
President's memorandum
Proposed additional financing
Republic of The Gambia
**Resilience of Organizations for Transformative
Smallholder Agriculture Project**

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Action: The Executive Board is invited to approve the recommendation for the proposed additional financing contained in paragraph 71.

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Financing summary

Initiating institution:	Ministry of Finance
Borrower/recipient:	Republic of The Gambia
Executing agency:	Ministry of Agriculture
Total project cost:	US\$80 million
Amount of original IFAD loan:	US\$4.26 million
Amount of original IFAD grant:	US\$17.02 million
Terms of original IFAD financing:	Highly concessional
Amount of additional IFAD grant:	US\$11.93 million
Terms of additional IFAD financing:	Debt Sustainability Framework
Cofinanciers:	Agence Française de Développement (AFD) Global Environment Facility (GEF) Green Climate Fund (GCF)
Amount of cofinancing:	AFD: US\$7.60 million GEF: US\$4.71 million GCF: US\$4.98 million
Terms of cofinancing:	Grants
Contribution of borrower/recipient:	US\$5.65 million
Contribution of beneficiaries:	US\$4.93 million
Financing gap remaining:	US\$18.91 million
Amount of IFAD climate finance:	US\$9.04 million

I. Background and project description

A. Background

1. The Resilience of Organizations for Transformative Smallholder Agriculture Project (ROOTS) was approved by IFAD Executive Board on 11 December 2019¹ for a six-year period. The financing agreement was signed on 27 December 2019 and entered into force on 1 March 2020 with completion and closing dates on 31 March 2026 and 30 September 2026, respectively.
2. The original financing comprised:
 - IFAD loan: US\$4.25 million
 - IFAD grant: US\$17.02 million
 - Government counterpart funding: US\$5.41 million
 - Beneficiary contribution: US\$6.25 million
3. The cofinancing partners are:
 - Global Environmental Facility (GEF): US\$4.70 million (reduced from US\$5.30 million)
 - Green Climate Fund (GCF): US\$4.98 million
 - Agence Française de Développement (AFD): US\$7.60 million (reduced from US\$11.16 million)
4. In response to the COVID-19 emergency, ROOTS also implemented activities under the Rural Poor Stimulus Facility, mobilizing a total amount of US\$0.59 million.
5. The initial financing gap was US\$20.6 million, which was expected to be partially covered by the performance-based allocation system under the Twelfth Replenishment of IFAD's Resources (IFAD12), i.e. an amount of US\$11.93 million (full IFAD grant to countries in or at high risk of debt distress). Expected financing from the OPEC Fund for International Development (OPEC Fund) in the amount of US\$10 million did not materialize due to the country's high debt risk, increasing the financing gap to US\$31.09 million.
6. In April 2023, the Government of The Gambia officially requested to utilize its IFAD12 allocation for an amount of US\$11.93 million to partially fill the financing gap. The remaining financing gap, including the IFAD12 allocation, amounts to US\$18.91 million.
7. The Ministry of Agriculture is the lead implementing agency of ROOTS. The project support unit (PSU) will be in charge of project-level coordination and oversight.

B. Original project description

8. **Goal.** The ROOTS goal is to improve the food security, nutrition and climate change resilience of smallholder farmers in The Gambia. The project development objective is to increase agricultural productivity and access to markets for enhanced food security and nutrition, and increased resilience, of family farms and farmers' organizations.
9. **Components:** ROOTS consists of three components:
 - **Component 1: Agricultural productivity and adaptation to climate change,** which is divided into two subcomponents: (i) subcomponent 1.1: infrastructure development and management; and (ii) subcomponent 2.2: agriculture services provision. The expected outcome for this component is improved smallholder farmers' productivity through the adoption of

¹ [EB 2019/128/R.33](#).

sustainable, climate-resilient and nutrition-sensitive technologies and practices.

- **Component 2: Access to markets** comprises two subcomponents: (i) subcomponent 2.1: building value chains and market linkages; and (ii) subcomponent 2.2: public-private-producer partnerships (4Ps) financing. The expected outcome for this component is to enable inclusive commercial partnerships between strengthened farmers' organizations and buyers through 4Ps.
- **Component 3: Project management, institutional development and citizen engagement.**

II. Rationale for additional financing

A. Rationale

10. The quantitative objectives initially defined for the project included a financing gap in addition to the mobilization of OPEC Fund resources to develop a large amount of irrigation infrastructure for the benefit of communities, in particular: (i) consolidate 1,300 ha of existing poorly performing tidal irrigation; (ii) develop 2,800 ha of new tidal irrigation on existing agricultural lands and 200 ha of new wet-season valley water control cascaded dykes; and (iii) develop 800 ha of new micro-catchments and run-off control dykes. In addition, the project was to provide market infrastructure and various agricultural services.
11. This additional financing will partially bridge the initial funding gap and support various community needs, such as bolstering resilience, ensuring food security, addressing environmental and social challenges and enhancing livelihoods (both incomes and productive assets).
12. The additional financing will not alter the project objectives or geographical focus areas. Some minor target adjustments may occur to accommodate increased unit costs, reflecting recent inflation trends.
13. Activities financed will be aligned with the ROOTS goal in accordance with the IFAD Strategic Framework 2016–2025, IFAD11 business model priorities and the country strategic opportunities programme (COSOP) 2019–2024. The additional financing will also be used to address key challenges in the country, such as low productivity and input supply, and will promote enhanced 4Ps, dissemination of climate-friendly production techniques, and improved food and nutrition security at household and national levels.
14. Due to significant delays, mainly due to the impact of the COVID-19 pandemic on staff recruitment and later effectiveness of the funds from the GCF, AFD and GEF, project activities have been delayed by nearly one year. To address this, a proposed extension of 24 months is being considered to ensure sufficient time for planned activities and the sustainability of sites and infrastructures. The exact extension duration will be determined during the midterm review.
15. ROOTS has supported 4,186 households so far, which is 12.5 per cent of the intended 40,000 beneficiary households. The proposed additional financing is to enable the project to reach its initial target number of beneficiaries in the intervention area. Some notable achievements include, among others:
 - **Completion of cold storage facilities.** As a pilot phase, ROOTS has supported the creation of three cold storage facilities that are to be transferred to the beneficiaries imminently.
 - **Operationalization of incomplete gardens in the National Agricultural Land and Water Management Development Project (NEMA).** By implementing best agricultural practices from farmer field schools, community vegetable gardens in Sololo, Sutukoba and Kunting Jahanka in NEMA have

significantly increased crop yields and incomes, especially for women. Dry season crops such as onions, tomatoes and peppers have seen notable improvements.

Thanks to the vegetable gardens, women have seen improved livelihoods, with better family nutrition and increased incomes. This has had a positive impact on their families' well-being and education, particularly during Ramadan.

- **Rice fields.** Memorandums of understanding have been signed with rice producers for subsidized inputs. ROOTS provided ploughing support to multiple sites. Prioritizing repairs for water irrigation systems in specific rice fields (Jahaly-Pacharr, Sukuta) and spillways (Jurunku) with additional funding is now under review.
 - **Gender Action Learning System (GALS) and social inclusion.** Notably, the GALS programme has expanded to 19 new sites since February 2023, bringing the total to 31 project sites following the change catalyst workshop. A dedicated group of GALS champions has emerged. While the vision journey aspect demands effort, participants now confidently establish their vision journey and gender balance tree. All beneficiaries report positive outcomes, including shared responsibilities and enhanced family and community cohesion. The adult literacy programme in ROOTS has improved literacy and numerical skills, yet further efforts are needed to empower beneficiaries for sustainable economic goals. Overall, both GALS and adult literacy initiatives show promise for making a significant impact.
 - **Public-private-producer partnerships and youth business matching grants.** The progress noted so far includes establishment and operationalization of three vegetable agricultural value chain interaction platforms; support was provided by the 4Ps team to complete the first cycle of 40 matching grants for rural youth entrepreneurs and begin the next batch selection.
16. IFAD is fully committed, in accordance with the financing agreement, to take all necessary measures to ensure the success of ROOTS.
- Special aspects relating to IFAD's corporate mainstreaming priorities**
17. In line with IFAD's mainstreaming commitments, ROOTS has been validated as:
- Including climate finance
 - Gender-transformational
 - Nutrition-sensitive
 - Youth-sensitive Prioritizing persons with disabilities
- Gender**
18. According to the 2022 Gender Inequality Index, The Gambia ranks 121st out of 159 countries in terms of gender equality. Despite making up 70 per cent of the agricultural labour force, women have limited control over their land, incomes and access to credit, making them vulnerable to the impacts of climate change. Women farmers also face a heavier workload compared to men.
19. To address these challenges, ROOTS will provide targeted support for the Government's gender equality and women's empowerment policies. This will include expanding gender-sensitive programmes such as GALS training, which is intended to enhance women's skills, knowledge and leadership abilities. Additionally, efforts will be made to raise awareness and provide training to promote men's involvement in advancing gender equality (i.e. to increase men's

participation in household-related tasks and sustain progress in decision-making at various levels).

Youth

20. Most of The Gambia's population is young, with 40 per cent below 15 years old and 25 per cent aged between 15 and 25. The country faces significant youth migration, both from rural to urban areas and overseas emigration, necessitating attention to population dynamics.
21. Youth suffer disproportionately from poverty, particularly in rural regions. ROOTS is dedicated to ensuring youth representation at all decision-making levels. It places strong emphasis on involving young people in programme activities using strategies such as awareness campaigns and the formation of youth groups. ROOTS also works to empower youth leaders and provide targeted support for youth-led small and medium-sized enterprises, including access to financial resources and business development services.
22. Furthermore, ROOTS will promote the active involvement of young people in decision-making bodies and committees. Through these measures, ROOTS seeks to uplift youth in The Gambia and create a more inclusive and supportive environment for their growth and development.

Nutrition

23. The Gambia faces severe poverty and limited social services, resulting in poor nutrition and food insecurity. In the 2022 Global Hunger Index, it ranks 87th out of 121 countries, indicating a serious hunger problem. Stunting and wasting rates are alarmingly high at 18.6 per cent and 9.2 per cent respectively, pushing the nation towards a nutrition crisis.
24. To tackle these issues, the project aims to boost agricultural productivity and market access. Its main objective is to improve food security, nutrition and the resilience of small-scale farmers to climate change. This project should increase food availability in local markets, enhance food quality and ultimately benefit rural communities. The goal is to alleviate the current crisis and create a healthier, more prosperous future for The Gambia's people.

Climate and environment

25. Based on the ND-GAIN Index,² The Gambia is ranked as the 33rd most vulnerable country and the 142nd most prepared country. The nation faces significant susceptibility to the impacts of climate change on rainfall, droughts, floods and temperature.
26. Since 1960, mean temperatures have risen by 1°C, increasing at 0.21°C per decade, with late-year months warming fastest at 0.32°C per decade. Future increases could reach 2.1°C by 2050 and up to 3.9°C by 2100, severely impacting the country's interior. Rainfall may drop to 54 per cent by 2100, while sea levels could rise 20 per cent above the global average, between 26 cm and 98 cm.
27. Climate change poses a threat to agriculture, forestry and fisheries in rural development sectors. The Gambia also contends with deforestation, soil erosion and other environmental issues. Forest cover has dropped significantly since the early 1980s, with mangroves being halved (from 67,000 ha to 35,700 ha). At the current rate, over half of the existing forests could vanish by 2100.
28. The Gambia is working to foster sustainable forest and land management and pursue climate-resilient initiatives to safeguard its environment and crucial sectors from climate change impacts.

² Notre Dame Global Adaptation Initiative.

B. Description of geographical area and target groups

29. **Target group.** ROOTS targets smallholder farmers, microentrepreneurs, impoverished rural youth and women. The project will benefit 40,000 households or 320,000 individuals, which is about 10 per cent of the country's total population. Notably, 80 per cent of the beneficiaries are women, and 25 per cent are youth. The project also aims to include individuals with disabilities.
30. **Intervention area.** ROOTS focuses on rice and horticulture value chains, implementing its initiatives across all five regions of The Gambia: Central River Region, North Bank Region, Lower River Region, Upper River Region and West Coast Region. The project will engage with 39 districts within these regions for its interventions.

C. Components, outcomes and activities

31. The PSU, the National Coordinating Organization for Farmers Associations in The Gambia and various implementing partners reached a consensus on the areas that would benefit from the additional financing. The decision considered two key factors: (i) the priority value chains promoted by ROOTS, which include rice cultivation and vegetable gardens; and (ii) the importance of giving precedence to activities cofinanced with AFD to prevent any unnecessary delays in their implementation. The identified areas are:
- Vegetable gardens;
 - Market access;
 - Cold storage facility for isolated communities;
 - Land development, and rehabilitation work in the irrigation schemes; and
 - Input support for rice production.
32. ROOTS consist of three main components:
- **Component 1: Agricultural productivity and adaptation to climate change**, which is divided into two subcomponents: (i) subcomponent 1.1: infrastructure development and management; and (ii) subcomponent 2.2: agriculture services provision.
 - The expected outcome for this component is improved smallholder farmers' productivity through the adoption of sustainable and climate-resilient and nutrition-sensitive technologies and practices.
 - **Component 2: Access to markets** comprises two subcomponents: (i) subcomponent 2.1: building value chains and market linkages; and (ii) subcomponent 2.2: 4Ps financing.
 - The expected outcome for this component is to enable inclusive commercial partnerships between strengthened farmers' organizations and buyers through 4Ps.
 - **Component 3: Project management, institutional development and citizen engagement**

D. Costs, benefits and financing

Project cost

33. The total cost of ROOTS is maintained at US\$80 million, including contingencies, taxes and customs duties. Considering current financing, the initial total project costs (US\$80 million) included a financing gap of US\$31.09 million, partially covered by the proposed additional financing under IFAD12 resources. The remaining financing gap, including the additional contribution from the Government, is estimated at approximately US\$18.91 million. Table 1 summarizes the original and additional financing.

34. The project budget of US\$80 million remains unchanged, but with some adjustments affecting the project components, as outlined below:
- (i) Infrastructure-related unit costs have slightly increased due to inflation since the project's design phase, resulting in higher expenses for component 1.
 - (ii) Cost estimates have been aligned with financing agreements from AFD, GCF, GEF, and approved activities, influencing the composition of project components.
 - (iii) Additional funding has led to higher coordination costs during the extended period, currently at 12 per cent, below the IFAD threshold of 15 per cent.

Financing by components

35. The project costs by component are: (i) component 1: US\$55.9 million (69.8 per cent of project base costs); (ii) component 2: US\$14.6 million (equivalent to 18.3 per cent of the project costs) and (iii) component 3: US\$9.5 million (11.9 per cent of the project cost).
36. **IFAD additional financing by component.** Component 1 will receive an additional amount of US\$9.19 million (77 per cent of IFAD additional financing), allocated as follows: subcomponent 1.1: US\$6.35 million to support the promotion of new vegetable gardens and tidal irrigation consolidation; and subcomponent 1.2: US\$2.84 million to improve funding for agricultural production techniques and youth-based services. Component 2 will account for an additional amount of US\$0.91 million in support of building value chains and market linkages, and 4Ps financing (7.7 per cent of IFAD additional financing) and component 3 will receive US\$1.82 million (15.3 per cent of IFAD additional financing).

Table 1

Original and additional financing summary

(Thousands of United States dollars)

	<i>Original financing (a)*</i>	<i>Additional financing (b)**</i>	<i>Total (a+b)</i>
IFAD grant	17 020	11 930	28 950
IFAD loan	4 255		4 255
AFD	7 600		7 600
GEF	4 708		4 708
GCF	4 980		4 980
Government	5 412	242	5 654
Beneficiaries	4 933		4 933
Financing gap		18 919	18 919
Total	48 909	31 091	80 000

* Currently mobilized from the US\$80 million initial total cost at the project design.

** Current financing gap.

Table 2

Additional financing: project costs by component (and subcomponent) and financier

(Thousands of United States dollars)

<i>Components/subcomponents</i>	<i>Total original gap</i>		<i>IFAD grant additional financing</i>		<i>Government contribution in kind</i>		<i>Balance financing gap</i>	
	<i>Amount</i>	<i>%</i>	<i>Amount</i>	<i>%</i>	<i>Amount</i>	<i>%</i>	<i>Amount</i>	<i>%</i>
1. Agricultural productivity and adaptation to climate change								
1.1. Infrastructure development and management	18 006	58	6 350	35	232	1	11 424	64
1.2. Agricultural services provision	3 085	10	2 842	92	10	0	233	8
Subtotal	21 091	68	9 192	44	242	1	11 657	55
2. Access to markets								
2.1 Building value chains and market linkages	4 375	14	550	13	-	-	3 825	87
2.2. 4Ps financing	3 161	10	360	11	-	-	2 801	89
Subtotal	7 536	24	910	12	-	-	6 620	88
3. Project management, institutional development and citizen engagement	2 464	8	1 828	74	-	-	636	26
Total	31 091	100	11 930	38	242	1	18 919	61

Table 3
Additional financing: project costs by expenditure category and financier
(Thousands of United States dollars)

Expenditure category	Total original gap		IFAD grant additional financing		Government contribution in kind		Balance financing gap	
	Amount	%	Amount	%	Amount	%	Amount	%
I. Consulting services	3 070	10	1 175	38	-	-	1 895	62
II. Goods and services and inputs	2 553	8	2 066	81	48	2	439	17
III. Works	18 148	58	3 385	19	194	1	14 569	80
IV. Grants and subsidies	5 145	17	3 690	72	-	-	1 455	28
V. Salaries and allowances	2 175	7	1 614	74	-	-	561	26
Total	31 091	100	11 930	38	242	1	18 919	61

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

Components/subcomponents	2020		2021		2022		2023		2024		2025		2026		Total	
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
1. Agricultural productivity and adaptation to climate change																
1.1. Infrastructure development and management	35	0	21	0	1 153	3	5 107	12	17 661	41	15 666	36	3 919	9	43 562	54
1.2. Agricultural services provision	-	-	115	1	269	2	2 674	22	4 057	33	3 638	30	1 531	12	12 284	15
Subtotal	35	0	136	0	1 421	3	7 782	14	21 719	39	19 304	35	5 450	10	55 846	69.8
2. Access to markets																
2.1. Building value chains and market linkages	-	-	138	2	499	6	951	12	2 556	33	2 075	27	1 541	20	7 760	10
2.2. 4Ps financing	-	-	46	1	160	2	1 090	16	2 954	43	2 545	37	68	1	6 863	9
Subtotal	-	-	184	1	659	5	2 041	14	5 510	38	4 620	32	1 609	11	14 623	18.3
3. Project management, institutional development and citizen engagement	752	8	1 221	13	1 134	12	1 499	16	1 681	18	1 713	18	1 531	16	9 531	11.9
Total	787	1	1 540	2	3 214	4	11 322	14	28 910	36	25 637	32	8 591	11	80 000	100

Financing and cofinancing strategy and plan

37. ROOTS was approved in December 2019 with a total cost for about GMD 4 billion, equivalent to US\$80 million. The initial financing plan included: (i) a loan under IFAD11 for US\$4.25 million (5.3 per cent) with a US\$0.70 million allocation under the Faster Implementation of Project Start-up facility; (ii) an IFAD grant for US\$17.02 million (21.3 per cent); (iii) GEF financing for US\$5.30 million (6.6 per cent); (iv) an OPEC Fund loan for US\$10 million (12.5 per cent); (v) AFD financing for US\$11.16 million (14.0 per cent); (vi) a contribution from the Government of The Gambia for US\$5.41 million in the form of tax exemptions (6.8 per cent); (vii) contributions from beneficiaries for US\$6.25 million (7.8 per cent); and (viii) a financing gap estimated initially at US\$20.60 million (25.7 per cent of the project costs) potentially to be covered by the IFAD12 allocation or other financiers to be identified. The total amount of IFAD climate finance for this project is estimated at US\$9.04 million, representing 75.7 per cent of IFAD's total project costs.
38. The OPEC Fund resources did not materialize, enlarging the financing gap for the infrastructure to about US\$31.09 million. The IFAD additional financing reduced this to US\$18.91 million. Efforts to bridge the remaining gap include potential funding from the Islamic Development Bank (IsDB), the Global Agriculture and Food Security Program (GAFSP), the Arab Bank for Economic Development in Africa (BADEA), the OPEC Fund and other international partners, recognizing ROOTS as vital to Gambian agriculture. The most recent supervision mission re-emphasized the need for the Ministries of Agriculture and Finance to lead in partnering with IsDB, BADEA and GAFSP to fill the ROOTS financial shortfall.
39. Due to COVID-19-related staffing delays affecting GCF, AFD and GEF funds utilization, a 12-month extension for project activities has been recommended to maintain site and infrastructure sustainability. The exact duration will be set at the time of the midterm review, allowing project scope adjustments to align with funding and cost changes.

Disbursement

40. The disbursement and procurement procedures for this additional financing will remain consistent with those specified in the original financing agreement.
41. IFAD provides funds via a designated United States dollar account at The Gambia's Central Bank. The project is required to submit a quarterly interim financial report (IFR) to IFAD, forecasting cash needs for the upcoming two quarters. Disbursements will depend on these IFRs, with the borrower/recipient's letter being updated to reflect IFR-based disbursement conditions.
42. As of 31 August 2023, IFAD's total disbursement on the loan and grant approved for the financing of ROOTS amounted to US\$12.63 million from total financing of US\$21.3 million. This translates into a disbursement performance rate of 59.39 per cent.

Summary of benefits and economic analysis

43. Overall, ROOTS is a moderately viable project, generating a net present value at a 6 per cent discount rate of US\$23.1 million and an economic internal rate of return of 14.2 per cent (on a total budget of US\$80.0 million, US\$33.2 million of which is funded by IFAD), without taking into account any of the environmental benefits. The full economic potential of the project, once the projected greenhouse gas mitigation is valued appropriately, is much higher. Using the average of the lower and higher estimates for the social cost of carbon published by the World Bank,³ ROOTS would generate a net present value of US\$47.7 million and an economic internal rate of return of 21.2 per cent.

³ World Bank guidance note on shadow price of carbon in economic analysis September 2017.

44. The results are robust under various conditions, including delays, lesser benefits, varying adoption levels and increased costs. They are conservative estimates, acknowledging uncertainties in the project's impact on nutrition, health, migration patterns and local production of rice and agricultural products. The project's vulnerability to a yield reduction of more than 30 per cent is significant. Detailed financial models and economic analyses are provided in appendix II.

Exit strategy and sustainability

45. As indicated in the initial ROOTS design, sustainability will be ensured through:
- (i) Ensuring financial and economic profitability of proposed investments;
 - (ii) Strengthening public institutions;
 - (iii) Enhancing the capacity of youth training institutions, focusing on promoting youth and women's leadership; and
 - (iv) Empowering and enabling autonomous farmers' organizations, fostering a sense of ownership within communities, and enhancing their operation and maintenance capabilities.

III. Risk management

A. Risks and mitigation measures

46. The mitigation measures designed and implemented during this stage have effectively reduced the likelihood of known risks. However, it is crucial to consider new risks and apply appropriate strategies to ensure the project continues smoothly.
47. In the following summary, the key project risks and their corresponding mitigation measures are presented.

Table 4
Project risks and mitigation measures

<i>Risks</i>	<i>Risk rating</i>	<i>Mitigation measures</i>
Political/ governance	Moderate	Engage in joint participation with other technical and financial partners in policy dialogue.
Macroeconomic	Moderate	<ul style="list-style-type: none"> • The International Monetary Fund will effectively monitor and support economic and financial policies, focusing on debt sustainability and fiscal discipline. • Clearly define conditions for tax exemption during project negotiations.
Sector strategies and policies	Medium	<ul style="list-style-type: none"> • IFAD will actively participate in policy dialogue and policymaking to provide support. • Strengthen policymaking capacities at the Ministry of Agriculture. • Allow project implementation flexibility at midterm to revisit sectoral priorities.
Institutional capacity	High	<ul style="list-style-type: none"> • Train trainers and enhance capacity and mobility. • Update organizational structure and expand roles. • Facilitate dialogue and training for inclusive business partnerships (4Ps).
Fiduciary - financial management	Moderate	<ul style="list-style-type: none"> • Regularly review the financial management team's size and skills to match relevant tasks and cofinancing outcomes. • Update the financial and administrative procedures manual with a schedule for creating, checking and sending annual workplans and budgets (AWPBs) to IFAD, with financial management activity instructions. • Ensure the project director's authorization for staff to approve goods or services is properly recorded. • Automate the project's IFR and disbursement processes. • Update the terms of reference for external audits to reflect new IFAD standards.
Fiduciary – procurement	Moderate	<ul style="list-style-type: none"> • Ensure appropriate staff are in place within the PSU. • Seek international technical assistance and delegated contract management as needed.
Environment and climate	High (climate); Medium (environment)	<ul style="list-style-type: none"> • Introduce climate-resilient technologies and practices such as adapted seeds, agroforestry, integrated soil fertility, anti-salinization and anti-erosion works.
Overall	Moderate	<ul style="list-style-type: none"> • IFAD's expertise in The Gambia and risk management, coupled with lessons from current projects and stakeholder relations at the IFAD Country Office, will mitigate risks for the new project.

B. Environment and social category

48. During ROOTS design, the Social, Environmental and Climate Assessment Procedures (SECAP) note in 2017 classified ROOTS under category B, signifying limited and manageable environmental and social impacts. The additional financing strives for sustainable environment and resource management, prioritizing avoidance of activities with high harm potential.
49. Key risks include governance issues, institutional, technical and organizational capacity gaps, and service provider limitations in infrastructure implementation, as well as the risk of excluding vulnerable groups.
50. To mitigate these risks, an inclusive environmental and social management plan will be integrated into the environmental, climate and social impact assessment study. This plan will propose measures to address identified risks, aligning with SECAP requirements and national guidelines set by the National Environment Agency.

C. Climate risk classification

51. The climate risk assessment has classified the situation as high. The communities that depend on natural resources for their livelihoods engage in climate-sensitive activities. The country faces significant climate hazards, including flooding, water scarcity, extreme heat and wildfires. Various studies indicate that these factors will have a detrimental impact on the productivity of major crops (maize, sorghum, millet and groundnut), which are crucial for the well-being of rural households.
52. Certain regions are more vulnerable than others, particularly the western and lower-central areas facing challenges such as salinity problems and sea level rise. To support adaptation and climate-resilient production systems, specific additional financing activities have been planned.
53. Considering the high-risk classification, it is essential to conduct a comprehensive climate risk analysis to better understand the potential implications and develop appropriate strategies.

IV. Implementation

A. Compliance with IFAD policies

54. There will be no alterations to the original design of ROOTS. The project will still be aligned with various Sustainable Development Goals (SDGs 1, 2, 5, 8, 9, 13 and 15).
55. The project is consistent with both the IFAD Strategic Framework 2016-2025 and IFAD's Strategy and Action Plan on Environment and Climate Change 2019-2025. The COSOP for the period 2019-2024 is primarily carried out through ROOTS.
56. The project will be in accordance with all IFAD-related sector policies.

B. Organizational framework Management and coordination

57. The plan involves a decentralized PSU in Banjul, with a regional field coordinator in each of the five ROOTS-covered regions. The Ministry of Agriculture will oversee the project through the central project coordination unit (CPCU) and a national steering committee (NSC), representing diverse stakeholders from public, private and civil society. The NSC will oversee project implementation and offer strategic guidance.

Financial management, procurement and governance

58. The current ROOTS implementation arrangements will remain unchanged, with financial and procurement management following the financing agreement and updated project procurement arrangement.

59. The Ministry of Agriculture will maintain an inclusive oversight structure to coordinate government agencies and stakeholders effectively and oversee project implementation under a project director, assisted by the NSC and the CPCU.
60. The NSC will continue to approve AWPBs and project reports, and offer overall policy and strategic guidance at the national level.
61. The PSU will manage daily operations, procurement, monitoring and evaluation (M&E) and reporting. It will develop environmental and social safeguards frameworks. Additionally, a new accountant and experienced internal auditor have joined the financial team.
62. The financial management procedures are detailed in the project's financial and accounting management document, ensuring IFAD's fiduciary objective of efficient fund utilization to achieve the project development objective. IFAD will use a risk-based approach, including prior and post reviews, and supervision and support missions. Top 10 fraud and corruption red flags are displayed in the PSU conference room, and IFAD's Policy on Preventing Fraud and Corruption in its Activities and Operations is incorporated into contracts with third parties and outlined in the finance and administrative procedures manual with links to the IFAD system.

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

63. **Planning, and monitoring and evaluation.** ROOTS aims to enhance its planning and M&E processes. This involves improving the generation and processing of project-related information and achieving specific results. Project staff and partners will receive training in M&E tasks, with a focus on involving beneficiaries in the process.
64. An outcome survey will track progress and pathways to project outcomes, while the midterm review will assess performance and identify measures to ensure key results are achieved. ROOTS will maintain a consultative and interactive approach to developing and submitting AWPBs on time for timely implementation.
65. **Learning, knowledge management and strategic communications.** ROOTS will align with its knowledge management and communication strategy, ensuring the identification, processing and documentation of experiences, lessons and successes to promote learning and visibility. Quarterly knowledge product stories will highlight key achievements, successes and innovations.
66. The project will utilize suitable channels to disseminate information to all stakeholders. The additional financing will help train project personnel and implementation partners in knowledge management and communication, emphasizing the sharing of experiences and lessons learned during project implementation.

D. Proposed amendments to the financing agreement

67. An amendment to the original financing agreement between the Republic of The Gambia and IFAD will be made to reflect the additional financing.

V. Legal instruments and authority

68. A financing agreement between the Republic of The Gambia 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.
69. The Republic of The Gambia is empowered under its laws to receive financing from IFAD.
70. 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

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

RESOLVED: that the Fund shall provide a Debt Sustainability Framework grant to the Government of the Republic of The Gambia in an amount of eleven million nine hundred and thirty thousand United States dollars (US\$11,930,000) 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				Updated End Target	Means of Verification			Assumptions
	Name	Baseline	Mid-Term	End Target		Source	Frequency	Responsibility	
Outreach ROOTS	1.b Estimated corresponding total number of households members					Project Progress Report	Baseline, Mid-term	Completion PSU	Stable political and macro- economic environment. No major natural disaster affects the Project Area
	Household members - Number of people	0	240,000	320,000	320,000				
	1.a Corresponding number of households reached								
	Total Households	0	30,000	40,000	40,000				
	Women-headed households - Households	0	4800	6400	6400				
	Non-women-headed households - Households	0	25200	33600	33600				
	1 Persons receiving services promoted or supported by the project								
	Total Persons Receiving Services	0	20000	40000	40000				
	Females - Females	0	16000	32000	32000				
	Males - Males	0	4000	8000	8000				
	Young - Young people	0	5000	10000	10000				
	People with Disability (PwD)	0							
	Non-Indigenous people - Number								
Project Goal To improve food security, nutrition and smallholder farmers' resilience to climate change in The Gambia	Targeted households with improved food security					Surveys	Baseline, Mid-term, Completion	GoTG, IFAD	Stable political and macro- economic environment. No major natural disaster affects the Project Area
	targeted households - Percentage (%)	0	25	50	50				
	People with greater resilience including people with Disabilities								
	People with greater resilience - men - Number of people	0	4000	8000	8000				
People with greater resilience - women - Number of people	0	16000	32000	32000		Surveys	Baseline, Mid-term, Completion	GoTG, IFAD	Stable political and macro- economic environment. No major natural

Results Hierarchy	Indicators				Updated End Target	Means of Verification			Assumptions
	Name	Baseline	Mid-Term	End Target		Source	Frequency	Responsibility	
	People with greater resilience - young - Number	0	5000	10000	10000				disaster affects the Project Area
Development Objective To increase agricultural productivity and access to markets for enhanced food security, nutrition and resilience of family farms and farmers organizations	Households reporting an improved access to markets and a 30% income increase								
	Households with improved access to market - Percentage (%)	0	25	50	50	Surveys	Baseline, Mid-term, Completion	PSU	Stable political and macro-economic environment. No major natural disaster affects the Project Area
	Yields								
	Rice, non-SRI, tidal - Area (Kg/ha)	1600	3600	3600	3600	Surveys	Baseline, Mid-term, Completion	PSU	
	Tomatoes - Area (kg/ha)	9600	12600	12600	12600				
	Onions - Area (kg/ha)	14400	19800	19800	19800				
	% of ROOTS supported beneficiaries (smallholder farmers, processors and marketers) that have increased their real agricultural income (by average 25%)								
	Women - Percentage (%)	0	40	80	80	Surveys	Baseline, Mid-term, Completion	PSU	
	Men - Percentage (%)	0	10	20	20				
	Disabled - Percentage (%)	0	5	10	10				
	Young people - Percentage (%)	0	15	25	25				
	% Reduction in the prevalence of child malnutrition (stunting, wasting, underweight)								
	stunting - Percentage (%)	0	5	10	10	Surveys	Baseline, Mid-term, Completion	PSU/NaNA	
	wasting - Percentage (%)	0	10	20	20				
	underweight - Percentage (%)	0	15	30	30				
1.2.8 Women reporting minimum dietary diversity (MDDW)									
Women (%) - Percentage (%)	0	25	50	50	Surveys	Baseline, Mid-term, Completion	PSU/NaNA		
Women (number) - Females	0	16000	32000	32000					

Results Hierarchy	Indicators				Updated End Target	Means of Verification			Assumptions
	Name	Baseline	Mid-Term	End Target		Source	Frequency	Responsibility	
	Households (%) - Percentage (%)	0	25	50	50				
	Households (number) - Households	0	16000	32000	32000				
	Household members - Number of people	0	128000	256000	256000				
Outcome	3.2.2 Households reporting adoption of environmentally sustainable and climate-resilient technologies and practices								
1. Environmentally sustainable, climate-resilient and nutrition sensitive technologies and practices are adopted by beneficiaries Environmentally sustainable, climate-resilient and nutrition sensitive technologies and practices are adopted by beneficiaries	Households - Percentage (%)	0	30	75	75	Surveys	Baseline, Mid-term, Completion	PSU	
	Total number of household members - Number of people	0	10000	30000	30000				
	Males - Males	0	2000	6000	6000				
	Females - Females	0	8000	24000	24000				
	Young - Young people	0	2500	7500	7500				
	3.2.1 Greenhouse gas emissions (CO2) avoided and/or sequestered								
	Number of tons - translation missing: en.logframe.multiplier.unit.name.tons	0	??	-136475	-136475				
	3.2.3 Households reporting a significant reduction in the time spent for collecting water or fuel								
	Households - Percentage (%)	0				Surveys	Baseline, Mid-term, Completion	PSU	
	Households – Households	0							
Total household members - Number of people	0								
Males – Males	0								
Females – Females	0								
Young - Young people	0								
Not Young – Number	0								
Output	3.1.4 Land brought under climate-resilient practices								
1.1 Natural resources are sustainably	Hectares of land - Area (ha)	0	3000	5900	3800	Progress reports	Annual	PSU	

Results Hierarchy	Indicators				Updated End Target	Means of Verification			Assumptions
	Name	Baseline	Mid-Term	End Target		Source	Frequency	Responsibility	
managed for rice and vegetable production	Upgraded women-led vegetable gardens (consolidated and new)								
	Upgraded Women-led vegetable gardens - Number	0	20	40	40	Progress reports	Annual	PSU	
	New Women-led vegetable gardens - Number	0	15	30	30				
Output 1.2 Access to agricultural services is improved	1.1.4 Persons trained in production practices and/or technologies								
	Men trained in crop - Males	0	2628	4610	4610	Progress reports	Annual	PSU	
	Women trained in crop - Females	0	10511	18440	18440				
	Young people trained in crop - Young people	0	1441	5763	5763				
	PwD		1314	2305	2305				
	Total persons trained in crop - Number of people	0	14830	23050	23050				
	1.1.3 Rural producers accessing production inputs and/or technological packages								
	Females – Females	0	4800	8000	8000	Progress reports	Annual	PSU	
	Males – Males	0	1200	2000	2000				
	Young - Young people	0	1500	2500	2500				
	Total rural producers - Number of people	0	6000	10000	10000				
	Jobs created (100% youth-led agricultural service businesses)								
	Jobs – Number	0	200	480	240	Progress Reports	Annual	PSU	
	1.1.8 Households provided with targeted support to improve their nutrition								
	Total persons participating - Number of people	0	3000	7000	7000	Progress Reports	Annual	PSU	
	Males – Males	0	600	1400	1400				
	Females – Females	0	2400	5600	5600				
	Household members benefitted - Number of people	0	25000	56000	56000				

Results Hierarchy	Indicators					Means of Verification			Assumptions
	Name	Baseline	Mid-Term	End Target	Updated End Target	Source	Frequency	Responsibility	
Output 1.3 Forest and land resources are sustainably managed (GEF)	Community Institutional development plans developed and implemented - Number				4	Progress Reports	Annual	PSU	
	Households promoting integrated water and SM practices -Number				700				
	Area of integrated water and SM practices -Ha				1500				
	Area under natural assisted regeneration - Ha				10,000				
	woodlots integrated into sustainable wood and biomass energy-Ha				1000				
	Community agroforestry area-Ha				5000				
	Area under integrated crop livestock systems-Ha				2000				
	Area with participatory SLM plans - Ha				15,000				
	Jambar cooking stoves distributed - Number				1,000				
Outcome 2. Inclusive commercial partnerships between FOs and buyers (through the public-private producers' partnerships/4Ps) are established	2.2.3 Rural producers' organizations engaged in formal partnerships/agreements or contracts with public or private entities								
	Number of POs - Organizations	0	40	60	60	Surveys	Baseline, Mid-term, Completion	PSU	
	Women in leadership position - Females	0	80	120	120				
Output 2.1 Women- and youth-based FOs are equipped with the knowledge and bargaining power to enter into inclusive and sustainable 4Ps	Effective agricultural value chain interaction platforms (AVIPs)								
	Value chain platforms - Number	0	12	12	12	Progress reports	Annual	PSU	
	2.1.6 Market, processing or storage facilities constructed or rehabilitated								
	Market facilities constructed/rehabilitated - Facilities	0	2	4	4	Progress reports	Annual	PSU	
	Processing facilities constructed/rehabilitated - Facilities	0	2	4	2				

Results Hierarchy	Indicators				Updated End Target	Means of Verification			Assumptions
	Name	Baseline	Mid-Term	End Target		Source	Frequency	Responsibility	
	Storage facilities constructed/rehabilitated - Facilities	0	2	4		15			
Output 2.2 Viable and sustainable 4P business plans are designed and financed	SMEs engaged in 4Ps								
SME - Number	0	10	20		Progress reports	Annual	PSU		
Youth led enterprises	Number YLE	0	6	12	240	Progress reports	Annual	PSU	
C3									
3.2 Number of agricultural policy reforms and investment plans	Number		2	4	4	Progress reports	Annual	PSU	

Part 1: Updated summary of the economic and financial analysis

Financial cash-flow models

A)		Activities												
FINANCIAL ANALYSIS		Irrigated tidal rice non-SRI (1 ha)		Irrigated tidal rice SRI (1 ha)		Rain fed tidal zone rice (1 ha)	Rain fed lowland rice (1 ha)	Upgraded vegetable garden	New vegetable garden	Poultry - broiler	Poultry - layer	Youth-led agribusiness	Coop agribusiness/FO	SME agribusiness
		Rehabilitated	New	Rehabilitated	New	Existing	Existing	Existing	New	New	New	New	New	New
	PY1	24,779	30,321	75,628	81,338	6,767	7,137	(1,326,616)	(5,680,727)	19,755	(33,615)	(330,000)	(2,250,000)	(9,000,000)
	PY2	34,298	39,840	90,334	96,044	9,584	9,954	474,200	1,180,016	340,689	387,278	55,000	400,000	1,750,000
	PY3	41,206	46,748	105,145	110,855	11,123	11,493	525,016	1,290,758	409,590	460,055	65,000	600,000	2,250,000
	PY4	42,101	47,643	105,345	111,055	11,643	12,013	525,016	1,290,758	409,590	481,430	75,000	600,000	3,000,000
	PY5	40,708	46,250	104,746	110,456	10,992	11,362	525,016	1,290,758	409,590	481,430	75,000	600,000	3,000,000
	PY6	41,988	47,530	103,823	109,533	11,613	11,983	525,016	1,290,758	409,590	481,430	75,000	600,000	3,000,000
	PY7	40,765	46,307	102,760	108,470	11,007	11,377	525,016	1,290,758	409,590	481,430	75,000	600,000	3,000,000
	PY8	41,761	47,303	101,504	107,214	11,553	11,923	525,016	1,290,758	409,590	481,430	75,000	600,000	3,000,000
PY9	39,998	45,540	99,856	105,566	10,743	11,113	525,016	1,290,758	409,590	481,430	75,000	600,000	3,000,000	
PY10	40,717	46,259	99,916	105,626	11,194	11,564	525,016	1,290,758	409,590	481,430	75,000	600,000	3,000,000	
NPV (Local curr.)	255,386	292,573	656,120	694,434	69,892	72,374	1,764,860	2,111,069	2,328,352	2,655,853	103,171	1,215,692	7,352,085	
NPV (USD)	5,108	5,851	13,122	13,889	1,398	1,447	35,297	42,221	46,567	53,117	2,063	24,314	147,042	
FIRR (@8%)	N/A	N/A	N/A	N/A	N/A	N/A	38%	22%	N/A	N/A	15%	20%	25%	
B/C ratio	1.90	1.90	2.50	2.50	1.30	1.40	2.60	2.20	1.46	1.44	1.18	1.86	1.49	

Table B: Project costs and log-frame indicators

B)						
PROJECT COSTS AND INDICATORS FOR LOGFRAME						
TOTAL PROJECT COSTS (in million USD)		80	Base costs	72.3	PMU	9.5
Beneficiaries		320,000 people		40,000 Households		
Cost per beneficiary		250 USD x person		2,000 USD x HH		Adoption rates
Components and Cost (USD million)		Outcomes				100%
<u>Agriculture Productivity and Adaptation to Climate Change</u>	55.8	Outcome 1: Environmentally sustainable, climate-resilient and nutrition sensitive technologies and practices are adopted by beneficiaries Outcome 2: Inclusive commercial partnerships between FOs and buyers (through the public-private producers' partnerships/4Ps) are established				
<u>Access to Markets</u>	14.6					
<u>Project Management and Coordination</u>	9.5					

Table C: Main assumptions and shadow prices

c)		MAIN ASSUMPTIONS & SHADOW PRICES ¹			
FINANCIAL	Output	Av. Increm. Yields (%)	Price (in LC)	Input prices	Price (LC)
	Rice (paddy)	100%	21	NPK (15-15-15)	28
	Rice (milled)	100%	30	Urea (46%)	28
	Tomato	33%	23	Compost	1
	Bitter tomato	33%	30	Rice seed (local)	16
	Onion	33%	30	Rice seed (improved)	24
	Cabbage	33%	30	Land preparation	2,500
	Eggplant	33%	40	Rice milling	50
	Chili pepper	33%	100	Rice bag	50
ECONOMIC	Official Exchange rate (OER)	50		Discount rate (opportunity cost of capital)	8%
	Shadow Exchange rate (SER)	52		Social Discount rate	6%
	Standard Conversion Factor	1.03		Output conversion factor	1.19
	Labour Conversion factor	0.80		Input Conversion factor	0.58

Table D: Beneficiary adoption rates and phasing

d)		BENEFICIARIES, ADOPTION RATES AND PHASING						
	Benef. HH	1	2	3	4	5	6	7
Rice producers	10,500	0	0	0	1,080	5,712	3,708	900
Irrigated tidal rice non-SRI & SRI	8,400	0	0	0	0	3,792	3,708	900
Rain fed tidal zone rice	2,400	0	0	0	960	1,440	0	0
Rain fed lowland rice	600	0	0	0	120	480	0	0
Vegetable producers	13,400	0	0	760	6,400	3,900	2,340	0
Upgraded gardens	10,400	0	0	260	5,200	2,600	2,340	0
New gardens	3,000	0	0	500	1,200	1,300	0	0
Youth-led agribusinesses	240	0	0	0	100	80	60	0
Coop agribusiness/FO	3,000	0	0	0	800	1,000	1,200	0
SME agribusiness	1,500	0	0	0	400	600	500	0
Sustainable Forest and Land Management (SFLM)	6,500				117	2,750	2,683	950
Other beneficiaries from market access	4,860	0	0	500	800	1,200	1,360	1,000
Total Households	40,000							
Household members - Number of people	320,000							

Table E: Overall Economic Analysis

E)		NET INCREMENTAL BENEFITS (GMD)											Cashflow (USD)		
E C O N O M I C A N A L Y S I S		Irrigated tidal rice non-SRI	Irrigated tidal rice SRI	Rain fed tidal zone rice	Rain fed lowland rice	Upgraded vegetable garden	New vegetable garden	Poultry - broiler	Poultry - layer	Youth-led agribusiness	Coop agribusiness/F O	SME agribusiness	Total Incremental Costs	Total Incremental Benefits	
	PY1	-	-	-	-	-	-	-	-	-	-	-	-	636,105	(636,105)
	PY2	-	-	-	-	-	-	-	-	-	-	-	-	1,540,001	(1,540,001)
	PY3	-	-	-	-	(1,261,931)	(29,679,303)	-	-	-	-	-	-	2,093,804	(2,415,298)
	PY4	-	-	8,719,251	522,712	(24,693,633)	(63,076,299)	-	-	-	4,500,000	2,000,000	8,000,000	6,970,538	(7,641,533)
	PY5	67,764,196	3,639,000	18,096,488	2,764,134	(1,117,455)	(48,734,162)	593,691	(958,320)	9,100,000	5,700,000	26,000,000	20,686,036	(18,206,597)	
	PY6	150,468,577	13,306,168	22,087,507	3,585,621	6,733,008	51,332,494	3,017,190	295,147	13,600,000	11,800,000	49,000,000	19,411,736	(11,631,187)	
	PY7	194,938,702	30,911,206	23,835,789	4,081,566	23,564,643	53,174,155	5,322,962	2,752,519	16,000,000	15,600,000	68,500,000	426,532	10,494,211	
	PY8	204,391,068	54,628,476	23,628,759	4,174,606	24,076,997	53,174,155	5,798,925	3,115,668	17,400,000	18,000,000	82,500,000	426,532	12,178,957	
	PY9	197,383,782	77,444,133	23,676,415	4,086,309	24,076,997	53,174,155	5,798,925	3,233,230	18,000,000	18,000,000	90,000,000	426,532	12,734,002	
	PY10	190,521,784	83,831,446	23,560,456	4,155,633	24,076,997	53,174,155	5,798,925	3,233,230	18,000,000	18,000,000	90,000,000	426,532	12,791,689	
	PY11	187,580,899	86,608,400	23,561,818	4,002,828	24,076,997	53,174,155	5,798,925	3,233,230	18,000,000	18,000,000	90,000,000	426,532	12,853,366	
	PY12	187,367,491	86,163,769	23,302,422	4,041,795	24,076,997	53,174,155	5,798,925	3,233,230	18,000,000	18,000,000	90,000,000	426,532	12,904,134	
	PY13	186,212,123	85,429,803	23,065,041	3,901,046	24,076,997	53,174,155	5,798,925	3,233,230	18,000,000	18,000,000	90,000,000	426,532	12,927,994	
	PY14	184,289,021	84,581,196	22,664,866	3,927,918	24,076,997	53,174,155	5,798,925	3,233,230	10,500,000	13,200,000	66,000,000	426,532	12,254,215	
	PY15	181,982,563	83,731,611	22,549,009	3,832,980	24,076,997	53,174,155	5,798,925	3,233,230	4,500,000	7,200,000	30,000,000	426,532	11,326,880	
	PY16	179,415,965	82,969,846	22,112,217	3,867,204	24,076,997	53,174,155	5,798,925	3,233,230	-	-	-	426,532	10,537,137	
	PY17	175,499,141	82,375,321	22,153,802	3,756,139	24,076,997	53,174,155	5,798,925	3,233,230	-	-	-	426,532	10,538,776	
	PY18	175,516,580	81,946,194	21,764,631	3,801,747	24,076,997	53,174,155	5,798,925	3,233,230	-	-	-	426,532	10,591,931	
	PY19	173,512,131	81,376,502	21,702,243	3,666,017	24,076,997	53,174,155	5,798,925	3,233,230	-	-	-	426,532	10,628,607	
PY20	172,813,095	80,861,914	21,364,237	3,715,144	24,076,997	53,174,155	5,798,925	3,233,230	-	-	-	426,532	10,712,477		
		With Env. Benefits					Without Env. Benefits								
		NPV@ 6 % (GMD bn)		2.46			NPV@ 6 % (GMD bn)		1.1						
		NPV@ 6 % (USD)		47,710,342			NPV@ 6 % (USD)		23,143,616						
		EIRR		21.2%			EIRR		14.2%						

Table F: Sensitivity analysis

Scenarios		EIRR	NPV (6,0%)	
			GMD billion	USD million
Base scenario		14.2%	1.1	23.1
Costs +	10%	12.3%	0.9	19.0
Costs +	20%	10.7%	0.7	14.9
Costs +	50%	6.7%	0.1	2.6
Benefits -	10%	12.1%	0.8	16.7
Benefits -	20%	9.9%	0.5	10.3
Benefits -	30%	5.9%	0.0	-0.3
Benefits delayed by 1 year		11.6%	0.8	17.3
Benefits delayed by 2 year		9.6%	0.6	11.8
Benefits delayed by 3 year		7.9%	0.3	6.7
Benefits delayed by 4 year		6.5%	0.1	1.7
Adoption rate -	10%	13.1%	0.9	18.8
Adoption rate -	20%	11.9%	0.7	15.2
Production prices -	10%	11.7%	0.7	15.0
Production prices -	20%	6.9%	0.1	2.1
Input prices +	10%	14.0%	1.0	21.7
Input prices +	20%	13.6%	1.0	20.5
Rice price -	10%	12.4%	0.8	17.0
Rice price -	20%	10.6%	0.6	11.9
Rice price -	30%	8.7%	0.3	6.7
Rice yield -	10%	11.7%	0.7	14.9
Rice yield -	20%	9.0%	0.4	7.7
Rice yield -	30%	6.2%	0.02	0.5

Appendix 2: Part 2: Economic and Financial Analysis

1. This annex presents the economic and financial analysis (EFA) of the proposed IFAD-funded Resilience of Organizations for Transformative Smallholder Agriculture (ROOTS) project in The Gambia. The evaluation is built on the cost-benefit analysis (CBA) applied to a range of agricultural production models (irrigated and rain fed rice, irrigated vegetable gardens, poultry) and income-generating activities (youth-led agricultural service provision, agri-SMEs and cooperatives) and it incorporates the estimated benefits resulting from the greenhouse gases (GHG) accounting, using the EX-ACT methodology. Part I of this annex introduces the identification of benefit streams, followed by Part II which describes the methodology and assumptions used for the CBA analysis, Part III summarizes the financial results of the main models. The GHG accounting is presented in Part IV, and

finally Part V summarizes the results of the economic analysis, including sensitivity analysis to explore how the results might change under different scenarios.

2. Overall, ROOTS is a profitable project, with an economic rate of return (EIRR) of 14.2% and generating a new present value (NPV at 6%) of the net additional benefits of USD 23.1 million (GMD 1.1 billion) without valuing any of the environmental benefits. The full economic potential of the project, when the projected GHG mitigation are valued appropriately, is much higher. Using the average of the Lower and higher estimates for the social cost of carbon published by the World Bank⁴, ROOTS would generate a net present value (NPV) of US\$ 47.7 million and an economic internal rate of return (IRR) of 21.2 % (on a budget of USD 80 million). The results are robust under various scenarios of implementation delays, reduced benefits and adoption rates and cost overruns. In addition, the results are conservative, given the difficulty of quantifying ex-ante the project's impact on nutrition and health, rural-urban migration and emigration as well as import substitution for rice and other agricultural products.

I. Identification of benefits

3. The identification of benefits is based on the analysis of the project's main intervention areas and the main cost building blocks. As the first component, focused on agricultural productivity and adaptation to climate change, accounts for two-thirds of the overall budget, the present analysis is centered on the benefits arising from the main production-related activities. In particular, the project is expected to generate additional improved production and incomes for beneficiaries through its mix of land of land development and support to agricultural input provision tailored to irrigated and rain fed rice and upgraded and new vegetable gardens. In addition, poultry production (broilers and layers) will be integrated into some of the new market-oriented vegetable gardens. The first component will also generate income-generation benefits to the youth, which will be supported to engage in agri-businesses.

4. The second component, designed to promote inclusive commercial partnerships, will generate two streams of benefits: first, its main intervention areas, coupled with the support to SMEs and cooperatives, will generate a pull effect for the production activities. Effects are expected to include a reduction of post-harvest losses, in particular for vegetables, gradual price increases (through better FO organization and linkages with buyers) as well as value addition. Second, the project will support based on demand 4P-engaged SMEs and cooperatives in 4Ps, which will generate additional benefits as they develop and grow.

5. Although modest, given the requirements to mitigate the rice production externalities, the project will generate net positive environmental benefits through its reforestation activities and improved cropping practices (including better water management). ROOTS will also impact other developmental outcomes, unquantifiable at this stage, but which include better nutrition and human health, improved policy dialogue and enabling environment for agriculture and rural development, lower food imports, better value chain integration, value addition and equity, etc.

II. Methodology and assumptions

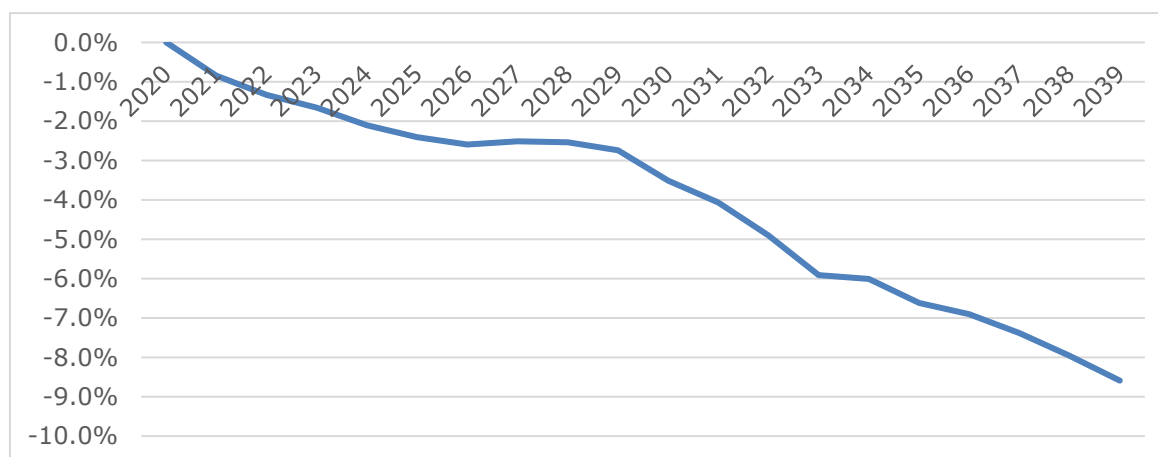
6. This analysis follows the standard methodology recommended for evaluating agriculture and rural development investment operations, as described in Gittinger (1982) and Belli et al. (2001) and is aligned to the IFAD guidelines for economic and financial analysis. The financial analysis was conducted to assess the profitability of the proposed project activities, modelled from the perspective of the target beneficiaries, and compared with the without-project situation (which reflects the current situation and has been considered static for the purpose of the analysis). Crop budgets have been prepared for the different rice production systems and for each season, with computed costs and

⁴ World Bank Guidance note on shadow price of carbon in economic analysis September 2017

benefits experienced by the beneficiaries with and without the project intervention, using market prices (full list in the Excel file). A total of 13 production models have been prepared: eight rice crop budgets (non-SRI irrigated tidal rice: wet season cultivation in rehabilitated and new perimeters, dry season cultivation in rehabilitated perimeters, dry season cultivation in new perimeters; same models for SRI irrigated tidal rice; rain fed tidal zone rice; rain fed lowland rice), three mixed vegetable garden crop budgets (wet season cultivation in upgraded gardens; dry and wet season cultivation in new gardens) and two models for poultry (broiler and layer). The economic analysis followed a similar approach but using economic prices and aggregating the results at the level of the project and from the society viewpoint. The economic analysis uses the incremental benefits, adoption rates and expected total number of beneficiaries (aligned to the updated logical framework), adding to that the environmental co-benefits arising from reduced GHG emissions and subtracting the total project economic costs to determine the overall economic viability of the project. The discount rates used are in line with the recommended guidelines, the practice of recent project and in-country discussions: 8% for the financial analysis and 6% for the economic analysis.

7. Given The Gambia's climate change vulnerability and the increasing use of climate-related tool in EFAs, the present analysis has used the newly developed IFAD Climate Adaption in Rural Development (CARD) tool, in order to include the estimate of climate-induced yield variability. Given the project's target value chains and the tool's current scope, only rice production has been considered, using the data for irrigated production, under the pessimistic scenario, for the analysis period 2020-2039. As shown in figure 1 below, the climate-induced yield decrease for irrigated rice is expected to reach about 9% by the end of the analysis period, when compared with the base year.

Figure 1 Climate-induced yield variability for irrigated rice in The Gambia (percentage change relative to base year 2020)



Source: IFAD Climate Adaptation for Rural Development (CARD) Tool

8. *Key assumptions for rice models.* As detailed in table 1 below, the analysis has identified four rice production systems and modelled their *without project* (WOP) and *with project* (WP) parameters: non-SRI irrigated tidal rice (2-season cultivation in rehabilitated and new perimeters), SRI irrigated tidal rice (same cultivation patterns), rain fed tidal zone rice (wet season cultivation with better water retention due to dykes), and rain fed lowland rice (wet season cultivation with better water retention due to dykes). The proposed yield increases are significant, yet they are realistic based on the fact that project will shift production from rain fed to irrigated, water managed systems and on the field observations during the design mission. In addition, the project will promote the adoption of SRI practices in the irrigated perimeters and the analysis has assumed that 20% of the beneficiaries will adopt it gradually over a normal-distribution 6-year period. It is worth noting that the yield targets below are not adjusted for climate variability, which has been

done directly in each model. Overall, all the rice models have been modelled with a three-year learning curve, to recognize that the productivity gains will be gradual despite the infrastructure investments and input provision.

Table 1 Key assumptions and parameters for rice production models

Rice models: Key parameters			Target Yields (kg/ha)		Target Yields (kg/ha)		
WOP Situation			WOP Yield (wet)	WOP Yield (dry)	WP Situation	WP Yield (wet)	WP Yield (dry)
Irrigated tidal rice	Rehabilitated perimeters	Rain fed, traditional tidal production (local seeds, no/limited fertilizer application)	1,500	1,600	2-season cultivation, with improved water control, better agronomical practices and use of improved seeds and fertilizer	3,200	3,600
<i>Non-SRI (80%)</i>	New perimeters		1,500	700		3,200	3,600
Irrigated tidal rice	Rehabilitated perimeters	As above	1,500	1,600	As above, but with SRI practices (differentiated water management, additional labour, etc.)	6,000	6,000
<i>SRI (20%)</i>	New perimeters		1,500	700		6,000	6,000
Rain fed tidal zone rice	Existing sites	Rain fed, wet season traditional production (local seeds, no/limited fertilizer application)	600	N/A	Wet season cultivation with better water retention due to dykes, better agronomical practices, use of improved seed and fertilizer	1,800	N/A
Rain fed lowland rice	Existing sites	Rain fed, wet season traditional production (local seeds, no/limited fertilizer application)	700	N/A	Wet season cultivation with better water retention due to dykes, better agronomical practices, use of improved seed and fertilizer	1,800	N/A

9. *Key assumptions for vegetable gardens.* Garden users cultivate a wide range of vegetables, based on individual consumption preferences and market demand. For the purpose of this analysis, the four of the most widely cultivate vegetables have been selected: tomato, onion, cabbage and chili pepper. For the upgraded gardens, which are cultivated only in the dry season given labor constraints, it is assumed that the project intervention will have two impacts: one is to increase yields, while reducing post-harvest losses, and the second to double the land utilization from the current low average level of 30% to 60%. For the new, market-oriented gardens, it is planned to design them with land utilization rates of 80%, drip irrigation throughout and to have the beneficiaries participate in farmer field schools (FFS), thus resulting in higher productivity levels. The WOP situation for the new gardens has been considered a partial valuation of the used labor.

10. *Key assumptions for poultry activities.* Based on the lessons learned from other projects and expected demand from beneficiaries, the project will include poultry activities for some of the new vegetable gardens. To estimate these additional benefits, layer and broiler models have been prepared based on data collected during the design mission and the standard parameters for these poultry activities. A 1000-bird broiler unit using day-old chicks (DOC) has been considered, with 7-week cycles and 3-4-week rest period, resulting in 5 cycles per year. Mortality has been assumed at 5% and gradual uptake over 3 years has been modelled. Similarly, a 1000-bird layer unit, also using DOCs and mortality 10%, has been considered, with an average laying per production cycle of 78% and gradual uptake in the first three years.

11. *Key assumptions for matching grant financed activities.* First, given the proposed mechanism for business plan formulation and approval, the focus of the matching grant will be on financing viable businesses. In particular, the business plan to be submitted will be required to include a cash flow analysis and profitability indicators (IRR), together with a solid market assessment. Second, a brief literature review of profitability analysis of small agribusinesses in the sub-region indicates that rates of return between 15%-30% are to be expected, in strong correlation with the business size. For these reasons, the present analysis has retained the following, rather conservative, IRRs as indicative in the economic analysis: 15% for youth-led businesses, 20% for cooperatives and 25% for SMEs. Depending on the matching grant ceiling for each of these businesses, a 10-year cash flow has been estimated and included in the overall economic aggregation.

12. *Financial and economic prices.* Market prices for the financial analysis were collected on the ground by the project Monitoring and Evaluation system and updated during the

additional financing mission, and economic prices were estimated using conversion factors designed to reflect prevailing taxes and subsidies. The conversion factors were estimated as follows: 1.11 for rice, 0.95 for imported inputs (like fertilizer and pesticides), and 0.8 for labor given the current market conditions, while for the rest of the inputs and outputs it has been considered that the economic prices were in line with the market prices. It is important to mention that accurate information on the use of non-family labor (paid labor) in the total labor requirements was not readily available: the analysis estimated that 80% of the labor needs for improved rice production will be met by family members (with a day of work valued at 100 GMD), while the remaining 20% is contracted outside of the family at a price of 125 GMD. In the vegetable gardens, it has been hypothesized that only family labor will be employed.

III. Financial results

13. All of the models assessed as part of this analysis appear viable, generating significant amounts of additional income and attractive returns on the investment (see Table 2 below).

Table 2 Summary results of the financial analysis

Financial Analysis: Summary results			Additional benefits/year		FIRR	NPV @ 8% (10-year)	
		Unit	(GMD)	(USD)	(percentage)	(GMD)	(USD)
Irrigated tidal rice	Rehabilitated perimeters	ha	76,482	1,530	N/A	465,569	9,311
<i>Non-SRI (80%)</i>	New perimeters	ha	90,342	1,807	N/A	557,443	11,149
Irrigated tidal rice	Rehabilitated perimeters	ha	188,190	3,764	N/A	1,174,204	23,484
<i>SRI (20%)</i>	New perimeters	ha	202,050	4,041	N/A	1,267,205	25,344
Rain fed tidal zone rice	Existing sites	ha	22,893	458	N/A	139,444	2,789
Rain fed lowland rice	Existing sites	ha	22,329	447	N/A	144,423	2,888
Upgraded vegetable garden	Existing sites	unit	601,925	12,038	46%	2,264,366	45,287
New vegetable garden	New sites	unit	1,611,338	32,227	29%	4,904,375	98,087
Poultry - broiler	New sites	unit	527,175	10,544	N/A	3,075,017	61,500
Poultry - layer	New sites	unit	293,930	5,879	N/A	1,465,228	29,305
Youth-led agribusiness*	New	unit	75,000	1,500	15%	103,171	2,063
Coop agribusiness*	Existing	unit	600,000	12,000	20%	1,215,692	24,314
SME agribusiness*	New/existing	unit	3,000,000	60,000	25%	7,352,085	147,042

* Conservative estimates

IV. Greenhouse gas (GHG) accounting

14. The environmental externalities of the project were updated using the EX-ACT tool, developed by FAO to provide estimations of the impact of AFOLU (agriculture, forestry and other land use) projects and policies on the carbon balance. The carbon balance is defined as the net balance across all GHGs expressed in CO₂ equivalents (CO₂e) that will be emitted or sequestered due to project implementation (WP), as compared to a business-as-usual scenario (WOP). EX-ACT is a land-based accounting system, estimating CO₂e stock changes (i.e. emissions or sinks of CO₂) expressed in equivalent tons of CO₂ per hectare and year. The tool was designed using mostly data from the Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories (NGGI-IPCC, 2006), which furnishes EX-ACT with recognized default values for emission factors and carbon values in soils and biomass (the so-called "Tier 1 level" of precision).

15. For ROOTS, the GHG accounting calculations are based on characteristics in the predominant AEZ in The Gambia (moist tropical climatic conditions with HAC soils) and the land use and crop management practices for WP and WOP situations. The changes expected to result from the project were included in the tool's different modules (in full alignment with the EFA assumptions and budget provisions) and include increased rice cultivation (irrigated and rain fed), land use changes from other crops to rice and vegetable cultivation, and increased use of chemical inputs, and Sustainable Forest and Land Management (SFLM) activities through 34500 ha promoted under GEF financing. Overall, the carbon balance results are modest, yet positive, with ROOTS's activities leading to a total reduction in CO₂ emissions of 903,821 tons over a period of 20 years starting from project implementation. Per year, the mitigation potential is roughly -45,191 tons of CO₂-e.

16. The social cost of carbon attempts to capture the marginal global damage (cost) of an additional unit of CO₂e emitted. The recent World Bank Guidance Note on Shadow Price of Carbon in Economic Analysis (September 2017) recommends "projects' economic analysis use a low and high estimate of the carbon price starting at US\$40 and 80, respectively, in 2020 and increasing to US\$50 and 100 by 2030". Following these World Bank guidelines, this analysis has used the yearly average between these two scenarios in the valuation of the environmental benefits.

V. Economic results

17. The overall benefits of the project were estimated using the economic results of the models and of the carbon balance, against the economic project costs and including phasing rates aligned with the Costab. The analysis, developed over 20 years, assumed a full adoption rate, given that i) learning curves have been included in each model; ii) several project activities are fully demand driven and logical framework targets represent the minimal results (e.g. targets for matching grant windows are based on the maximum investment size, yet in practice lower values will be financed, resulting in a higher number of beneficiaries); and iii) the NEMA experience indicates high adoption rates for production activities. In addition, to model the pull effect of the inclusive commercial partnerships supported by the second component, an increase factor of 5% has been applied to SRI rice (considered the prime avenue for surplus and increased commercialization) and of 10% for the new vegetable gardens. These adjustments have been made in order to reflect the project's logic of increased value chain integration, better bargaining power through grouped sales and ultimately higher prices for producers. Lastly, the project financial costs were converted into economic costs in Costab, by removing the effects of inflation and transfer payments (i.e. taxes and subsidies). In addition, costs already included in the models were removed from Costab to avoid double-counting.

18. Under all these parameters, ROOTS is a moderately viable program, generating a net present value (NPV at 6% discount rate) of US\$ 23.1 million and an economic internal rate of return (EIRR) of 14.2% (on a total budget of US\$80.0 million, US\$33.2 million of which are funded by IFAD), without valuing any of the environmental benefits. The full economic potential of the project, when the projected GHG mitigation are valued appropriately, is much higher. Using the average of the Lower and higher estimates for the social cost of carbon published by the World Bank, ROOTS would generate a net present value (NPV) of US\$ 47.7 million and an economic internal rate of return (IRR) of 21.2 %.

19. The results are conservative, given the difficulty of quantifying ex-ante the project's impact on nutrition and health, rural-urban migration and emigration as well as import substitution for rice and other agricultural products.

20. The sensitivity analysis shows that the baseline results are robust under most scenarios, as summarized in table 3. The robustness of these results was explored by testing the effects of changes in several critical parameters: (i) reduced project benefits; (ii) increased project costs; (iii) delayed project benefits; (iv) decreased output prices; (v) increased input prices; and (vi) reduced adoption rate. Even in the most unlikely scenarios

of a 4-year delay, or a decrease in benefits by 30% or an increase in costs by 50%, the project remains profitable. The project also indicates a high sensitivity to a drop in yield forecasts of more than 30%.

Table 3 Summary of the sensitivity analysis

Scenarios		EIRR	NPV (6,0%)	
			GMD billion	USD million
Base scenario		14.2%	1.1	23.1
Costs +	10%	12.3%	0.91	19.02
Costs +	20%	10.7%	0.72	14.91
Costs +	50%	6.7%	0.12	2.55
Benefits -	10%	12.1%	0.80	16.71
Benefits -	20%	9.9%	0.49	10.28
Benefits -	30%	5.9%	-0.01	-0.27
Benefits delayed by 1 year		11.6%	0.83	17.33
Benefits delayed by 2 year		9.6%	0.57	11.85
Benefits delayed by 3 year		7.9%	0.32	6.65
Benefits delayed by 4 year		6.5%	0.08	1.75
Adoption rate -	10%	13.1%	0.90	18.76
Adoption rate -	20%	11.9%	0.73	15.20
Production prices -	10%	11.7%	0.72	15.03
Production prices -	20%	6.9%	0.10	2.14
Input prices +	10%	14.0%	1.04	21.66
Input prices +	20%	13.6%	0.98	20.49
Rice price -	10%	12.4%	0.82	17.04
Rice price -	20%	10.6%	0.57	11.89
Rice price -	30%	8.7%	0.32	6.74
Rice yield -	10%	11.7%	0.72	14.94
Rice yield -	20%	9.0%	0.37	7.71
Rice yield -	30%	6.2%	0.02	0.49