



Investing in rural people

Executive Board

Report to the President Proposed additional financing to the Kingdom of Cambodia Accelerating Inclusive Markets for Smallholders Project

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Action: According to the delegation of authority procedure approved by the Executive Board at its 126th session and detailed in document [EB 2019/126/R.48/Rev.2](#), the President is invited to approve the recommendation for the proposed additional financing contained in paragraph 45. This proposal is posted for Executive Board representatives' review no later than 14 days prior to approval by the President. In the absence of a request from an Executive Board representative for the proposal to be submitted at the forthcoming session of the Board, it will be considered approved by the President.

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For more information on the ongoing AIMS project, please visit
<https://www.ifad.org/en/web/operations/-/project/2000001268>

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Project delivery team

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Financing summary

Initiating institution:	IFAD
Borrower:	Government of the Kingdom of Cambodia
Executing agency:	Ministry of Commerce
Total project cost:	US\$90.7 million
Amount of original IFAD loan:	US\$36.3 million
Terms of original IFAD loan:	Highly concessional
Amount of additional IFAD loan:	US\$5.0 million
Amount of IFAD loan 1:	US\$1.65 million
Terms of IFAD loan 1:	Highly concessional: interest-free but with a fixed service charge; the loan will have a maturity period of 40 years, including a grace period of 10 years
Amount of IFAD loan 2:	US\$3.35 million
Terms of IFAD loan 2:	Blend: subject to interest on the principal amount outstanding and a service charge to be determined by the Fund; the loan will have a maturity period of 25 years, including a grace period of 5 years
Financing gap	US\$15 million
Cofinancier:	Private sector
Original amount of cofinancing:	US\$8.6 million
Additional amount of cofinancing	US\$1.4 million
Terms of cofinancing:	N/A
Original contribution of borrower:	US\$8.6 million
Additional contribution of borrower:	US\$4.8 million
Original contribution of beneficiaries:	US\$8.1 million
Additional contribution of beneficiaries:	US\$2.9 million
Amount of IFAD climate finance:	US\$2.079 million
Cooperating institution:	Directly supervised by IFAD

I. Background and project description

A. Background

1. This memorandum seeks the approval of the IFAD Executive Board for additional financing of US\$5 million to be provided to the Kingdom of Cambodia for the Accelerating Inclusive Markets for Smallholders Project (AIMS). The proposed additional financing will be provided in the form of two IFAD loans (totalling US\$5 million). The financing gap of US\$15 million may be sourced through subsequent performance-based allocation system (PBAS) cycles and/or through the Borrowed Resource Access Mechanism, under financing terms to be determined and subject to internal procedures and subsequent Executive Board approval, or through cofinancing identified during implementation. The objective of the proposed additional financing is to scale up and consolidate AIMS operations.
2. AIMS was approved by the Executive Board in December 2016. The financing agreement entered into force on 28 February 2017. The implementation of AIMS was extended by 18 months, until 30 September 2024, with financial closure to take place by 31 March 2025. The original total project cost was US\$61.613 million and was financed by an IFAD loan (US\$36.3 million), the Government (US\$8.654 million), beneficiaries (US\$8.116 million) and the private sector (US\$8.586 million). As at 25 June 2024, 94.66 per cent of the IFAD loan had been disbursed.

B. Original project description

3. **Goal and development objective.** The AIMS project goal is to enhance the prosperity of Cambodian smallholder farmers through increasingly profitable links to agribusinesses and markets. The project development objective is to increase returns from farming for smallholders, including poorer farmers, through efficient public sector investment. The project has two interrelated components: (i) value chain development and (ii) value chain financing.
4. **The project has exceeded its key output targets.** AIMS, through technical service providers, has reached 61,106 households (surpassing the target of 60,000), providing them with improved production techniques. The project has provided business literacy training to 51,878 households, organized 3,163 multi-stakeholder platforms (MSPs) events and conducted 75 trader-to-trader (T2T) network meetings and 901 weekend floating markets. With the Agricultural and Rural Development Bank (ARDB) as fund manager, AIMS has funded 3,883 value chain innovation fund (VCIF) proposals, with disbursements totalling US\$4.248 million. As at 31 March 2024, ARDB had disbursed US\$7.489 million from the credit line of US\$5 million to finance 881 investments. AIMS has assisted in installing 333 pumping wells and completing 153 common market infrastructure works under the sector development facility, and 89 infrastructure investments are in progress.
5. **The outcomes of the project interventions have also been achieved.** A total of 42,148 households spread over 1,462 producers' organizations (POs) benefited from sales contracts in 2023. AIMS cumulatively brokered 811,300 tons of target commodity production, with a value of US\$162.47 million. The project has achieved an 84 per cent rate of adoption by farmers of production and post-harvest technologies, exceeding its target of 75 per cent. The cumulative smallholder investment in target value chains and production clusters amounts to US\$5.3 million.

II. Rationale for additional financing

A. Rationale

6. AIMS is a well-performing project and has gained rich experience in market facilitation and brokering between value chain drivers and smallholder farmers. Through initiatives focused on market access, better production techniques and

sustainable practices, AIMS has not only improved the economic viability of the four commodity value chains targeted but also empowered farming communities, particularly women, and strengthened their resilience to climate change.

7. The purpose of the additional financing is to scale up the successful AIMS interventions and also further consolidate the gains achieved. With the additional financing in phase 2, AIMS will follow a twin strategy of (i) scaling up premium product production and marketing; and (ii) developing a consolidation strategy for deepening the market facilitation initiatives of the four value chain commodities.
8. The scaling-up strategy involves (i) facilitating production by about 40,500 farmers of premium commodities: Khmer chicken, safe vegetables, safe spices and fragrant rice; these commodities have been chosen based on higher income potential, current market demand, and expressed interest from traders and agribusinesses to source locally and farmers' willingness to invest; and (ii) forming clusters of POs in order to crowd in more national- and regional-level buyers and mobilizing additional smallholder farmers into clusters to benefit from better market terms; the cluster approach will also generate demand for appropriate value chain infrastructure.
9. Under the consolidation strategy, AIMS will continue to play a brokering role between traders and about 47,700 producers already mobilized around four commodities (chicken, rice, cassava and vegetables) with a view to deepening the trust among them and strengthening the business relationships already built, thus improving the volume and value of commodities sold through larger contracts.
10. With the additional financing, AIMS will increase investments in both private and public infrastructure that aims to build the resilience of smallholder farmers against climate and market risks and improve their climate resilience and incomes.
11. The objectives of AIMS will remain the same, and the activities proposed to be carried out with the additional financing will be consistent with the AIMS original design. The implementation approaches will be similar and the project components will remain the same. With the investments made under phase 1 of AIMS and with those to be made in phase 2 with the proposed additional financing, the following goals, objectives and targets are expected to be achieved.

<i>Goal/objective</i>	<i>Indicators</i>	<i>Target</i>
Goal Enhance the prosperity of Cambodian smallholder farmers through increasingly profitable links to agribusinesses and markets	80 per cent of total of 88,200 direct beneficiaries have increased real net farming income by >30 per cent (Unit = No. of households)	70,560 households
Development objective Increase returns from farming for smallholders, including poorer farmers, through efficient public sector investment	Number of beneficiaries who have increased return on labour in farming by 40 per cent (Unit = No. of households)	47,000 households
	Economic internal rate of return	20 per cent

12. **Extension.** With the additional financing, the project will be extended for three years, until 30 September 2027, in order to (i) scale up the successful AIMS models for the additional value chains; (ii) form and strengthen additional clusters and bolster their market linkages with national players; and (iii) implement the value chain infrastructure at cluster level in years 2 and 3, after the clusters have been formed in year 1.

Special aspects relating to IFAD's corporate mainstreaming priorities

13. In line with IFAD's mainstreaming commitments, the project has been validated as:
 - Including climate finance.** About US\$2.079 million of the IFAD loan for the additional financing will be utilized for building climate resilience.

- ☒ **Including adaptive capacity.** With a view to enhancing adaptive capacity, the project will further promote and scale up the adoption of climate-resilient technologies, such as solar pumps, drip irrigation, net houses, solar dryers, cooling storage facilities and innovative finance solutions with adaptation benefits for smallholder farmers, agricultural cooperatives (ACs) and POs and agricultural micro, small and medium-sized enterprises (MSMEs).

B. Description of geographical area and target groups

14. AIMS is a nationwide project being implemented in 18 provinces, 129 districts, 707 communes and 3,020 villages, thus covering 86 per cent of districts, 56 per cent of communes and 26 per cent of villages in the country. A total of 78,280 households have been mobilized (exceeding the target of 75,000 households) in the four priority commodity value chains, with households identified under the national Identification of Poor Households Programme (IDPoor) constituting 17 per cent, near-poor households 77 per cent and better-off households 6 per cent. With the additional financing, AIMS will incorporate about 13,200 additional households into existing POs in currently targeted villages and communes,¹ with a focus on IDPoor households and women, and will have a target outreach of 88,200 households by 2027. The composition of the target groups will be the same as in the original AIMS, with preference given to women farmers when mobilizing new households. Overall, 50 per cent of the total outreach beneficiaries will be women.

C. Components, outcomes and activities

15. The two interlinked components of AIMS will remain unchanged:
- (i) **Component 1: Value chain development** is the lead component, and value chain brokering and facilitation within selected clusters is the core approach, along with capacity-building and strengthening of market infrastructure.
 - (ii) **Component 2: Value chain financing** will stimulate increased private investment in the priority value chains by farmers, MSMEs, ACs and agribusinesses through investment support and the existing line of credit under AIMS.
16. The outcomes to be achieved will also remain the same, with revised targets for the additional financing: (i) profits to farmers and businesses increased through participation in inclusive value chains; (ii) private investment by smallholders and agribusinesses in priority value chains increased; (iii) capacity of national and subnational institutions to design and deliver inclusive agriculture market development initiatives substantially increased; and (iv) sales by POs increased.
17. The subcomponents and key activities for scaling up and for consolidation strategies are presented below:

<i>Subcomponent</i>	<i>Scaling up: Premium commodity value chains</i>	<i>Consolidation strategy: Commodity value chains</i>
Subcomponent 1.1: Value chain facilitation and brokering	40,500 households producing Khmer chicken, safe vegetables, safe spices and fragrant rice Key activities: public-private-producer partnerships (4Ps) dialogues, T2T networking, cluster formation, provincial and cluster MSPs, cluster business plan preparation	47,700 households producing vegetable, chicken, rice; cassava will receive tapering support Key activities: T2T networking, capacity-building for local traders, sales contract facilitation
Subcomponent 1.2: Market-oriented smallholder farmer mobilization	40,500 households Key activities: skills training, demonstrations, farmer field schools promoting climate-resilient practices, value chain study, collective mark registration	None

¹ Producers in adjacent communes, especially members of IDPoor households and women, will also be incorporated if they wish to join.

Subcomponent 1.3: Sector development facility (based on cluster demand, construction of infrastructure as a public good)	50 per cent of investments Key activities: at least 50 per cent water-related infrastructure and the rest market-related infrastructure	50 per cent of investments Key activities: up to 50 per cent water-related infrastructure and the rest market-related infrastructure
Subcomponent 2.1: Value chain investment support	70 per cent of the fund Window 1: Improved technologies such as net houses for growing safe vegetables and spices, modern farm irrigation, improved housing and a full package of improved practices for Khmer chicken production and rice seed production; at least 50 per cent of VCIF to be used for climate risk management interventions, such as net houses and modern irrigation Window 2: MSMEs, agribusinesses and ACs that are prepared to invest in bringing innovations into value chains to address identified bottlenecks through new technologies, new business models, new products or new services; priorities to be determined by the value chain actors themselves through 4Ps and MSP dialogue processes	30 per cent of the fund Window 1: Improved technologies for vegetable and chicken production; at least 50 per cent of VCIF will be used for climate risk management interventions, such as net houses and modern irrigation
Subcomponent 2.2: Credit line (already disbursed under phase 1 and to be rotated by ARDB)	Eligible households and MSMEs	Eligible households and MSMEs

18. The key outcomes and output targets under the original project and the additional financing are presented below:

<i>Key indicators</i>	<i>Key outcomes/output targets in original design</i>	<i>Key outcomes/ output targets after additional financing</i>
Outreach	75,000 households	88,200 households
Subcomponent 1.1 – Value chain facilitation and brokering		
MSPs that are active	90 per cent	No change
Number of POs reporting increases in sales	1 628	1 865
Public-private partnerships with large and small agribusinesses	250	450
Number of partnerships with national level buyers (new output indicator)	N/A	12
Subcomponent 1.2 – Market-oriented smallholder farmer mobilization		
Rate of adoption of production and post-harvest technologies	75 per cent of farmers	No change
Number of farmers trained in improved production technologies (IFAD core indicator)	60 000	73 200
Number of households producing premium products with production plans to meet market demand (new output indicator)	N/A	30 000
Collective mark registration	N/A	4
Subcomponent 1.3 – Sector development facility		
Percentage of facility devoted to water-related investments		50 per cent
Subcomponent 2.1 – Value chain investment support		
Number of households accessing VCIF (new output indicator)	N/A	3 553
Number of MSMEs accessing VCIF (new output indicator)	N/A	20
Percentage of fund devoted to climate risk management		60 per cent
Subcomponent 2.2 – Credit line		
Number of partner financial institutions	2	3
Number of households accessing credit	881	1 421

D. Costs, benefits and financing

Project costs

19. Both AIMS components are partially counted as climate finance. The amount of climate finance for AIMS in phase 2 is US\$2.079 million.²

Financing and cofinancing strategy and plan

20. The total budget for phase 2 of AIMS with the additional financing is US\$29.103 million over a period of three years. The budget includes an IFAD loan of US\$5 million. The additional financing phase has been designed with a PBAS, under financing terms to be determined and subject to internal procedures and subsequent Executive Board approval. Should the PBAS resources materialize, they would bring the total IFAD contribution under the additional financing to US\$20 million, equivalent to 69 per cent of the total additional financing. Government contributions are estimated at US\$4.792 million (16 per cent), covering duties, taxes and goods. Beneficiary and private sector contributions amount to US\$2.88 million (10 per cent) and US\$1.42 million (5 per cent), respectively.

Table 1

Original and additional financing summary

(Thousands of United States dollars)

	<i>Original financing*</i>	<i>Additional financing</i>	<i>Total</i>
IFAD loan	36 300	5 000	41 300
Private sector	8 586	1 428	10 015
Beneficiaries	8 116	2 883	10 999
Borrower/recipient	8 654	4 792	13 446
Financing gap	–	15 000	15 000
Total	61 656	29 103	90 759

² Climate finance has been calculated using methodologies adopted by the multilateral development banks for tracking climate change adaptation and mitigation finance.

Table 2

Additional financing: Project costs by component, subcomponent and financier

(Thousands of United States dollars)

<i>Component/subcomponent</i>	<i>IFAD additional loan</i>		<i>Financing Gap</i>		<i>Beneficiaries</i>			<i>Private sector</i>			<i>Borrower/recipient (RGC)</i>			<i>Total</i>	
	<i>Amount</i>	<i>%</i>	<i>Amount</i>	<i>%</i>	<i>Cash</i>	<i>In kind</i>	<i>%</i>	<i>Cash</i>	<i>In kind</i>	<i>%</i>	<i>Cash</i>	<i>In kind</i>	<i>%</i>	<i>Amount</i>	<i>%</i>
1. Value chain development															
1.1. Value chain facilitation brokering and sector development facility	999	12	2 998	36	-	-	-	-	-	-	-	4 382	52	8 379	29
1.2. Market-oriented social mobilizers	262	20	786	60	-	-	-	-	262	20	-	-	-	1 310	5
1.3. Sector investment facility	2 225	24	6 676	71	-	469	5	-	-	-	-	-	-	9 370	32
Subtotal	3 487	18	10 460	55	-	469	2	-	262	1	-	4 382	23	19 060	65
2. Value chain financing															
2.1. Value chain investment support	800	12	2 400	35	2 414	-	36	1 167	-	17	-	-	-	6 781	23
2.2. Financial service provider partnerships	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
Subtotal	800	12	2 400	35	2 414	-	36	1 167	-	17	-	-	-	6 781	23
3. Project management															
3.1. Project coordination	514	21	1 543	63	-	-	-	-	-	-	-	410	17	2 467	8
3.2. Knowledge management and planning, monitoring and evaluation	199	25	597	75	-	-	-	-	-	-	-	-	-	795	3
Subtotal	713	22	2 140	66	-	-	-	-	-	-	-	410	13	3 262	11
Total	5 000	17	15 000	52	2 414	469	10	1 167	262	5	-	4 792	16	29 103	100

Table 3

Additional financing: Project costs by expenditure category and financier

(Thousands of United States dollars)

<i>Expenditure category</i>	<i>IFAD additional loan</i>		<i>Financing gap</i>		<i>Beneficiaries</i>			<i>Private sector</i>			<i>Borrower/recipient</i>			<i>Total</i>	
	<i>Amount</i>	<i>%</i>	<i>Amount</i>	<i>%</i>	<i>Cash</i>	<i>In kind</i>	<i>%</i>	<i>Cash</i>	<i>In kind</i>	<i>%</i>	<i>Cash</i>	<i>In kind</i>	<i>%</i>	<i>Amount</i>	<i>%</i>
Investment costs															
I. Consultancies	519	22	1 557	67	-	-	-	-	262	11	-	-	-	2 338	8
II. Training	538	9	1 613	26	-	-	-	-	-	-	-	4 152	66	6 303	22
III. Credit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IV. Grants	3 025	19	9 076	56	2 414	469	18	1 167	-	7	-	-	-	16 151	55
Total investment costs	4 082	16	12 247	49	2 414	469	12	1 167	262	6	-	4 152	17	24 793	85
Recurrent costs															
V. Operating costs	918	21	2 753	64	-	-	-	-	-	-	-	639	15	4 311	15
Total recurrent costs	918	21	2 753	64	-	-	-	-	-	-	-	639	15	4 311	15
Total	5 000	17	15 000	52	2 414	469	10	1 167	262	5	-	4 792	16	29 103	100

Table 4

Project costs by component and project year (PY)

(Thousands of United States dollars)

Component/subcomponent	PY1		PY2		PY3		Total	
	Amount	%	Amount	%	Amount	%	Amount	%
1. Value chain development								
1.1. Value chain facilitation brokering and sector development facility	2 788	33	2 871	34	2 720	32	8 379	29
1.2. Market-oriented social mobilizers	645	49	665	51	-	-	1 310	5
1.3. Sector investment facility	4 663	50	4 707	50	-	-	9 370	32
Subtotal	8 096	42	8 244	43	2 720	14	19 060	65
2. Value chain financing								
2.1. Value chain investment support	2 034	30	3 390	50	1 356	20	6 781	23
2.2. Financial service provider partnerships	-	-	-	-	-	-	-	-
Subtotal	2 034	30	3 390	50	1 356	20	6 781	23
3. Project management								
3.1. Project coordination	988	40	743	30	736	30	2 467	8
3.2. Knowledge management and planning, monitoring and evaluation	262	33	295	37	239	30	795	3
Subtotal	1 250	38	1 038	32	975	30	3 262	11
Total	11 380	39	12 672	44	5 051	17	29 103	100

Disbursement

21. Disbursement arrangements for the additional financing in phase 2 of the project will be similar to those for phase 1 of the ongoing project. There will be one designated account for the Ministry of Commerce (MOC), to which the IFAD funds for the MOC components will be disbursed. ARDB will not receive funds from IFAD under the additional financing. Consolidated interim financial reports are to be submitted quarterly by the MOC project management office (PMO) within 45 days of the end of the relevant quarter. The PMO will also be responsible for submitting withdrawal applications for justification and advances each quarter, based on the submitted and validated interim financial reports.

Summary of benefits and economic analysis

22. Cost-benefit analysis was conducted to assess the economic and financial feasibility of AIMS during the design phase; the analysis was updated at the midterm review of phase 1 and was further revised taking into account the additional financing in phase 2. This revised analysis estimated the returns on the entire investment, predominantly relying on the data previously used, supplemented by information from field interviews with some AIMS participants. The analysis covers a 20-year period, including an execution phase, with estimates made using a social discount rate and a cost of capital of 10 per cent.
23. **Return on investment of the overall project.** The analysis shows promising economic returns. The economic internal rate of return (EIRR) is estimated at 29.1 per cent, surpassing the 20 per cent threshold set in the development goal. This EIRR assumes that 70 per cent of targeted farmers and 95 per cent of traders will adopt the improved technologies and practices promoted by the project in rice, vegetable, spice, cassava and chicken value chains in both rainfed and irrigated systems. The net present value (NPV) is projected at US\$341.1 million, with a benefit-cost ratio of 1.45, based on quantifiable post-project benefits. Sensitivity and scenario analyses indicate that, with the additional financing, AIMS will remain profitable over a 15-year evaluation period, but it could become unprofitable if projected benefits decrease by more than 31 per cent or if costs increase by more than 45 per cent due to shocks during implementation, which is unlikely, given the favourable local economic context and macro trends.
24. **Return on investment of the additional financing.** Economic analysis of the additional financing alone also demonstrates a promising economic return on investment over 20 years. The NPV would be US\$297.8 million, with an EIRR of

28.8 per cent and a benefit-cost ratio of 1.67. Sensitivity and scenario analyses confirm the robustness of these projections. The project would become unfeasible if the projected benefits were reduced by more than 40 per cent or if costs increased by over 67 per cent as a result of adverse factors, which is unlikely, considering the economic context. The project remains viable even with evaluation periods of 10 and 15 years.

25. The financial analysis shows that most activities supported by the project will yield positive financial returns over a 10-year evaluation period, primarily benefiting participating farmers and traders.

Exit strategy and sustainability

26. The implementation of AIMS has enabled a range of different farmers' groups, agribusinesses and other enterprises to operate successfully in each value chain and to meet their own requirements for future growth. POs are self-sustaining, institutionally and financially. Through collaboration with the IFAD-funded Agriculture Services Programme for an Inclusive Rural Economy and Agricultural Trade (ASPIRE-AT), there are possibilities to graduate the promising business clusters to agriculture cooperatives. A self-sustaining network of grassroots institutions, including POs and ACs, financial institutions and private enterprises, are expected to sustain the project benefits.
27. Provincial departments of commerce (PDOCs) are carrying out the project's essential brokering functions at subnational level. Business cluster facilitators are the connecting links between POs/clusters, buyers and PDOCs, and at project closure their costs are expected to be borne by the marketing companies who will utilize their services to maintain their business relationships with farmers. Thus, PDOCs, business cluster facilitators, and buyers and traders are expected to perpetuate the market linkages of smallholder farmers well beyond project closure.

III. Risk management

A. Risks and mitigation measures

28. AIMS is considered a project with moderate risk. Some substantial risks have been identified, particularly related to institutional capacity for implementation and sustainability and to climate risks in Cambodia, such as flooding, drought and heat waves. Well-articulated design features mitigate most of the risks: enhancing the competitiveness of smallholders in markets; designing financing instruments to support farmers, farmers' organizations and agribusinesses; and making sector development investments to promote climate-resilient practices, viability and sustainability in project interventions. The financial management and procurement risks for AIMS in phase 2 are considered moderate and will be mitigated by further enhancing financial management procedures and capacity.

Overall risk summary

<i>Risk category/subcategory</i>	<i>Inherent risk</i>	<i>Residual risk</i>
Country context	Moderate	Moderate
Sector strategies and policies	Moderate	Moderate
Environment and climate context	Moderate	Moderate
Project scope	Moderate	Moderate
Institutional capacity for implementation and sustainability	Substantial	Moderate
Project financial management	Substantial	Moderate
Project procurement	Moderate	Moderate
Environment, social and climate impact	Substantial	Moderate
Stakeholders	Moderate	Low
Overall	Moderate	Moderate

B. Environment and social category

29. The environmental and social category risk for phase 2 of the project is determined to be moderate, based on the screening tool of the 2021 Social, Environmental and Climate Assessment Procedures (SECAP). The SECAP review note for AIMS has been updated in line with the additional financing interventions. An Environmental, Social and Climate Management Plan has been developed to ensure the systematic identification, assessment and management of applicable risks at subproject level, in line with national legislation and IFAD's SECAP requirements. AIMS has a grievance redress mechanism and stakeholder engagement plan in place, albeit with some gaps, which have been identified and will be updated during the early implementation phase of AIMS phase 2, in particular to ensure consistent recording and reporting of grievances. During the early implementation phase, an Indigenous Peoples planning framework will be developed to ensure that planned project activities where Indigenous populations reside will be conducted in line with the national legislation and IFAD's SECAP requirements. These documents will be included as an annex to the project implementation manual. SECAP-related activities and costs have been included and will be reflected in annual workplans and budgets.

C. Climate risk classification

30. The climate risk is determined to be substantial. The project households largely depend on rainfall for major crops and household ponds or wells for vegetable production, animal-raising and domestic uses. With the additional financing, AIMS will further promote climate-resilient technologies and climate-smart agriculture practices. The screening checklist will guide the project to include adequate adaptation and mitigation measures. Under rice production, regenerative farming practices will be promoted.

IV. Implementation

A. Compliance with IFAD policies

31. AIMS aligns well with IFAD's Strategic Framework 2016–2025, with its overarching goal of enabling poor rural people to overcome poverty and achieve food security through remunerative, sustainable and resilient livelihoods and its three interlinked strategic objectives (SOs): SO1: Increase poor rural people's productive capacities; SO2: Increase poor rural people's benefits from market participation; and SO3: Strengthen the environmental sustainability and climate resilience of poor rural people's economic activities. AIMS adheres to IFAD policies and strategies for gender mainstreaming, environment and natural resources management, climate change, safeguards and scaling up.

B. Organizational framework

Management and coordination

32. MOC will continue to be the project executing agency for AIMS and will continue hosting the PMO led by the AIMS project director. The PMO is responsible for overall project operation, including administration activities, financial management, procurement, monitoring and evaluation (M&E) and reporting. Project implementation at subnational level is led by 18 PDOCs. Four PDOC staff in each province have specific roles for AIMS and are assigned to specific clusters. Value chain technical consultants will support the PMO and PDOCs in implementing the market development functions. The project will engage business class facilitators to interface between PDOCs and clusters and also value chain actors.
33. ARDB will be the fund administrator for the VCIF under component 2.1. ARDB will continue to disburse loans out of the existing credit line and report to PMO. The project will engage technical service providers to help strengthen producers' capacity to meet market requirements in the priority commodities. The Ministry of Economy and Finance will chair the country project steering committee.

Financial management, procurement and governance

34. **Financial management.** The existing MOC PMO and ARDB project coordination unit will be responsible for the financial management arrangements for the additional financing. Both implementing agencies have experienced and qualified staff who have relevant experience and qualifications for timely preparation and submission of project budgets and who can ensure adequate internal controls and funds flow arrangements under the additional financing. Both implementing agencies have accounting software to maintain reliable accounting records and submit acceptable interim financial reports to IFAD. The project's internal control framework includes standard operating procedures developed by the Government to manage projects funded by international financial institutions. In addition, the AIMS project implementation manual will be revised and approved, as needed, to include any additional policies and procedures required for the additional financing. The project has adequate arrangements for the timely submission of project audit reports for the additional financing. Although there were significant delays in submitting audit reports for the ARDB component in previous years, IFAD and the borrower have agreed on measures to address the delays and prevent them from happening again.
35. **Procurement.** The PMO will be directly responsible for project procurement activities. The PMO will have a procurement team, including a procurement chief, a procurement officer, a procurement specialist and a procurement assistant (project-contracted staff). Procurement using IFAD funds under the additional financing will follow the standard operating procedures on procurement for all externally financed projects in Cambodia, to the extent that these procedures are consistent with the IFAD Project Procurement Guidelines. A detailed project procurement arrangement letter will establish the detailed procurement requirements and thresholds for procurement methods and for IFAD prior review. The annual procurement plans, in consonance with the annual workplans and budgets, will be prepared by the PMO and submitted for IFAD's no objection before proceeding with procurement activities. IFAD's Online Project Procurement End-to-end System (OPEN) will be used for preparation and monitoring of the implementation of project procurement plans. Requests for IFAD prior review and no objection will be routed through the OPEN system. Data on all contracts and related payments will be recorded and updated regularly in the contract monitoring tool of the IFAD Client Portal. Contract data will be updated on a regular basis.
36. Procurement risk assessment for the project conducted according to the IFAD Project Procurement Manual shows that the overall inherent procurement risk is moderate.

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

37. The AIMS M&E system is a comprehensive platform consisting of a database, a dashboard and documents. Under the additional financing, the M&E system will continue to keep track of qualitative and quantitative data and information on project implementation. The findings will be shared with project management during monthly coordination meetings. This information will be the basis for preparing periodic progress reports and reporting M&E data to IFAD. As the data will come from various actors with different capacities, more effort will be made under the additional financing to enhance capacity and coordination to improve efficiency in data collection and transfer and data quality from the field level to the PMO level. An annual outcome survey for phase 2 will be conducted in 2026. Other relevant thematic studies will also be carried out during phase 2.
38. **Knowledge management.** The M&E, knowledge management and value chain teams will continue pursuing current collaborations to generate knowledge products and public materials. A knowledge management specialist is responsible at the

national level and also coordinates at field level. In phase 2, AIMS will prioritize the dissemination of lessons learned. Two policy briefs will also be prepared. Annual reports, documentaries and various communication supports will be developed. Peer communication, thematic exchange groups, learning visits and workshops will take place, as will communication through community channels and social media.

D. Proposed amendments to the financing agreement

39. The financing agreement will be amended to incorporate the additional financing and the private sector contributions.
40. Under the additional financing, an update of the logical framework is being proposed to bring it into better alignment with the new framework. The original outreach objectives, project goal, development objective and outcome indicators will be retained. The changes proposed are:
 - Output 3.1 will become output 1.1.
 - New outputs 1.2, 2.1, 3.1, 4.1, 4.2 and 4.3 will be added. Some have already been tracked in the management information system, and some capture the new activities of the additional financing phase.
41. The total end targets include both the original target and the new additional financing target. Some indicators are without targets and will be tracked and achievements reported. Gender disaggregation of data will be maintained.

V. Legal instruments and authority

42. A financing agreement between the Kingdom of Cambodia and IFAD will constitute the legal instrument for extending the proposed additional financing to the borrower/recipient. The signed financing agreement will be amended following approval of the additional financing.
43. The Kingdom of Cambodia is empowered under its laws to receive financing from IFAD.
44. 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

45. According to the delegation of authority procedure approved by the Executive Board at its 126th session and detailed in document EB 2019/126/R.48/Rev.2, the President is invited to approve the proposed financing in terms of the following resolution:

RESOLVED: that the Fund shall provide a loan on highly concessional terms to the Kingdom of Cambodia in an amount of one million six hundred and fifty thousand United States dollars (US\$1,650,000 million) 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 blend terms to the Kingdom of Cambodia in an amount of three million three hundred and fifty thousand United States dollars (US\$3,350,000 million) and upon such terms and conditions as shall be substantially in accordance with the terms and conditions presented herein.

Donal Brown
Associate Vice-President, Programme Management Department

Updated logical framework incorporating the additional financing

Results Hierarchy	Indicators	Original log frame			Total end target (Original target + AF target)	Means of Verification			Assumptions
	Name	Baseline	Mid-Term	End Target		Source	Frequency	Responsibility	
Outreach	1 Persons receiving services promoted or supported by the project					Total HH registered in MIS+ number people attended technical training by (Technical service providers)	Annual		
	Males - Males			75000	88200				
	Females - Females			75000	88200				
	Youth - Young males				2250				
	Youth – Young females				2250				
	Indigenous people – Male Indigenous people				9000				
	Indigenous people – Female Indigenous people				9000				
	Total number of persons receiving services - Number of people		75000	150000	176400				
	1.a Corresponding number of households reached					MIS - Farmer Diary, MIS	Annual	PMO	
	Women-headed households - Households		18750	37500	44100				
	Non-women-headed households - Households		18750	37500	44100				
	Households - Households		37500	75000	88200				
	1.b Estimated corresponding total number of households members					HHs have on an average 4 members	Annual	PMO	

	Household members - Number of people		150000	300000	352800				
Project Goal Enhance prosperity of Cambodian smallholder farmers through increasingly profitable links to agri-businesses and markets	80% of total of 88,200 direct beneficiaries increased real net farming income by >30%					End line and evaluation survey	Baseline; Mid-term; End line	PMO	Assumes continued social, political and economic stability in the country and neighbouring ASEAN region
	Households - Number	0	20000	60000	70560				
Development Objective To increase returns from agriculture value chains for smallholders, including poorer farmers and youth, through efficient public sector investment	Number of beneficiaries' increased return on labour in farming by 40%					End line and evaluation survey	Baseline; Mid-term; End line	PMO	There are no prolonged fall in export/local demand or prices for agricultural products.
	Households - Number	0	13500	40000	47000				
	Public return on investment (ROI)					End line and evaluation survey	End of project	PMO	
ROI - Percentage (%)	0		20	20					
Outcome 1 Profits to farmers and businesses from Inclusive value chains increased for multiple higher value products.	Adoption rate of production and postharvest technologies of participating farmers					Technical service providers report and verification/check by M&E-PMO	Baseline; Mid-term; End line	PMO	There are no prolonged fall in export/local demand or prices for agricultural products. For AIMS value chains substantial improvements in production and post-harvest are necessary and feasible as foundations of growth.
	Adoption rate - Percentage (%)			75	75				
	Aggregate value of products sold					Formal & informal contract/agreement	Annual	PMO	
Aggregate value - Money (USD' 000)				19500					
Output 1.1 Farmers trained on improved technologies for production or post-harvest practices	1.1.4 Persons trained in production practices and/or technologies					SM Report/Hub report/MIS	Annual	PMO	
	Total number of persons trained by the project - Number of people		45000	60000	73200				
	Men trained in crop - Males			21000	25620				

	Women trained in crop - Females			21000	25620				
	Men trained in livestock - Males			9000	10980				
	Women trained in livestock - Females			9000	10980				
	Total persons trained in crop - Number of people			42000	51240				
	Total persons trained in livestock - Number of people			18000	21960				
	1.1.7 Persons in rural areas trained in financial literacy and/or use of financial products and services								
	Males - Males		17500	25000	29400	SM Report/Hub report/MIS	Annual	PMO	
	Females - Females		17500	25000	29400				
	Persons in rural areas trained in FL and/or use of Financial Products and Services (total) - Number of people		35000	50000	58800				
Output 1.2	Number of buy and sale contracts / agreements (formal and informal)					MIS	Annual	PMO	
	Number			8000					
Outcome 2 Private investment increased in priority value chains from smallholders and agribusinesses	Agri-business investment in priority value chains and production clusters					Value of private sector investment (VCIF-W2)	Annual	PMO	Sufficient numbers of banks and MFIs continue to show commercial interest and commitment to expanding agricultural lending portfolio to smallholder and agribusiness sectors Participating smallholders have sufficient interest to improve their financial literacy.
	USD - Money (USD' 000)			5312					
	Smallholder investment in priority value chains and production clusters					Value of Smallholder investment (VCIF-W1)	Annual	PMO	
	USD - Money (USD' 000)			10,999					
	Participating smallholder farmers with increased financial literacy					BLT Pre & Post test result	Annual	PMO	
Smallholder farmers – Female Percentage (%)		1		25					

	Smallholder farmers – Male Percentage (%)		1		25				Positive framework conditions for investment into agriculture
	Total Smallholder farmers - Percentage (%)		1	50	50				
	Partner Financial Institutions (PFIs) continue financing VCs					PFI signed MOU with AIMS (entry in MIS)	Annual	PMO	
	PFIs - Number		2	2	3				
Output 2.1 Access to finance	Number of HH accessing to loan / LOC					MIS	Annual	PMO	
	HH- Number			881*	1421				
	Number of HH accessing to grants (Poor and Near Poor) (VCIF W1)					MIS	Annual	PMO	
	HH- Number				3334				
	Number of agribusiness accessing to grants (VCIF W2)					MIS	Annual	PMO	
	Agribusiness owned/managed by women - Number				8				
	Agribusiness owned/managed by men - Number				12				
Total Agribusiness – Number				20					
Outcome 3 Substantially increased capacity of national and sub-national institutions to design and deliver inclusive agriculture market development initiatives	MSPs that are active, well attended					MIS	Annual	PMO	External socio-political factors do not disrupt MSPs. Sufficient interest from Private sector in MSPs across all priority VCs of AIMS. Assumes 80% of total direct project beneficiaries.
	MSPs - Percentage (%)		1	90	90				
Output 3.1 KM/M&E and VC products	Number of policy-relevant knowledge products completed				2	Project report	Annual	PMO	
	Number								
	Number of 4Ps organized at national level					Project report	Annual	PMO	
	Number				12				

Outcome 4 Increased sales by POs	2.2.5 Rural producers' organizations reporting an increase in sales					PO's annual sale report/cluster tracking	Base; mid-term; end line; annual	PMO
	Number of Rural POs - Organizations			1628	1865			
	Rural POs with women in leadership position - Organizations				1865			
	2.2.3 Rural producers' organizations engaged in formal partnerships/agreements or contracts with public or private entities					Buy and sell contract	Base; mid-term; end line; annual	PMO
	Number of POs - Organizations				1746			
	Women in leadership position - Females				1746			
	PPPs or similar partnerships with large and small agri-businesses and service enterprises							
	Partnerships - Number		100	250	450			
	Partner supported agri-businesses - Number				1000			
	Numbers of MSP organized							
MSP - Number		927	1853	3553				
2.1.3 Rural producers' organizations supported					MIS	Annual	PMO	
Rural POs supported - Organizations		812	1628	1865				
Output 4.1 Engagement with private sectors	Number of national buyer with contract					MIS	Annual	PMO
	Number				12			
Output 4.2 PO access to Market facilities	Number of SDF completed and operational with sustainable management plans					MIS	Annual	PMO
	Number				1000			
	Number of HHs producing premium product with clear production plan					Cluster report	Annual	PMO

Output 4.3 Increase PO capacity in sale	Number				30000				
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Updated summary of the economic and financial analysis

Methodological approach

1. The economic rationale behind AIMS is built on several key strategies: boosting agricultural productivity and minimizing post-harvest losses through the adoption of good agricultural and post-harvesting practices such as intercropping, seed production, enhanced post-harvest handling and storage, crop rotation, and composting. Additionally, the program focuses on increasing cropping intensity and transitioning to high-value crop and livestock varieties, which includes utilizing drip irrigation to extend production during the dry season. These measures are anticipated to potentially raise crops yields and animal production by up to 100% and reduce post-harvest, storage, processing, and transport losses by up to 100%.

2. A cost-benefit analysis was performed to determine the economic and financial feasibility of the project. The original cost-benefit analysis, updated during the midterm review, was further revised, and a complementary economic-financial analysis was developed for the additional financing. This was done to estimate the return on the entire investment. The analysis primarily drew on information from previous assessments during the initial project design phase and the midterm review. Data was further verified through field interviews with some beneficiaries from the first phase of the project.

3. The analysis is based on data collected for various productive systems in rotational or associated systems. For the initial phase of the project, priority was given to crops such as cassava, cashew, pepper, rice, longan, various types of vegetables, and broiler chickens. In the additional financing, priority is given to rice and vegetable crops, spices, and broiler chickens. Additionally, the analysis considered data from traders of vegetables, rice, and chicken meat production.

4. Financial analyses utilized actual market prices, inclusive of taxes, subsidies, and other market distortions. Conversely, economic analyses employed adjusted economic prices to correct for these distortions, reflecting the broader economic environment in Cambodia. The results from the financial analysis provide insights into the returns for implementing entities, participants, private enterprises, and beneficiaries. Meanwhile, the economic analysis reveals the genuine returns to society, offering valuable insights for policymakers responsible for promoting public investment.

5. The analysis was conducted considering an evaluation period of 20 years as the base scenario, including the execution phase. The estimates were made using a social discount rate and a cost of capital of 10 percent³. The internal rate of return (IRR), net present value (NPV), benefit-cost ratio (B/C), and other indicators such as the payback period and switching values were estimated. The analysis considers the total cost of the projects, including contributions from beneficiaries and governmental counterparts. Sensitivity and scenario analyses were conducted to evaluate the potential impact of key variable changes on the project's economic viability due to different factors, such as changes in input and output prices, adoption rates, benefits, costs, social discount rates, and evaluation periods.

Results

6. **Return on investment of the overall project.** The economic analysis of the AIMS project, encompassing both original and additional financing, indicates promising economic returns. The EIRR is estimated at 29.1 percent, exceeding the threshold set in the development goal at 20 percent. This EIRR estimate assumes that 70% of targeted farmers and 95% of traders will adopt the improved technologies and/or practices promoted by the project, impacting crops and animal production such as rice, vegetables, spices, cassava, and chicken in both rainfed and irrigated systems. The Net Present Value is projected at USD 341.1 million, with a benefit-cost ratio of 1.45, derived from quantifiable

³ Values used in the previous EFA analyses.

benefits related to post-project activities. Sensitivity and scenario analyses highlight the robustness of these evaluations, indicating that the project would remain profitable over a 15-year evaluation period. Sensitivity analysis shows that the project can become unprofitable if projected benefits decrease by more than 31 percent and costs increase by more than 45 percent due to any shocks during implementation which considering the local economic context and the macro trends is unlikely.

7. **Return on investment of the additional finance.** If only the benefits and costs of additional finance projected over 20 years are considered, the project would also have a promising economic return on investment. The NPV would be USD 297.8 million, the IRR would be 28.8 percent, and the B/C ratio would be 1.67. The sensitivity and scenario analysis demonstrates the robustness of these findings. The project would become unfeasible if the projected benefits were reduced by more than 40 percent or if costs increased by over 67 percent due to any adverse factors which is unlikely considering the economic context. The project would remain viable in evaluation periods of 10 and 15 years.

Indicator	Overall project	Additional finance
IRR	29.1 %	28.8 %
BCR (@10% discount rate)	1.45	1.67
NPV (@10% discount rate)	USD 341.1 million	USD 297.8 million
Switching values	Up to 45% increase in costs Up to 31% reduction in benefits	Up to 67% increase in costs Up to 40% reduction in benefits

8. Sensitivity analysis and risk analysis. Similarly, the sensitivity analysis conducted to evaluate the potential changes in various variables that can affect the economic profitability of the investment is shown in the following table.

Variables	Δ%	Overall project		Additional financing		Link with the risk matrix
		IRR (%)	NPV (USD M)	IRR (%)	NPV (USD M)	
Base scenario		29.1%	341.1	28.8%	297.8	
Project benefits	-10%	23.7%	230.9	24.9%	223.8	Combination of risks affecting output prices, yields and adoption rates
Project benefits	-20%	17.7%	120.7	20.7%	149.9	
Project costs	10%	24.7%	269.9	25.6%	256.0	Increase of construction material prices
Project costs	20%	20.5%	198.7	22.7%	214.2	
Output prices	-10%	28.8%	335.7	28.74%	296.5	Low management, negotiating capacity of farmers groups, market price fluctuation, external shocks
Output prices	-20%	28.4%	330.3	28.66%	295.1	
Input prices	10%	26.1%	298.0	26.4%	270.3	Market price fluctuations and external shocks
Input prices	20%	23.3%	254.9	24.2%	242.8	
Adoption rate (60%)		28.2%	285.5	28.2%	252.8	Quality of technical assistance and access to technologies
Adoption rate (75%)		29.5%	368.8	29.1%	320.3	
Adoption rates	-20%	27.7%	263.0	27.9%	233.5	
Evaluation period (15 years)		24.8%	155.2	27.5%	211.8	Uncertainty about the continuation of the activities supported by the project in the short, medium and/or long term
Evaluation period (10 years)		-1.1%	-35.0	20.6%	73.4	

Social discount rate (9 percent)	na	399.6	na	341.5	Linked with political and economic stability and macroeconomic context
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9. **The following table shows a comparison of the estimated economic rates of return during the project design phase,** the update during the midterm review (considering the original project and additional financing), and the estimated results for the additional financing only, considering a social discount rate of 10 percent and an evaluation period of 20 years.

Indicator	Project design – Overall project	Mid-term review Overall project	Overall project – OF plus AF	Additional financing
EIRR	31%	35%	29.1 %	28.8 %

10. The various estimates of the economic internal rate of return shown in the previous table consistently demonstrate the project's economic viability. The estimated internal rate of return during the design of the original project is higher than the estimates in the updated analysis of the entire project and the projections for the additional financing. This difference could be explained by the fact that, during the design phase of the project and the update of the analysis in the midterm review, a broader list of higher-priced products, such as pepper, longan, and cashew, was considered as part of the farm models. Additionally, more optimistic assumptions were made in the project design regarding production parameters, without considering the negative effects of the pandemic on production dynamics and the increase in the cost of agricultural inputs. The updated estimate of the EFA indicators for the overall project and additional project would present a more realistic scenario, as the main beneficiaries are small farmers and SME traders, who are characterized by lower productive efficiencies, limited production factors, greater vulnerability to external shocks, and, as a result, lower returns on investments.

11. The financial analysis reveals that most activities supported by the project, primarily focusing on farmers and traders, yield positive returns. Notably, traders of chicken, vegetables and rice, along with primary producers of pepper and chicken, are projected to achieve the highest returns on investment, with Internal Rates of Return (IRR) of 34 percent, 34 percent, 28 percent, 23 percent and 20 percent respectively. This underscores the potential of these initiatives to significantly increase household incomes and enhance the revenues of traders involved in the various value chains supported by the project.

Table A
Financial cash flow models

A.1 Original financing – farm/trader models

Year	Producers									Traders	
	Farm models'net incremental benefits (in \$US)									Enterprise and marketing models'net incremental benefits (in \$US)	
	Farm 1	Farm 2	Farm 3	Cassava	Cashew	Pepper	Rice	Longan	Vegetables	Chicken	Beef fattening
PY1	-5454	-5621	-3308	-371	-1144	-18175	-77	-8108	-4915	-230	-138
PY2	-1398	-1737	-239	-64	-194	-15516	-68	441	-934	-144	-138
PY3	-619	-1019	-9	109	-229	-13526	23	-322	-66	91	-248
PY4	965	1066	669	101	-220	3093	33	1512	804	91	-248
PY5	1945	2237	1127	101	153	11289	43	3423	1494	7	-358
PY6	2766	3145	1472	101	356	16689	43	3557	2184	112	-358
PY7	3357	3909	1874	101	558	22089	43	5243	2184	112	245
PY8	4491	5075	2281	101	963	28257	43	5422	3564	112	245
PY9	5069	5965	2283	101	1065	39313	43	5422	3564	112	245
PY10	4933	5865	1959	101	1099	41607	43	4545	3564	7	245
NPV (USD)	4,719	5,745	2,525	62	386	36,266	41	7,189	3,091	32	-581
FIRR (@10%)	20%	21%	21%	13%	14%	23%	17%	23%	18%	12%	N/A

A.2 Additional financing - farm/trader models

Year	Producers									Traders			
	Farm models'net incremental benefits (in \$US)									Enterprise and marketing models'net incremental benefits (in \$US)			
	Farm 1 - AF	Farm 2 - AF	Farm 3 - AF	Farm 5 - AF - Chicken	Farm 6 - AF - spicy	Pepper	Rice	Vegetables	Chicken	Chicken	Vegetable	Rice	Beef
PY1	-3404	-3655	-2683	-29	-7537	-18175	-77	-4915	-158	-2821	-3138	-3410	-232
PY2	-1276	-1687	-1733	-73	-4231	-15516	-68	-934	-71	507	332	80	-232
PY3	-695	-1102	-1250	61	-3241	-13526	23	-66	69	793	707	423	-100
PY4	615	615	803	70	2790	3093	33	804	113	1107	1101	855	-165
PY5	1421	1579	1896	-90	4116	11289	43	1494	-47	1462	1380	1,143	32
PY6	2044	2315	2668	54	4116	16689	43	2184	90	1462	1659	1,431	32
PY7	2319	2747	3264	54	5449	22089	43	2184	106	1534	2496	2,873	153
PY8	2589	3848	3858	54	6884	28257	43	3564	114	1534	2496	2,873	153
PY9	2589	4732	3858	54	8217	39313	43	3564	114	1606	2496	2,873	153
PY10	2697	4916	4096	-74	8217	41607	43	3564	-14	1606	2496	2,873	153
NPV (USD)	2,319	4,270	5,110	29	6,662	36,266	41	3,091	99	3,742	4,966	4,525	-279
FIRR (@10%)	18%	21%	25%	21%	19%	23%	17%	18%	20%	34%	34%	28%	-1%

A.3 Overall farm/trader models

Years	Producers															Traders				
	Farm models'net incremental benefits (in \$US)															Enterprise and marketing models'net incremental benefits (in \$US)				
	Farm 1 - OF	Farm 1 - AF	Farm 2	Farm 2 - AF	Farm 3	Farm 3 - AF	Farm 4 - AF - rice seed production	Farm 5 - AF - Chicken	Farm 6 - AF - spicy	Cassava	Cashew	Pepper	Rice	Longan	Vegetables	Chicken	Chicken	Vegetable	Rice	Beef
PY1	-5454	-3404	-5621	-3655	-3308	-2683	-203	-29	-7537	-371	-1144	-18175	-77	-8108	-4915	-158	-2821	-3138	-3410	-232
PY2	-1398	-1276	-1737	-1687	-239	-1733	-121	-73	-4231	-64	-194	-15516	-68	441	-934	-71	507	332	80	-232
PY3	-619	-695	-1019	-1102	-9	-1250	-40	61	-3241	109	-229	-13526	23	-322	-66	69	793	707	423	-100
PY4	965	615	1066	615	669	803	41	70	2790	101	-220	3093	33	1512	804	113	1107	1101	855	-165
PY5	1945	1421	2237	1579	1127	1896	123	-90	4116	101	153	11289	43	3423	1494	-47	1462	1380	1,143	32
PY6	2766	2044	3145	2315	1472	2668	123	54	4116	101	356	16689	43	3557	2184	90	1462	1659	1,431	32
PY7	3357	2319	3909	2747	1874	3264	204	54	5449	101	558	22089	43	5243	2184	106	1534	2496	2,873	153
PY8	4491	2589	5075	3848	2281	3858	204	54	6884	101	963	28257	43	5422	3564	114	1534	2496	2,873	153
PY9	5069	2589	5965	4732	2283	3858	204	54	8217	101	1065	39313	43	5422	3564	114	1606	2496	2,873	153
PY10	4933	2697	5865	4916	1959	4096	204	-74	8217	101	1099	41607	43	4545	3564	-14	1606	2496	2,873	153
NPV (USD)	4,719	2,319	5,745	4,270	2,525	5,110	225	29	6,662	62	386	36,266	41	7,189	3,091	99	3,742	4,966	4,525	-279
FIRR (@10%)	20%	18%	21%	21%	21%	25%	21%	21%	19%	13%	14%	23%	17%	23%	18%	20%	34%	34%	28%	-1%

Table 2 **Project costs and logframe targets**
Project/programme costs

Component/subcomponent	Additional IFAD loan		Beneficiaries			Private business (SMEs)			Borrower/recipient (RGC)			Total	
	Amount	%	Cash	In-kind	%	Cash	In-kind	%	Cash	In-kind	%	Amount	%
A. Value chain development	13,947	73%	0	469	2%	0	262	1%	-	4,382	23%	19,060	65%
1. Value Chain Facilitation Brokering and Sector Development Facility	3,997	48%			0%			0%		4,382	52%	8,379	29%
2. Market-oriented social mobilizers	1,048	80%			0%		262	20%			0%	1,310	5%
3. Sector Investment Facility	8,902	95%		469	5%			0%			0%	9,370	32%
B. Value Chain Financing	3,200	47%	2,414	0	36%	1,167	0	17%	0	0	0%	6,781	23%
1. Value Chain Innovation Fund	3,200	47%	2,414		36%	1,167		17%			0%	6,781	23%
2. Financial Services Partnership	-	0%			0%			0%			0%	0	0%
C. Project Management	2,853	87%	0	0	0%	0	0	0%	0	410	13%	3,262	11%
1. Project coordination	2,057	83%			0%			0%		410	17%	2,467	8%
2. Knowledge management and planning, monitoring and evaluation	795	100%			0%			0%	0		0%	795	3%
Total	20,000	69%	2,414	469	10%	1,167	262	5%	0	4,792	16%	29,103	100%

Logframe targets

PROJECT COSTS AND INDICATORS FOR LOGFRAME

Total Project Costs (in million USD)	29.103	Project management including M&E and KM	3.262
Beneficiaries	88,000 Households		
Cost per beneficiary (USD)	330	Adoption rates	75%
Components and Cost (USD million)		Outcomes	Indicators
Value chain Development	19.06	a) increased Profits to farmers and businesses for higher value products from Inclusive value chains,	1) Adoption rate of production and postharvest technologies of 73,200 participating farmers increased 2) Aggregate value of products sold increased
Value chain financing	6.781	b) Increased sales by POs.	3) 1,865 Rural producers' organizations reporting an increase in sales 4) Partnerships with 450 large and small agri-businesses and service enterprises and rural producers' organisations
Project management	3.262	c) Private investment increased in priority value chains from smallholders and agribusinesses	5) Agri business investments and small holder investments in priority value chains increased
		d) substantially increased capacity of national and sub-national institutions to design and deliver inclusive agriculture market development initiatives	6) 90% of Multi Stakeholder Platforms are active, well attended

Table C**Main assumptions and shadow prices****i) General investment assumptions**

- The ex-ante incremental cost-benefit analysis aimed to assess key project valuation metrics, such as Net Present Value (NPV) at both private and social prices over a 20-year period, along with Financial and Economic Internal Rates of Return (FIRR and EIRR), the Benefit/Cost ratio (B/C), payback period and switching values. These metrics were calculated for the overall project, additional financing and distinct types of farm/trader models. Additionally, sensitivity analyses were conducted to examine the potential effects of changes in critical variables like benefits, costs, implementation delays, evaluation periods, and discount rates. The estimate of the entire project economic and financial indicators considered the all-project costs including the beneficiary counterparts, private sector contributions and government contributions.

- The conversion rate from DKH to US dollars was based on the exchange rate during the design of the additional financing (1 USD = 4066 DKH). For the baseline scenarios, a 10% discount rate was applied for both financial and economic analyses over a standard 20-year evaluation period, consistent with the parameters set in the preliminary economic and financial analysis. To adjust private prices to social shadow) prices for various goods and services, It was used conversion factors calculated for considering the following formula.

Table 2. Derivation of conversion factors

Category	Value (Riel trillion)
Exports of goods and services, 2021 (current LCU) (Average 10 years)	48.74
Imports of goods and services, 2021 (current LCU) (Average 10 years)	50.55
Taxes on international trade, 2021 (current LCU)* (Average 10 years)	1.95
Customs and other import duties, 2021 (current LCU) (Average 10 years)	1.77
Taxes on exports, 2021 (current LCU) (Average 10 years)	0.18
Cambodia does not provide any export or import subsidies (https://www.wto.org/english/tratop_e/tpr_e/s364_e.pdf)	
SERF = ((M + Tm - Sm) + (X - Tx + Sx)) / (M + X)	
M = imports	51
Tm = taxes on imports	2
Sm = subsidies on imports	0
X = exports	49
Tx = taxes on exports	0.18
Sx = subsidies on exports	0
M + Tm - Sm	52
X - tx + Sx	49
SERF	1.02
SCF = 1/SERF	0.9842

Source: Estimates based on the data provided by the World Bank (2021)

- The international numeraire pricing system was employed to convert private prices to economic prices for tradable and non-tradable goods and services. Adjustments were made using a Standard Conversion Factor (SCF) of 0.98 and a Shadow Wage Rate Factor (SWRF) of 0.75 for unskilled labor and 0.90 for skilled labor, further adjusted for the SCF.
- The analysis did not account for positive externalities such as technology spillovers and environmental and social benefits, due to challenges in accurately quantifying these effects and a scarcity of pertinent data.

C.2 Specific assumptions

- The analysis evaluates the projected incremental costs and benefits of activities designed for implementation across various intervention areas of the project. These activities aim to support farmers and traders within selected value chains. The table below details the farm models and trader models used for this analysis and includes specific assumptions for each model under different scenarios: the situation without the project (WOP), the situation at the mid-term review with the project (WP at MTR), and the projected situation with additional financing (WP at AF).

Table 3. Farm and trader models

I. Producers							
CROPPING PATTERNS							
Name of AEZ	%	WOP		WP at MTR		WP at AF	
		ha	%	ha	%	ha	%
Plateau and mountainous zone							
FARM 1							
Cassava	28%	2.50	42%	2.50	0%	1.05	0%
Cashew	25%	0.700	10%	0.25	0%	0.000	0%
Pepper	0%	0.625	2%	0.05	2%	0.050	5%
Rice	25%	0.000	20%	0.50	20%	0.500	48%
Fruit tree	5%	0.625	6%	0.15	0%	0.000	0%
Vegetables	17%	0.125	20%	0.50	20%	0.500	48%
Total	100%	2.50	100%	2.50	42%	1.05	100%
Tonle sap zone							
FARM 2							
Cassava	30%	2.00	38%	2.00	0%	1.00	0%
Cashew	1%	0.60	3%	0.76	0%	0.00	0%
Pepper	0%	0.02	4%	0.06	4%	0.08	8%
Rice	25%	0.00	24%	0.48	24%	0.48	48%
Fruit tree	35%	0.50	9%	0.18	0%	0.00	0%
Vegetables	9%	0.70	22%	0.44	22%	0.44	44%
Total	100%	2.00	100%	2.00	62%	1.00	100%
Plain Mekong zone							
FARM 3							
Cassava	5%	0.90	10%	0.90	0%	0.56	0%
Cashew	0%	0.05	3%	0.03	0%	0.00	0%
Pepper	0%	0.00	0%	0.00	3%	0.03	5%
Rice	50%	0.00	34%	0.31	31%	0.28	50%
Fruit tree	30%	0.45	25%	0.23	0%	0.00	0%
Vegetables	15%	0.27	28%	0.25	28%	0.25	45%
Total	100%	0.90	100%	0.90	62%	0.56	100%
Seed production							
FARM 4							
Rice	0%	0.00	0%	0.00	100%	3.00	100%
Total	0%	0.00	0%	0.00	100%	3.00	100%
Animal products							
FARM 5							
Chicken meat	100%	100.00	100%	300.00	100%	300.00	100%
Total	100%	100.00	100%	300.00	100%	300.00	100%
II. Traders							
Vegetables							
Vegetables: Post-harvest facilities/technologies							
Vegetables	%	Capacity (kg/year)	%	Capacity (kg/year)	%	Capacity (kg/year)	%
		4,800.00		0.00		8,640.00	
Total	0%	4,800.000	0%	0.00	100%	8,640.000	100%
Chicken							
Chicken: Slaughter and cold chain trucks							
Chicken carcass	0%	4,435.20	0%	0.00	100%	4,435	100%
Total	0%	4,435.200	0%	0.00	100%	4,435.20	100%
Rice							
Rice: Post-harvest equipment							
Rice	0%	5,000.00	0%	0.00	100%	9,000.00	100%
Total	0%	5,000.000	0%	0.00	100%	9,000.000	100%

- The following table shows the financial and economic prices of outputs and inputs used to project the benefits and costs for each farm and trader model presented in the table above.

Table 4. Financial and economic prices of outputs and inputs

Financial & Economic Prices		1 USD:DKH	4086			
Description	Unit	Financial Prices @	Financial Prices @	Financial	Economic	
		Design 2016	MTR 2021	Prices @ AF 2024	Prices \$U SD	
Outputs						
Crops						
Cassava wet	t	70	100.0	79.0	77.8	
Cassava dry	t	150	175.0	118.0	116.1	
Rice (wet season) dried	Kg	0.28	0.3	0.2	0.3	
Rice (dry season) dried	Kg	0.225	0.3	0.2	0.3	
Rice AQIP	Kg	0.315	0.9	0.9	1.2	
wet paddy (no aromatic)	Kg	0.175	0.2	0.2	0.2	
Chicken (farmyard)	Kg	3.5	4.0	4.0	3.9	
Longan 0.28	Kg	1.25	0.9	0.9	0.9	
Mango	Kg	0.37	0.3	0.2	0.2	
Vegetables (av. leafy veg.)	Kg	0.79	1.3	1.3	1.2	
Long bean	kg	0.62	0.8	0.8	0.7	
Pepper White	Kg	15	20.0	20.0	19.7	
Cashew Raw	Kg	1.1	1.3	1.6	1.6	
Cabbage	Kg	0.49	0.8	0.2	0.2	
Chinese Kale	Kg	1	1.5	1.5	1.5	
Masta Green	Kg	0.99	1.3	1.3	1.2	
Lettuce	Kg	0.58	0.8	0.8	0.7	
Cattle (chest 180cm)	cow	750	750.0	787.5	775.1	
Black pepper	Kg			20.0	19.7	
Chili	Kg			0.7	0.7	
Cucumber	Kg			0.3	0.3	
Eggplant	Kg			0.5	0.5	
Inputs						
Seed						
Cassava cutting	bundle	2.50	3.3	3.5	3.4	
Rice seed	kg	0.66	0.7	0.7	0.7	
Rice seed (AQIP)	kg	0.95	0.9	0.9	0.9	
Maize	kg	4.06	3.5	3.7	3.6	
Long bean (80 seed)	pack	0.80	1.0	1.1	1.1	
Chinese Kale (10gr)	pack	0.77	1.0	1.0	1.0	
Watermelon	kg	53.91	53.0	56.0	55.1	
Pepper tree	tree	5.00	4.4	4.6	4.5	
Longan tree	tree	1.00	1.0	1.1	1.0	
Cashew tree/seedling	tree	0.75	0.4	0.4	0.4	
Fertilizer / chemicals						
Farmyard manure/compost	cart	17	20.0	21.3	21.0	
Fertilizer UR EA	bag	32	33.8	35.8	21.0	
Fertilizer DAP	bag	26	35.0	37.7	27.6	
Fertilizer NPK (20:20:15)	bag	29	34.0	36.3	32.7	
Mulch & compost for treecrop	tree	0.5	0.5	0.5	0.5	
Insecticide	l	40	55.0	59.3	58.4	
Herbicide	l	20	29.0	31.4	30.9	
Other						
Chicken pen (approx 100 chicken)	pen	35	40.0	42.6	41.9	
Chicks	chick	0.25	0.8	1.0	1.0	
Chicks (vaccinated)	chick	1.25	1.4	0.8	0.8	
Commercial feed	kg	0.6	0.6	0.6	0.6	
Local feed	kg	0.15	0.3	0.3	0.3	
Cattle (chest 120cm)	cow	550	550.0	581.4	572.2	
Beef feed & treatment	cow	70	70.0	74.0	72.8	
Fuel gasoline	l	0.9	1.0	1.1	1.0	
Fuel diesel	l	0.8	0.9	0.9	0.9	
Poles	pole	4.5	4.5	4.8	4.7	
Iron wire	kg	1.1	1.1	1.2	1.1	
Pole protection (banana leaf)	leaf	0.15	0.2	0.2	0.2	
Pump machine	unit	250	250.0	264.3	260.1	
Irrigation system (2850\$/0.1ha)	unit	2650	2850.0	2850.0	2805.0	
Sprinklers	unit	1.9	0.4	0.4	0.4	
Services						
Transportation	t	5.5	7.0	7.5	6.9	
Motor bike rent	day	50	65.0	69.8	64.0	
Land preparation (tractor)	day	61	75.0	80.2	73.8	
Land preparation (animal)	ha	77	77.0	81.4	75.8	
Land preparation ridging (tractor)	day	15	37.5	42.8	38.9	
Land clearing	ha	10	13.0	14.0	12.8	
Harvesting bulk (cassava)	t	37	42.0	44.7	41.3	
Harvesting tree crop	kg	0.88	0.2	0.2	0.2	
Combine harvester	ha	96	87.5	92.1	86.1	
Bags	bag	0.15	0.2	0.2	0.2	
Labour						
Family labour	person-day	6	7.5	8.0	5.5	
Hired labour Skilled (spraying, fertilizer)	person-day	7	10.0	10.8	9.1	
Hired labour Unskilled (land preparation & ha)	person-day	6	7.5	8.0	5.5	
Post-harvest/Processing						
Outputs						
Vegetable	Raw material	kg	0.5	0.8	0.5	0.5
Vegetable	Vegetables processed	kg	0.8	1.3	2.0	2.0
Chicken	Liveweight	kg	2.5	3.0	3.0	3.0
Chicken	Carcass	kg	3.5	4.0	4.0	3.9
Rice	Processed rice	kg	0.28	0.3	1.2	1.6
Inputs						
Bags/trays for packing	Bas for packing	Bag	0.15	0.2	0.2	0.2
Water for cleaning	Water for cleaning vegetable	m3	0.1	0.1	0.1	0.1
Materials	1 kit of knife, scissors, etc	unit	4	4.0	4.2	4.2
Electricity	Electricity for processing vegetables	Kw/h	0.05	0.1	0.1	0.1
Other services for commer	Data for internet	month	3.00	3.0	3.2	3.1
Transport						
Transport from field	Travel		5.00	5.0	5.3	5.2
Transport to the market	Travel		5.00	5.0	5.3	5.2
Labour						
Transport from field		pers-day	6.0	7.5	8.0	5.9
Transport to the market		pers-day	6.0	7.5	8.0	5.9
Shelling/cleaning/Packing		pers-day	7.0	10.0	10.8	8.0
Total Labour skilled		pers-day	7.0	10.0	10.8	8.0
Total Labour unskilled		pers-day	6.0	7.5	8.0	5.9
Investment (maintenance)						
Equipments						
Tools						
Maintenance of processing facility (10%)		unit	100.0	100.0	100.0	98.4

Table D. Beneficiary adoption rates and phasing

Items	Target HH	First phase							AF			
		Start 2017	2018	2019	2020	MTR 2021	2022	2023	AF 2024	2025	2026	End 2027
OF. FARM 1 Plateau & Mountains Zone	15007											
Adoption rate	70%	0%	0%	40%	40%	10%	5%	5%	0%	0%	0%	0%
No. of HH - OF	10505	0	0	4202	4202	1051	525	525	0	0	0	0
AF. FARM 1 Plateau & Mountains Zone	12008											
Adoption rate	70%	0%	0%	0%	0%	0%	0%	0%	0%	40%	50%	10%
No. of HH - OF	8405	0	0	0	0	0	0	0	0	3362	4203	841
Total	27015	0	0	4202	4202	1051	525	525	0	3362	4203	841
Accumulative	18911	0	0	4202	8404	9455	9980	10505	10505	13867	18070	18911
OF. FARM 2 Tonle Sap Zone	13514											
Adoption rate	70%	0%	0%	40%	40%	10%	5%	5%	0%	0%	0%	0%
No. of HH - OF	9460	0	0	3784	3784	946	473	473	0	0	0	0
AF. FARM 2 Tonle Sap Zone	16677											
Adoption rate	70%	0%	0%	0%	0%	0%	0%	0%	0%	40%	50%	10%
No. of HH - OF	11674	0	0	0	0	0	0	0	0	4670	5837	1167
Total	30191	0	0	3784	3784	946	473	473	0	4670	5837	1167
Accumulative	21134	0	0	3784	7568	8514	8987	9460	9460	14129	19966	21134
OF. FARM 3 Plain Zone	19179											
Adoption rate	70%	0%	0%	40%	40%	10%	5%	5%	0%	0%	0%	0%
No. of HH - OF	13425	0	0	3784	3784	946	473	473	0	0	0	0
AF. FARM 3 Plain Zone	5394											
Adoption rate	70%	0%	0%	0%	0%	0%	0%	0%	0%	40%	50%	10%
No. of HH - OF	3776	0	0	0	0	0	0	0	0	4670	5837	1167
Total	24572	0	0	3784	3784	946	473	473	0	4670	5837	1167
Accumulative	17201	0	0	3784	7568	8514	8987	9460	9460	14129	19966	21134
OF. FARM 4 Rice seed production	0											
Adoption rate	70%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
No. of HH - OF	0	0	0	0	0	0	0	0	0	0	0	0
AF. FARM 4 Rice seed production	1284											
Adoption rate	70%	0%	0%	0%	0%	0%	0%	0%	0%	40%	50%	10%
No. of HH - OF	899	0	0	0	0	0	0	0	0	360	449	90
Total	1284	0	0	0	0	0	0	0	0	360	449	90
Accumulative	899	0	0	0	0	0	0	0	0	360	809	899
OF. FARM 5 Chicken production	0											
Adoption rate	70%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
No. of HH - OF	0	0	0	0	0	0	0	0	0	0	0	0
AF. FARM 4 Chicken production	3853											
Adoption rate	70%	0%	0%	0%	0%	0%	0%	0%	0%	40%	50%	10%
No. of HH - OF	2697	0	0	0	0	0	0	0	0	1079	1348	270
Total	3853	0	0	0	0	0	0	0	0	1079	1348	270
Accumulative	2697	0	0	0	0	0	0	0	0	1079	2427	2697
OF. FARM 5 Spicy	0											
Adoption rate	70%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
No. of HH - OF	0	0	0	0	0	0	0	0	0	0	0	0
AF. FARM 4 Spicy	1284											
Adoption rate	70%	0%	0%	0%	0%	0%	0%	0%	0%	40%	50%	10%
No. of HH - OF	899	0	0	0	0	0	0	0	0	514	642	128
Total	1284	0	0	0	0	0	0	0	0	514	642	128
Accumulative	899	0	0	0	0	0	0	0	0	514	1156	1284
B. Beneficiaries - Traders												
OF. Vegetable	0											
Adoption rate	95%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
No. of HH - OF	0	0	0	0	0	0	0	0	0	0	0	0
AF. Vegetable	147											
Adoption rate	95%	0%	0%	0%	0%	0%	0%	0%	0%	40%	50%	10%
No. of HH - OF	140	0	0	0	0	0	0	0	0	56	70	14
Total	147	0	0	0	0	0	0	0	0	56	70	14
Accumulative	140	0	0	0	0	0	0	0	0	56	126	140
B. Beneficiaries - Traders												
OF. Chicken	0											
Adoption rate	95%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
No. of HH - OF	0	0	0	0	0	0	0	0	0	0	0	0
AF. Chicken	162											
Adoption rate	95%	0%	0%	0%	0%	0%	0%	0%	0%	40%	50%	10%
No. of HH - OF	154	0	0	0	0	0	0	0	0	61	77	15
Total	162	0	0	0	0	0	0	0	0	61	77	15
Accumulative	154	0	0	0	0	0	0	0	0	61	138	154
B. Beneficiaries - Traders												
OF. Rice	0											
Adoption rate	95%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
No. of HH - OF	0	0	0	0	0	0	0	0	0	0	0	0
AF. Rice	141											
Adoption rate	95%	0%	0%	0%	0%	0%	0%	0%	0%	40%	50%	10%
No. of HH - OF	134	0	0	0	0	0	0	0	0	61	77	15
Total	141	0	0	0	0	0	0	0	0	61	77	15
Accumulative	134	0	0	0	0	0	0	0	0	61	138	154
Total original financing	47700											
Total additional financing	40500											
Total	88200											
Traders	450											

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Year 20	Year 15	Year 10	
Incremental	185,200	8,302,142	26,351,590	44,934,300	65,020,096	86,674,400	103,640,118	119,644,163	135,634,778	148,155,772	154,849,266	155,941,039	155,941,039	155,941,039	155,941,039	155,941,039	155,941,039	155,941,039	155,941,039	155,941,039	155,941,039	155,941,039	155,941,039	
2025	185200	8084444	16237532	22654072	32654590	40199015	45240442	53045131	58010609	62372309	62372309	62372309	62372309	62372309	62372309	62372309	62372309	62372309	62372309	62372309	62372309	62372309	62372309	62372309
2026	0	217697	10070518	20266125	28312281	40812929	50237090	56551614	66313846	72520693	77972818	77974167	77974167	77974167	77974167	77974167	77974167	77974167	77974167	77974167	77974167	77974167	77974167	77974167
2027	0	0	43539	2014104	4053225	5662456	8162586	10047418	11310323	13262769	14504139	15594564	15594564	15594564	15594564	15594564	15594564	15594564	15594564	15594564	15594564	15594564	15594564	15594564
Incremental	28147473	52666341	48840882	43286858	39009799	42103672	45883080	49238257	51582761	55901492	60328282	61191314	61191314	61191314	61191314	61191314	61191314	61191314	61191314	61191314	61191314	61191314	61191314	61191314
2025	28147473	17482000	19951513	13976967	16550712	17921040	19344102	20577869	21024400	24476525	24476525	24476525	24476525	24476525	24476525	24476525	24476525	24476525	24476525	24476525	24476525	24476525	24476525	24476525
2026	0	35184341	21852500	24939391	17471209	20688391	22401300	24180128	25722336	26280500	30595657	30595657	30595657	30595657	30595657	30595657	30595657	30595657	30595657	30595657	30595657	30595657	30595657	30595657
2027	0	0	7036868	4370500	4987878	3494242	4137678	4480260	4836026	5144467	5256100	6119131	6119131	6119131	6119131	6119131	6119131	6119131	6119131	6119131	6119131	6119131	6119131	6119131
Investment	7548316	12580526	5032210	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2025	7548316	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2026	0	12580526	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2027	0	0	5032210	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Operation co	1132992	1100621	1003507	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2025	1132992	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2026	0	1100621	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2027	0	0	1003507	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Incremental	-36643580	-58045346	-28525009	1647442	26010297	44570728	57757038	70405907	84052016	92254279	94520984	94749726	94749726	94749726	94749726	94749726	94749726	94749726	94749726	94749726	94749726	94749726	94749726	94749726
Aggregated c	-36643580	-94688926	-123213936	-121566494	-95556197	-50985469	6771569	77177476	161229492	-123483771	348004755	442754481	537504207	632253932	727003658	821753384	916503110	1011252836	1106002561	1200752287	297798872	211814992	73417265	
	20 years	15 years	10 years																					
NPV	\$297,798,872.20	\$211,814,991.84	\$73,417,265.36																					
FIRR	28.816%	27.506%	20.59%																					
B/C	\$1.67	\$1.55	\$1.25																					
Payback period	6.88	6.88	6.88																					
FNPV/Beneficiary	7353	5230	1813																					
Switching value -	-40%	-35%	-20%																					
Switching value -	67%	55%	25%																					

Table F
Sensitivity analysis

Variables	Δ%	Overall project		Additional financing		Link with the risk matrix
		IRR (%)	NPV (USD M)	IRR (%)	NPV (USD M)	
Base scenario		29.1%	341.1	28.8%	297.8	
Project benefits	-10%	23.7%	230.9	24.9%	223.8	Combination of risks affecting output prices, yields and adoption rates
Project benefits	-20%	17.7%	120.7	20.7%	149.9	
Project costs	10%	24.7%	269.9	25.6%	256.0	Increase of construction material prices
Project costs	20%	20.5%	198.7	22.7%	214.2	
Output prices	-10%	28.8%	335.7	28.74%	296.5	Low management, negotiating capacity of farmers groups, market price fluctuation, external shocks
Output prices	-20%	28.4%	330.3	28.66%	295.1	
Input prices	10%	26.1%	298.0	26.4%	270.3	Market price fluctuations and external shocks
Input prices	20%	23.3%	254.9	24.2%	242.8	
Adoption rate (60%)		28.2%	285.5	28.2%	252.8	Quality of technical assistance and access to technologies
Adoption rate (75%)		29.5%	368.8	29.1%	320.3	
Adoption rates	-20%	27.7%	263.0	27.9%	233.5	
Evaluation period (15 years)		24.8%	155.2	27.5%	211.8	Uncertainty about the continuation of the activities supported by the project in the short, medium and/or long term
Evaluation period (10 years)		-1.1%	-35.0	20.6%	73.4	
Social discount rate (9 percent)		na	399.6	na	341.5	Linked with political and economic stability and macroeconomic context