29,800	
French bean seeds	Kg	20	40	20	25	30	35	40	
Manure	kg	3,500	10,000	3,500	5,125	6,750	8,375	10,000	
Urea	kg	15	50	15	24	33	41	50	
Herbicide	Kg	0	9	-	2	5	7	9	
Calcium carbide	kg	0	200	-	50	100	150	200	
Superphosphate	kg	0	200	-	50	100	150	200	
Pesticides	lt	0	1	-	0	1	1	1	
Tools	lumpsum	1	1	1	1	1	1	1	
Basal Fertilizers	Kg	100	500	100	200	300	400	500	
Land preparation	pers.day	80	90	80	83	85	88	90	
Planting	pers.day	60		60					
Irrigation	pers.day	0	40	-	10	20	30	40	
Fertilizer application	pers.day	30	30	30	30	30	30	30	
Weeding	pers.day	30	40	30	33	35	38	40	
Pesticides application	pers.day	5	10	5	6	8	9	10	
Post harvesting	pers.day	20	40	20	25	30	35	40	
Post harvesting	pers.day	20	30	20	23	25	28	30	

This model assumes a production of 7200 kg per hectare without project, rising to 29,800 kg per hectare with project interventions, over a five-year production period, mainly due to increased access to irrigation water for the garden which enables production for more than one season in a year. Input costs include manure, fertilizers, herbicides, pesticides and labour for various farming activities. In the with-project scenario, it is assumed that the crop receives adequate water for irrigation throughout the production period. At a discount rate of 16.4, production of French beans on a one-hectare piece of land generates positive NPV of RWF 117.1 million.

Pepper Production

Table 8: Assumptions for the pepper production model on 1 hectare

Assumptions		WOP	WP	Progression					
				Y1	Y2	Y3	Y4	Y5	
Production	Kg	6,000	18,000	6,000	9,000	12,000	15,000	18,000	
Pepper seeds	Kg	1	1	1	1	1	1	1	
Manure	kg	5,000	10,000	5,000	6,250	7,500	8,750	10,000	
Urea	kg	50	100	50	63	75	88	100	
Herbicide	Kg	0	9	-	2	5	7	9	
Calcium carbide	kg	0	200	-	50	100	150	200	
Superphosphate	kg	0	200	-	50	100	150	200	
Pesticides	lt	0	1	-	0	1	1	1	
Tools	lumpsum	1	1	1	1	1	1	1	
Basal Fertilizers	Kg	100	500	100	200	300	400	500	
Land preparation	pers.day	80	90	80	83	85	88	90	
Planting	pers.day	60		60					
Irrigation	pers.day	0	40	-	10	20	30	40	
Fertilizer application	pers.day	30	30	30	30	30	30	30	
Weeding	pers.day	30	40	30	33	35	38	40	
Pesticides application	pers.day	5	10	5	6	8	9	10	
Post harvesting	pers.day	20	40	20	25	30	35	40	
Post harvesting	pers.day	20	30	20	23	25	28	30	

This model assumes a production of 6,000 kg per hectare without project, rising to 18,000 kg per hectare with project interventions, over a five year production period, mainly due to increased access to irrigation water for the garden which increases the number of production seasons per year on the same hectare. Input costs include manure,

fertilizers, herbicides, pesticides and labour for various farming activities. In the with-project scenario, it is assumed that the crop receives adequate water for irrigation throughout the production period. At a discount rate of 16.4, production of pepper on a one-hectare piece of land generates positive NPV of RWF 118.1 million.

Water Melon production model

Table 9: Assumptions for the water melon production model on 1 hectare

Assumptions		WOP	WP	Progression					
				Y1	Y2	Y3	Y4	Y5	
Production	Kg	10,000	40,000	10,000	17,500	25,000	32,500	40,000	
Water melon seed	Kg	30	30	30	30	30	30	30	
Manure	kg	5,000	10,000	5,000	6,250	7,500	8,750	10,000	
Urea	kg	50	100	50	63	75	88	100	
Herbicide	Kg	0	9	-	2	5	7	9	
Calcium carbide	kg	0	200	-	50	100	150	200	
Superphosphate	kg	0	200	-	50	100	150	200	
Pesticides	lt	0	1	-	0	1	1	1	
Tools	lumpsum	1	1	1	1	1	1	1	
Basal Fertilizers	Kg	100	500	100	200	300	400	500	
Land preparation	pers.day	80	90	80	83	85	88	90	
Planting	pers.day	60		60					
Irrigation	pers.day	0	40	-	10	20	30	40	
Fertilizer application	pers.day	30	30	30	30	30	30	30	
Weeding	pers.day	30	40	30	33	35	38	40	
Pesticides application	pers.day	5	10	5	6	8	9	10	
sz	pers.day	20	40	20	25	30	35	40	
Post harvesting	pers.day	20	30	20	23	25	28	30	

This model assumes a production of 10,000 kg per hectare without project, rising to 40,000 kg per hectare with project interventions, over a five year production period, mainly due to increased access to irrigation water for the garden leading to production for more seasons in a year. Input costs include manure, fertilizers, herbicides, pesticides and labour for various farming activities. In the with-project scenario, it is assumed that the crop receives adequate water for irrigation throughout the production period. At a discount rate of 16.4, production of melon on a one-hectare piece of land generates positive NPV of RWF 102.1 million.

Tomato production model

Table 10: Assumptions for the tomato production model on 1 hectare

Assumptions		WOP	WP	Progression					
				Y1	Y2	Y3	Y4	Y5	
Production	Kg	12,000	32,000	12,000	17,000	22,000	27,000	32,000	
Tomato seedling	Kg	20,000	30,000	20,000	22,500	25,000	27,500	30,000	
Manure	kg	5,000	10,000	5,000	6,250	7,500	8,750	10,000	
Urea	kg	50	100	50	63	75	88	100	
Herbicide	Kg	0	9	-	2	5	7	9	
Calcium carbide	kg	0	200	-	50	100	150	200	
Superphosphate	kg	0	200	-	50	100	150	200	
Pesticides	lt	0	1	-	0	1	1	1	
Tools	lumpsum	1	1	1	1	1	1	1	
Basal Fertilizers	Kg	100	500	100	200	300	400	500	
Land preparation	pers.day	80	90	80	83	85	88	90	
Planting	pers.day	60		60					
Irrigation	pers.day	0	40	-	10	20	30	40	
Fertilizer application	pers.day	30	30	30	30	30	30	30	
Weeding	pers.day	30	40	30	33	35	38	40	
Pesticides application	pers.day	5	10	5	6	8	9	10	
sz	pers.day	20	40	20	25	30	35	40	
Post harvesting	pers.day	20	30	20	23	25	28	30	

This model assumes a production of 12,000 kg per hectare without project, rising to 32,000 kg per hectare with project interventions, over a five-year production period, mainly due to increased access to irrigation water for the garden and more production seasons per year on each hectare. Input costs include manure, fertilizers, herbicides, pesticides and labour for various farming activities. In the with-project scenario, it is assumed that the crop receives adequate water for irrigation throughout the production period. At a discount rate of 16.4, production of tomato on a one-hectare piece of land generates positive NPV of RWF 57.3 million.

Rice production model

Table 11: Assumptions for the rice production model on 1 hectare

Assumptions		WOP	WP	Progression					
				Y1	Y2	Y3	Y4	Y5	
Production	Kg	7,920	13,000	7,920	9,190	10,460	11,730	13,000	
Rice seeds	Kg	60	60	60	60	60	60	60	
Manure	kg	5,000	10,000	5,000	6,250	7,500	8,750	10,000	
Urea	kg	50	100	50	63	75	88	100	
Herbicide	Kg	0	9	-	2	5	7	9	
Calcium carbide	kg	0	200	-	50	100	150	200	
Superphosphate	kg	0	200	-	50	100	150	200	
Pesticides	lt	0	1	-	0	1	1	1	
Tools	lumpsum	1	1	1	1	1	1	1	
Basal Fertilizers	Kg	100	500	100	200	300	400	500	
Land preparation	pers.day	80	90	80	83	85	88	90	
Planting	pers.day	60		60					
Irrigation	pers.day	0	40	-	10	20	30	40	
Fertilizer applica	pers.day	30	30	30	30	30	30	30	
Weeding	pers.day	30	40	30	33	35	38	40	
Pesticides applic	pers.day	5	10	5	6	8	9	10	
sz	pers.day	20	40	20	25	30	35	40	
Post harvesting	pers.day	20	30	20	23	25	28	30	

This model assumes a production of 7,920 kg per hectare without project, rising to 13,000 kg per hectare with project interventions, over a five-year production period, mainly due to increased access to irrigation water for the garden. Input costs include manure, fertilizers, herbicides, pesticides and labour for various farming activities. In the with-project scenario, it is assumed that the crop receives adequate water for irrigation throughout the production period. At a discount rate of 16.4, production of rice on a one-hectare piece of land generates positive NPV of RWF 9.7 million.

Beans production model*Table 12: Assumptions for the beans production model on 1 hectare*

Assumptions		WOP	WP	Progression					
				Y1	Y2	Y3	Y4	Y5	
Production	Kg	2,010	6,000	2,010	3,008	4,005	5,003	6,000	
Beans seeds	Kg	35	60	35	41	48	54	60	
Manure	kg	5,000	10,000	5,000	6,250	7,500	8,750	10,000	
Urea	kg	50	100	50	63	75	88	100	
Herbicide	Kg	0	9	-	2	5	7	9	
Calcium carbide	kg	0	200	-	50	100	150	200	
Superphosphate	kg	0	200	-	50	100	150	200	
Pesticides	lt	0	1	-	0	1	1	1	
Tools	lumpsum	1	1	1	1	1	1	1	
Basal Fertilizers	Kg	100	500	100	200	300	400	500	
Land preparation	pers.day	80	90	80	83	85	88	90	
Planting	pers.day	60		60					
Irrigation	pers.day	0	40	-	10	20	30	40	
Fertilizer applica	pers.day	30	30	30	30	30	30	30	
Weeding	pers.day	30	40	30	33	35	38	40	
Pesticides appli	pers.day	5	10	5	6	8	9	10	
sz	pers.day	20	40	20	25	30	35	40	
Post harvesting	pers.day	20	30	20	23	25	28	30	

This model assumes a production of 2010 kg per hectare without project, rising to 6,000 kg per hectare with project interventions, over a five-year production period, mainly due to increased access to irrigation water for the garden. Input costs include manure, fertilizers, herbicides, pesticides and labour for various farming activities. In the with-project scenario, it is assumed that the crop receives adequate water for irrigation throughout the production period. At a discount rate of 16.4, production of beans on a one-hectare piece of land generates positive NPV of RWF 10.3 million.

Soya bean production model*Table 13: Assumptions for the soya beans production model on 1 hectare*

Assumptions		WOP	WP	Progression					
				Y1	Y2	Y3	Y4	Y5	
Production	Kg	2,400	6,000	2,400	3,300	4,200	5,100	6,000	
Soya Beans seed	Kg	35	50	35	39	43	46	50	
Manure	kg	5,000	10,000	5,000	6,250	7,500	8,750	10,000	
Urea	kg	50	100	50	63	75	88	100	
Herbicide	Kg	0	9	-	2	5	7	9	
Calcium carbide	kg	0	200	-	50	100	150	200	
Superphosphate	kg	0	200	-	50	100	150	200	
Pesticides	lt	0	1	-	0	1	1	1	
Tools	lumpsum	1	1	1	1	1	1	1	
Basal Fertilizers	Kg	100	500	100	200	300	400	500	
Land preparation	pers.day	80	90	80	83	85	88	90	
Planting	pers.day	60		60					
Irrigation	pers.day	0	40	-	10	20	30	40	
Fertilizer applica	pers.day	30	30	30	30	30	30	30	
Weeding	pers.day	30	40	30	33	35	38	40	
Pesticides appli	pers.day	5	10	5	6	8	9	10	
sz	pers.day	20	40	20	25	30	35	40	
Post harvesting	pers.day	20	30	20	23	25	28	30	

This model assumes a production of 2,400 kg per hectare without project, rising to 6,000 kg per hectare with project interventions, over a five-year production period, mainly due to increased access to irrigation water for the garden. Input costs include manure, fertilizers, herbicides, pesticides and labour for various farming activities. In the with-project scenario, it is assumed that the crop receives adequate water for irrigation

throughout the production period. At a discount rate of 16.4, production of soya beans on a one-hectare piece of land generates positive NPV of RWF 2.7 million.

Maize production model

Table 14: Assumptions for the maize production model on 1 hectare

Assumptions		WOP	WP		Progression				
					Y1	Y2	Y3	Y4	Y5
Production	Kg	3,000	5,000		3,000	3,500	4,000	4,500	5,000
Maize seeds	Kg	20	20		20	20	20	20	20
Manure	kg	5,000	10,000		5,000	6,250	7,500	8,750	10,000
Urea	kg	50	100		50	63	75	88	100
Herbicide	Kg	0	9		-	2	5	7	9
Calcium carbide	kg	0	200		-	50	100	150	200
Superphosphate	kg	0	200		-	50	100	150	200
Pesticides	lt	0	1		-	0	1	1	1
Tools	lumpsum	1	1		1	1	1	1	1
Basal Fertilizers	Kg	100	500		100	200	300	400	500
Land preparation	pers.day	80	90		80	83	85	88	90
Planting	pers.day	60			60				
Irrigation	pers.day	0	40		-	10	20	30	40
Fertilizer applica	pers.day	30	30		30	30	30	30	30
Weeding	pers.day	30	40		30	33	35	38	40
Pesticides applic	pers.day	5	10		5	6	8	9	10
sz	pers.day	20	40		20	25	30	35	40
Post harvesting	pers.day	20	30		20	23	25	28	30

This model assumes a production of 3,000 kg per hectare without project, rising to 5,000 kg per hectare with project interventions, over a five-year production period, mainly due to increased access to irrigation water for the garden. Input costs include manure, fertilizers, herbicides, pesticides and labour for various farming activities. In the with-project scenario, it is assumed that the crop receives adequate water for irrigation throughout the production period. At a discount rate of 16.4, production of maize on a one-hectare piece of land generates positive NPV of RWF 6.2 million.

Potato production model

Table 15: Assumptions for the potato production model on 1 hectare

Assumptions		WOP	WP		Progression				
					Y1	Y2	Y3	Y4	Y5
Production	Kg	7,600	16,000		7,600	9,700	11,800	13,900	16,000
Potato seeds	Kg	800	1,200		800	900	1,000	1,100	1,200
Manure	kg	5,000	10,000		5,000	6,250	7,500	8,750	10,000
Urea	kg	50	100		50	63	75	88	100
Herbicide	Kg	0	9		-	2	5	7	9
Calcium carbide	kg	0	200		-	50	100	150	200
Superphosphate	kg	0	200		-	50	100	150	200
Pesticides	lt	0	1		-	0	1	1	1
Tools	lumpsum	1	1		1	1	1	1	1
Basal Fertilizers	Kg	100	500		100	200	300	400	500
Land preparation	pers.day	80	90		80	83	85	88	90
Planting	pers.day	60			60				
Irrigation	pers.day	0	40		-	10	20	30	40
Fertilizer applica	pers.day	30	30		30	30	30	30	30
Weeding	pers.day	30	40		30	33	35	38	40
Pesticides applic	pers.day	5	10		5	6	8	9	10
sz	pers.day	20	40		20	25	30	35	40
Post harvesting	pers.day	20	30		20	23	25	28	30

This model assumes a production of 7,600 kg per hectare without project, rising to 16,000 kg per hectare with project interventions, over a five-year production period,

mainly due to increased access to irrigation water for the garden. Input costs include manure, fertilizers, herbicides, pesticides and labour for various farming activities. In the with-project scenario, it is assumed that the crop receives adequate water for irrigation throughout the production period. At a discount rate of 16.4, production of potato on a one-hectare piece of land generates positive NPV of RWF 8.4 million.

Summary of crop production financial models

Figure 2: Financial results from 1 hectare crop models

		PRODUCTION													
F I N A N C I A L	Model's incremental income (RWF)														
	Fruits			Vegetables						Staples					
	Avocado	Mango	Citrus	Onion	Carrot	French bean	Peppers	Watermelon	Tomato	Rice	Bean	Soybean	Maize	Potato	
A N A L Y S I S	PW1	-14,930,534	-14,866,452	-14,866,452	-14,969,951	-13,553,067	-13,361,680	-14,931,878	-13,270,428	-13,306,520	-13,453,160	-13,391,960	-13,418,960	-13,446,360	-13,332,560
	PW2	117,422	96,805	96,805	4,407,781	6,055,152	9,479,815	8,551,026	8,579,292	5,654,180	2,586,993	2,662,671	2,362,799	2,389,126	2,578,838
	PW3	65,378	42,243	42,243	8,544,713	10,422,590	17,080,510	16,793,131	15,195,013	9,464,080	3,386,346	3,476,503	2,503,758	2,943,812	3,249,396
	PW4	13,334	-12,409	-12,409	12,681,645	14,790,029	24,681,205	25,035,235	21,810,733	13,273,981	4,185,699	4,290,335	2,844,717	3,538,498	3,919,974
	PW5	-38,710	-67,062	-67,062	16,818,577	19,157,468	32,281,900	33,277,340	28,426,454	17,083,881	4,985,052	5,104,167	3,185,676	4,098,184	4,590,552
	PW6	-80,310	-104,662	-104,662	16,777,777	19,116,668	32,241,100	33,236,540	28,392,454	17,043,081	4,944,252	5,063,367	3,144,876	4,052,384	4,549,752
	PW7	2,124,750	1,862,204	2,081,687	16,777,777	19,116,668	32,241,100	33,236,540	28,392,454	17,043,081	4,944,252	5,063,367	3,144,876	4,052,384	4,549,752
	PW8	4,329,810	3,829,069	4,268,086	16,777,777	19,116,668	32,241,100	33,236,540	28,392,454	17,043,081	4,944,252	5,063,367	3,144,876	4,052,384	4,549,752
	PW9	6,534,870	5,795,935	6,454,385	16,777,777	19,116,668	32,241,100	33,236,540	28,392,454	17,043,081	4,944,252	5,063,367	3,144,876	4,052,384	4,549,752
	PW10 - 20	8,739,930	7,762,800	8,640,733	16,777,777	19,116,668	32,241,100	33,236,540	28,392,454	17,043,081	4,944,252	5,063,367	3,144,876	4,052,384	4,549,752
NPV (RWF)		1,907,942	243,199	1,718,086	53,357,436	65,183,829	117,079,079	118,060,379	102,119,769	57,332,981	9,716,460	10,298,313	2,714,245	6,226,852	8,392,151
NPV (USD)		1,329.6	169.5	1,197.3	37,182.9	45,424.3	81,588.2	82,272.0	71,163.6	39,953.3	6,771.0	7,176.5	1,891.5	4,399.3	5,848.2
B/C Ratio		1.1	2.6	1.1	4.3	4.5	7.9	9.9	6.5	4.6	2.5	1.3	0.9	2.0	1.5

The analysis found that all the crops promoted within the various irrigation schemes had capacity to generate adequate financial returns to attract beneficiaries to take up project interventions.

Household production models

Several farm/household's models were elaborated to determine the financial viability of the proposed interventions and to analyse the potential change in income the project may enable, at household level. The underlying assumption is that, thanks to investment in infrastructure, increased access to inputs, water or water saving technologies, small farming equipment and technical assistance, project beneficiaries will be able to increase production, reclaim and rehabilitate farm land and engage in new farming practices. Tables below show the key assumptions concerning cropping patterns and farm income composition based on landholding and activities. Finally, self-consumption of agriculture produce is accounted for, based on the average consumption per individual household member per year.

The characteristics of production households are as elaborated below:

Table 16: Category 1 - Ubudehe 1

	Unit	WOP	WP
Maize	ha	0.09	0.18
Beans	ha	0.09	0.18
Potato	ha	0.04	0.08
Total cropped area		0.22	0.44
Household size	hh	4.5	4.5
Maize consumption/person/year	Kg	45	45
Beans consumption/person/year		34	34
Potato consumption/person/year		150	150

This farming household is assumed to be among the poor households, with access to a cultivated area equivalent to 0.22 hectares in the without project scenario. The household is able to produce three crops on the limited land, with concentration on staple

crops (maize, beans and potatoes) so as to provide food security to the household. With access to water for irrigation as a result of KIIWP 2 investments, the household is expected to double the productive area of land from 0.22 hectares to 0.44 hectares, while maintaining only three crops due to limited financing available from the household. Adequate provision has been made for home consumption of the produced crops.

Table 17: Category 2 - Ubudehe 2

	Unit	WOP	WP
Maize	ha	0.09	0.18
Beans	ha	0.09	0.18
Potato	ha	0.04	0.08
Tomato	ha	0.16	0.32
Avocado	ha	0.09	0.18
<i>Total cropped area</i>		<i>0.47</i>	<i>0.94</i>
Household size	hh	4.5	4.5
Maize consumption/person/year	Kg	45	45
Beans consumption/person/year	Kg	34	34
Potato consumption/person/year	Kg	150	150
Tomato consumption/person/year	Kg	17	17
Avocado consumption/person/year	Kg	10	10

This farming household is assumed to have better access to land and financing for investment in agriculture. As a result, the household is assumed to grow crops in a total of 0.47 hectares in the WOP scenario, doubling to 0.94 with project investments. Given more access to land, this household is assumed to grow staple crops (maize, beans, potatoes), in addition to vegetables (tomato) and fruits (avocado) to provide household food security and generate more income. In terms of labour requirements, this household requires 60 of hired labour and only 40 as family labour, due to the relatively larger scale of farm operation than households in Ubudehe 1.

Table 18: Category 3 - Ubudehe 3

	Unit	WOP	WP
Maize	ha	0.09	0.18
Beans	ha	0.09	0.18
Potato	ha	0.04	0.08
Tomato	ha	0.16	0.32
Avocado	ha	0.09	0.18
Mango	ha	0.09	0.18
Onions	ha	0.16	0.32
<i>Total cropped area</i>		<i>0.72</i>	<i>1.44</i>
Household size	hh	4.5	4.5
Maize consumption/person/year	Kg	45	45
Beans consumption/person/year	Kg	34	34
Potato consumption/person/year	Kg	150	150
Tomato consumption/person/year	Kg	17	17
Avocado consumption/person/year	Kg	10	10
Mango consumption/person/year	Kg	10	10
Onion consumption/person/year	Kg	2	2

This household is assumed to have more access to land and finances to engage in commercially-oriented agriculture. In the WOP scenario, this household is assumed to produce crops on 0.72 hectares, which doubles to 1.44 hectares with project investment under KIIWP 2. This household is assumed to engage in the growing of three staple crops, two fruit crops and two vegetable crops. Adequate provision for household consumption is assumed.

All the technical assumptions considered in the models were sourced from national agricultural surveys and statistics, technical studies and reports.

Summary of financial household model results

Table 19: Financial model results at household level

Farm Area Models	WP	
	NPV	B/C
Cat.1a - Ubudehe 1	17,412,777	4.1
Cat.1a - Ubudehe 2	69,230,299	8.1
Cat.1a - Ubudehe 3	124,771,741	9.3

Results from the analysis indicate that KIIWP 2 investments would help households in Ubudehe 1 to achieve food security, as well as sell the excess to the market. At the same time the investments would help households in Ubudehe 2 and Ubudehe 3 to further pursue agricultural commercialization objective, with diversification from production of staples, to increased production of high value crops such as fruits and vegetables.

Generally, the HHs' models described so far present positive returns in both the present post-financing scenarios, exception made for the poorest beneficiaries in the target population (Ubudehe 1). For the latter, the proposed activity will become viable only thanks to the project financing and else - due to the lack of savings and own financial resources - they would not be able to undertake the proposed activities and make a profit.

The results of the financial analysis indicates that the activities proposed under the KIIWP2 project are technically viable solutions capable of addressing current production constraints and, on this basis, should be adopted by farmers. In addition, the EFA carried out a Financing analysis to present the set of incentives the target population may have while participating to the project. In light of the financial support provided by the project and since post-financing results are higher those shown in the pre-financing scenario, it is very likely that project activities will largely be taken up by farmers.

Credit requirements to undertake production

KIIWP2 promotes the production of fruit crops which take long to mature. In addition, incremental returns from other value chain crops are achieved due to production over several seasons during the year, without limitation to established rain seasons. As a result, the production models generate negative net returns within the initial years, which requires project attention to credit requirements of participating households. The financing requirements are as indicated below:

Table 20: Credit requirements and repayments among value chains

	Total Debt required (P+i) (RWF)	Repayment from 1 ha of production (RWF)											
Crop		Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Total
Avocado	34,686,510						998,688	3,203,748	5,408,808	7,613,868	9,818,929	7,642,468	34,686,510
Mango	35,547,807						14,165,829	16,132,695	5,249,283				35,547,807
Citrus	35,790,032						1,234,038	3,400,387	5,586,735	7,773,084	9,959,433	7,796,336	35,790,032
Onion	10,472,070		10,384,585	87,485									10,472,070
Carrot	11,744,909		9,522,010	2,222,898									11,744,909
French be	6,823,364		6,823,364										6,823,364
Pepper													
Melon	8,147,242		8,147,242										8,147,242
Tomato	7,138,307		7,138,307										7,138,307
Rice	9,933,633		7,509,402	2,424,230									9,933,633
Beans	16,017,001		2,799,640	3,113,471	3,927,308	4,741,135	1,935,451						16,017,001
Soyabean	16,539,284		1,378,243	1,719,203	2,060,162	2,401,121	2,360,321	2,360,321	2,360,321	1,899,993			16,539,284
Maize	11,798,330		5,683,381	6,114,949									11,798,330
Potato	14,438,737		3,494,583	4,165,161	4,835,739	1,963,254							14,438,737
	219,087,226		62,380,757	19,847,399	30,823,204	9,105,510	20,674,328	25,087,150	38,605,147	17,286,545	19,778,361	15,438,834	219,087,226

Participating households would require financing to the tune of RWF 219.0 million within the first years. Given returns expected from the various models as indicated in the table

above, participating households will be able to repay the loans for vegetable and serial crops. Debts for fruit crops would, however, require a slightly longer period to repay, due to a longer gestation period. Financing mechanisms should therefore be explored for participating households.

ECONOMIC ANALYSIS

The objectives of the economic analysis are: (i) to examine the overall Programme viability; (ii) to assess the Project's impact and the overall economic rate of return; and (iii) to perform sensitivity analyses upon risks and variables affecting project's results.

Key Assumptions. Production and activity models considered in the financial analysis are used as building blocks for determining the viability of the whole project, once addressing for market distortion and opportunity costs for inputs and outputs. The economic analysis of the project hinges on the following assumptions:

- The economic analysis timeframe is 20 years;
- Project inputs and outputs are valued at their economic parity prices. A Standard Conversion Factor of 0.943 has been computed and used in this analysis;
- An economic discount rate of 13.3 has been used, being the return on 20-year government bonds in Rwanda;
- Family labour is valued at existing market rates, in order to factor in commercialization of value chains within the project areas.

Programme Economic Costs. The economic analysis includes the investment and incremental recurrent costs of project components. Programme financial costs have been converted to economic values by removal of taxes, duties and subsidies. In order to avoid double counting, the final aggregation considered only those costs that were not already accounted for in the productive models.

Table 21: Programme Economic costs

Rwanda
Keyana Irrigation and Integrated Watershed Management Project Phase II (KIMF2)
Project Components by Year – Base Costs
Economic Costs (US\$ '000)

	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total
A. Component A: Strengthening resilience to droughts										
1. Sub-component A.1: Catchment Rehabilitation and Protection	852	1,303	1,083	728	1,997	3,167	1,454	-	-	10,583
2. Sub-component A.2: Infrastructure Development and Management	134	6,884	7,806	8,255	19,213	33,819	27,088	12,285	-	113,065
3. Sub-component A.3: Enhancing Climate Smart Agriculture Practices and Technologies	403	740	744	330	1,876	1,805	2,137	3,240	2,306	13,442
Subtotal	1,389	8,727	9,433	7,373	23,086	38,592	30,659	15,525	2,306	137,093
B. Component B: Support to farm business development										
1. Sub-component B.1: Developing Farming as a business	43	711	1,872	2,132	5,785	4,802	1,899	1,371	324	18,517
2. Sub-component B.2: Supporting backward and forward market linkages	632	1,176	1,026	565	341	5	-	-	-	3,746
Subtotal	675	1,887	2,898	2,697	6,126	4,807	1,899	1,371	324	22,263
C. Component C: Institutional development and project coordination										
1. Sub-component C.1: Policy and institutional development	225	255	289	210	889	748	699	699	716	4,531
2. Sub-component C.2: Project coordination	908	773	773	773	793	813	1,360	1,360	1,320	8,871
3. Sub-component C.3: Emergency fund	0	-	-	-	-	-	-	-	-	0
4. Sub-component C.4: Unallocated	2,960	-	-	-	-	-	-	-	-	2,960
Subtotal	4,094	1,028	1,062	983	1,682	1,561	2,059	2,059	2,036	16,362
Total BASELINE COSTS	6,158	11,642	13,392	11,054	30,874	44,760	34,418	18,935	4,666	175,715
Price Contingencies										
Inflation										
Local	-	-	-	-	-	-	-	-	-	-
Foreign	-	-	-	-	-	-	-	-	-	-
Subtotal Inflation	-	-	-	-	-	-	-	-	-	-
Devaluation	-	-	-	-	-	-	-	-	-	-
Subtotal Price Contingencies	-	-	-	-	-	-	-	-	-	-
Total PROJECT COSTS	6,158	12,042	13,393	11,054	31,452	46,408	35,733	19,642	4,720	181,467
Taxes	-	-	-	-	-	-	-	-	-	-
Foreign Exchange	1,032	6,296	7,358	6,000	17,952	27,841	21,148	11,234	1,908	100,767

Benefits Estimation. The incremental benefits stream comprises the economic net values of all the models developed in the analysis. These benefits are then aggregated following the inclusion phasing foreseen in the costab. The results are as indicated below.

Figure 3: Results from the Economic Analysis

ECONOMIC ANALYSIS	NET INCREMENTAL BENEFITS															Total benefits	Gross	Cash flow			
	Assessable	Margin	Others	Others	Costs	Penalties	Programs	Subsidies	Taxes	Rent	Rent	Regulation	Market	Political							
	PV1	0	0	0	0	0	0	0	0	0	0	-2,877,749	0	-2,888,638	-5,163,933				-10,930,320	14,771,462	-25,701,78
	PV2	-1,934,226	-1,895,244	-1,897,559	0	0	0	0	0	0	0	-8,153,603	0	-8,688,016	-3,471,242				-18,040,680	18,759,791	-36,800,48
	PV3	-1,970,085	-2,039,757	-772,406	-1,198,704	-1,115,504	-800,595	-505,927	-555,848	-831,798	-848,277	3,602,499	-42,0885	-213,575	1,918,892				4,230,372	19,850,192	-29,880,56
	PV4	-1,587,948	-1,608,078	-614,229	-617,095	-841,196	-121,297	-128,030	-125,762	-337,557	-525,72	1,252,749	-27,3068	332,351	2,384,329				-4,337,404	17,772,189	-19,709,59
	PV5	-867,636	-5,028,623	-1,921,740	-2,033,250	-1,609,068	-620,779	-889,070	-548,640	-1,244,716	-1,77,264	-13,628	-914,789	-907,912	2,426,028				-17,951,117	87,323,652	-65,274,70
	PV6	-7,678,737	-7,906,824	-3,026,064	-2,337,064	-1,484,987	2,78,055	-55,686	-105,046	-1,22,6197	-2,51,887	-746,915	-1,01,077	-1,949,536	2,280,979				-25,310,985	68,840,624	-94,151,61
	PV7	-6062,273	-6,094,237	-2,342,570	1,339,772	2,640,218	4,775,570	2,568,032	2,670,099	1,691,196	-100,186	1,373,164	-610,376	-621,476	2,282,430				3,909,361	54,242,397	-50,233,03
	PV8	-3,153,019	-2,994,059	-992,583	6,260,642	7,934,834	10,868,783	5,978,862	6,186,763	5,803,089	9,7354	4,121,876	480,150	1,608,564	2,284,341				43,685,159	31,151,785	12,533,37
PV9	-78,164	211,437	411,083	11,219,057	13,286,843	16,325,072	9,560,831	9,786,316	9,105,334	280,130	6,660,901	1,285,126	3,346,005	2,285,966	83,815,997	9,705,919	74,110,07				
P10, PV15	14,451,858	14,097,529	6,058,251	16,586,237	18,888,383	23,238,472	13,838,958	13,896,941	12,824,813	380,570	8,066,834	1,574,603	2,775,094	2,286,261	14,954,803	2,933,113	14,631,69				
NPV @ 13% (RWF)															80,920,833						
NPV @ 13% (USD)															56,391						
EIRR															28.6%						

Economic Profitability. The project is a technical and economically viable investment to the economy as a whole. The project economic NPV of the net benefit stream over the 20-year timeframe, discounted at 13.3, is RWF 80.9 million (USD 56.391 million). This value yields an EIRR of 28.6.

Sensitivity Analysis. The section presents the effect of variations in project benefits and costs. Profitability results were tested in the sensitivity analysis to measure variations due to unforeseen factors, hence identifying those variables affecting final results the most. The table below presents the extent to which a change in variables' levels would induce a change to project key indicators.

Figure 4: Results of the sensitivity analysis

SENSITIVITY ANALYSIS (SA)					
		Δ%	Link with the risk matrix	IRR	NPV (RWF)
Base scenario				17.8%	80,920,833,689
Project benefits	-10%	Combination of risks affecting output prices, yields and adoption rates		16.4%	51,687,642,050
Project benefits	-20%			15.1%	28,210,379,011
Project benefits	-50%			9.8%	-42,221,410,109
Project costs	10%	Increase of labour costs and input non labour costs (i.e. feed formulation)		16.5%	59,204,132,559
Project costs	20%			15.5%	43,243,360,029
Project costs	50%			13.0%	-4,638,957,564
1 year lag in ben.		Risks affecting adoption rates and low implementation capacity		15.4%	36,735,546,537
2 years lag in ben.				13.4%	2,808,329,663

The project is not highly sensitive to increase in costs or reduction in benefits.

Conclusion

Investment in KIIWP2 generates positive financial results to the participating households and generates positive returns to the whole economy over a twenty-year period.

The detailed computations are as per attached Ms. Excel file.