Document:	EB 2020/LOT/P.6
Date:	15 July 2020
Distribution:	Public
Original:	English

E

Investing in rural people

President's memorandum

Proposed additional financing to

Republic of Malawi for the

Sustainable Agricultural Production Programme

Project ID: 1100001534

Note to Executive Board representatives

Focal points:

Technical questions:

Sara Mbago-Bhunu
Regional Director
East and Southern Africa Division
Tel.: +39 06 5459 2838
e-mail: s.mbago-bhunu@ifad.org

Ambrosio Barros
Country Director
Tel.: +27 11 517 1661
e-mail: a.nsinguibarros@ifad.org

Dispatch of documentation:

Deirdre Mc Grenra
Chief
Institutional Governance and Member Relations
Tel.: +39 06 5459 2374
e-mail: gb@ifad.org

For: **Approval**

Contents

Appendices

Programme delivery team	
Regional Director:	**Sara Mbago-Bhunu**
Country Director:	**Ambrosio Barros**
Technical Lead:	**Putso Nyathi**
Finance Officer:	**Claudio Mainella**
Climate and Environment Specialist:	**Paxina Chileshe**
Legal Officer:	**Aspasia Tsekeri**

Abbreviations and acronyms

ADD	agricultural development district
ASWAp	agricultural sector-wide approach
GAPs	good agricultural practices
M&E	monitoring and evaluation
MoAFS	Ministry of Agriculture and Food Security
NAIP	National Agricultural Investment Plan
PMU	programme management unit
SAPP	Sustainable Agricultural Production Programme
VCF	village challenge fund

Financing summary

Initiating institution	Ministry of Finance, Economic Planning and Development
Borrower/recipient	Republic of Malawi
Executing agency	Ministry of Agriculture and Food Security
Total programme cost	US$71.1 million
Amount of original IFAD loan	SDR 14.65 million (equivalent to approximately US$22.85 million)
Terms of original IFAD financing	40 years, including a grace period of 10 years, with a service charge of three quarters of one per cent (0.75 percent) per annum
Amount of original IFAD Debt Sustainability Framework grant:	SDR 14.25 million (plus a Programme Preparatory Facility grant of US$0.6 million — total equivalent to approximately US$22.85 million)
Amount of additional IFAD loan	SDR 7.30 million (equivalent to approximately US$10.05 million)
Amount of additional IFAD Debt Sustainability Framework grant	SDR 2.70 million (equivalent to approximately US$3.72 million)
Terms of additional IFAD financing	40 years, including a grace period of 10 years, with a service charge of three quarters of one per cent (0.75 per cent) per annum
Cofinancier(s)	Private sector
Amount of cofinancing	US$1.42 million related to additional financing
Contribution of borrower/recipient	US$4.20 million (original financing) and US$2.80 million (related to additional financing)
Contribution of beneficiaries	US$1.20 million (original financing) and US$2.00 million (related to additional financing)
Cooperating institution	IFAD

Recommendation for approval

The Executive Board is invited to approve the recommendation for the proposed additional financing contained in paragraph 54.

I. Background and programme description

A. Background

1. The Executive Board approved the Sustainable Agriculture Production Programme (SAPP) on 13 December 2011 (EB document EB 2011/104/R.19). The financing agreement was signed and became effective on 24 January 2012. The programme completion date is 31 March 2021 and the loan closing date is 30 September 2021. The total programme cost is US$51.1 million, including IFAD financing in the amount of US$45.7 million, 50 per cent of which was provided as a highly concessional loan, and the other 50 per cent as a Debt Sustainability Framework (DSF) grant. Counterpart funding from the Government of Malawi was US$4.2 million and the beneficiaries' contribution amounted to US$1.2 million. To date, 95 per cent of the IFAD loan and 94 per cent of the grant have been disbursed. An amount of US$600,000 of the DSF grant was provided as a self-standing Project Preparation Facility grant, of which 49 per cent was disbursed.

2. In January 2020, the Government of Malawi requested additional financing (AF) of US$13.8 million for the programme from IFAD, resulting in a two-year extension of the programme completion date. The proposed additional financing would take the form of a highly concessional loan (73 per cent) and a DSF grant (27 per cent) from the 2019-2021 performance-based allocation system (PBAS) provision for the Republic of Malawi. The objectives of the proposed additional financing are to scale up SAPP operations and fill a financing gap due to exchange rate losses.

B. Original programme description

3. SAPP's goal is to contribute to poverty reduction and improved food security among the rural population. The specific development objective is to achieve a viable and sustainable small-scale agricultural sector using good agricultural practices (GAPs). SAPP's main thrust is to enhance agricultural productivity based on simple, affordable GAPs to help bridge the considerable differences between actual and potential crop yields.

4. SAPP's main outcomes include: (i) appropriate agricultural technologies/GAPs developed and understood by beneficiaries. The programme encourages development and refinement of existing technologies and practices to suit the various agro-ecological zones in which farmers work and promote such practices for adoption; (ii) widespread adoption by farmers of crops and livestock GAPs leading to improved agricultural productivity and nutrition.

II. Rationale for additional financing

A. Rationale

5. The Government of Malawi has requested additional financing from the 2019-2021 PBAS allocation for an amount of US$13.8 million, along with a two-year extension of the programme completion date. The additional financing will serve two purposes. First, it will finance a budget gap that resulted from an exchange loss from SDRs to US$ amounting to US$4.2 million. Considering that the annual budget for SAPP is slightly above US$7 million, the loss affected resources representing about two-thirds of the final 2020/21 budget. Second, the proposed additional financing will scale up SAPP complementary interventions for an additional 60,750 households through interventions in the programme's original six districts. The new total financing will thus reach 260,750 households.

6. Scaling-up will focus on areas of intervention and specific activities whose effectiveness was identified by SAPP's mid-term review and by the impact assessment undertaken by IFAD's Research and Impact Assessment Division (RIA). Under the first of SAPP's three components, the areas of intervention include: (i) raising awareness and sensitizing district offices and smallholders about the importance of research trial results; (ii) reviewing SAPP's impact on climate change and capacities for climate change adaptation; (iii) enhancing fertility of soils; (iv) creating knowledge on adoption behaviour; (v) producing certified seeds. Under component 2, they are: (i) increasing stakeholder participation; (ii) improving coordination of integrated agricultural extension management; (iii) strengthening the capacities of farmers' organizations through access to finance; (iv) enhancing access to quality seeds and market linkages; (v) improving smallholder households' nutritional intake through pass-on schemes and homestead farming.

7. SAPP has so far achieved an outreach of 198,573 households (992,865 household members) against an end-target of 200,000 (1,000,000 members). Moreover, SAPP has registered satisfactory progress in a number of outputs and outcomes that were part of the activities due to be scaled-up in the six intervention districts. Under SAPP's component 1 (Adaptive Research), the programme circulated four legume varieties and two agronomic technologies, and 82 per cent of participants in GAPs farm trials indicated that those trials were relevant to their challenges. Under component 2 (Adoption of GAPs), 94 per cent of beneficiaries implemented at least two improved practices and 70 per cent of beneficiaries participating in seed multiplication were satisfied with the availability of seeds at their locations. The livestock pass-on scheme resulted in 80 per cent of households owning chickens and 60 per cent keeping goats. Furthermore, 51,379 households against a target of 25,000 received targeted support to improve their nutrition, which led to increased dietary diversification. Finally, SAPP interventions produced a 62 per cent increase in the mean annual income of beneficiaries and a 71 per cent rise in yields.

8. SAPP's positive impact was further confirmed in the 2018 impact assessment carried out by RIA, which found that SAPP had been instrumental in increasing the adoption of GAPs. SAPP also had a direct positive impact on crop diversification and the value of crop yields per hectare, while the occurrence of extreme weather events was found to be the major limiting factor. Further research to address this issue is being undertaken during the extension period. Coordinated linkages with the other IFAD-funded programmes will further enhance SAPP effectiveness: the Programme for Rural Irrigation Development (PRIDE) will use GAPs already tested by SAPP for its extension services, and SAPP village challenge fund (VCF) groups will take part in irrigation projects implemented by PRIDE. SAPP shares a list of viable income-generating projects with the Financial Access for Rural Markets, Smallholders and Enterprises Programme to ensure that participating businesses receive financial support. Overall, the last supervision mission rated the likelihood of achieving the programme's development objective as satisfactory and achievable by 2021. Private sector linkages will ensure sustainability of the new measures. An IFAD grant to the Alliance for a Green Revolution in Africa, aimed at improving delivery of seed and soil fertility technologies to smallholders, has linked seed producers to the Malawi Multi Seeds Company and SAPP farmers to agro-dealers. SAPP extension will scale up these activities. Commodity platforms supported by PRIDE will link up SAPP farmers to ensure access to output markets. SAPP will also foster market linkages through the decentralized stakeholder platforms.

9. SAPP is deploying mitigation measures for COVID-19 to ensure continued implementation of key activities, including the provision and multiplication of seeds and the strengthening of supply chains. Other initiatives include remote delivery of

extension services through radio and mobile vans, and nutrition-sensitive activities such as integrated household farming and pass-on schemes to provide diversified diets for beneficiaries. SAPP is using a decentralized implementation approach through farmer field schools, with integration of community-based monitoring and evaluation (M&E). The programme will continue to review and adjust its operations as the dynamics of the COVID-19 outbreak in Malawi rapidly change.

Special aspects relating to IFAD's corporate mainstreaming priorities

10. SAPP promotes adoption of GAPs responding to climatic shocks faced by the country. The programme embeds the mainstreaming issues of nutrition, youth, gender, HIV/AIDS and climate and the environment into its core activities.

11. Women play a key role in agriculture in Malawi, producing 70 per cent of the food consumed locally. However, land rights and traditions mean that only a third of agricultural holdings in Malawi are held by women, who thus rarely control over land and yields. Youth under 35 years of age constitute about 70 per cent of the total population and unemployment for the age group is strikingly high at 40 per cent. Interest in agriculture-based livelihoods among youth is decreasing, mainly due to a lack of financial incentives and a shortage of skills and resources. SAPP, which has a 50 per cent target for women's participation and a 30 per cent target for youth, has been successful in addressing inequality issues. Lessons learned will be replicated targeting the new beneficiaries. According to the Annual Outcome Survey (AOS), key successes include an increase in the annual income of targeted households, improved access and control over assets, and a reduction in the workload of women through the use of fuel-efficient cooking stoves.

12. According to the 2018 AOS, 79 per cent of households consumed a maize-based diet together with vegetables and legumes. There was limited consumption of fruit and animal-source foods, with adverse health effects, particularly on children in the 6-23 months age range. The survey revealed that an average of 65 per cent of beneficiary households, against a baseline target of 50 per cent, practiced dietary diversification and that 71 per cent consumed three meals a day, almost double the baseline target of 36.4 per cent. SAPP will scale up these successes while ensuring that dietary diversification benefits the most vulnerable, in particular women of reproductive age.

13. Malawi's agriculture sector is vulnerable to climate change due to its high reliance (95 per cent) on rainfed crops. Maize is Malawi's key staple crop, grown by nearly 97 per cent of farmers and accounting for 60 per cent of caloric intake. Maize is, however, sensitive to changes in temperatures and rainfall. With the increased temperatures and droughts projected, SAPP impact areas could experience severe shortages of most of the commonly grown crops. SAPP has contributed to climate change adaptation and mitigation through the promotion of GAPs resilient to climatic extremes, especially droughts, and through carbon sequestration in soil organic matter. This has involved the introduction of resilient rainfed farming (drought tolerant varieties/species, response farming, adapted cropping practices, conservation agriculture, pit planting, integrated soil fertility management), sustainable soil and water conservation practices together with agroforestry, small-scale irrigation for high value crops and other diversification options.

B. Description of geographical area and target groups

14. SAPP is implemented in six districts: Blantyre, Chiradzulu and Balaka in the Southern Region; Lilongwe, and Nkhotakota in the Central Region; and Chitipa in the Northern Region.

15. The programme is designed to benefit about 200,000 smallholder households to create a viable and sustainable smallholder sector through promotion and adoption of GAPs. The programme target group is defined as "smallholder food security households". Beneficiaries comprise households that have the potential to achieve

food security but, due to limited resources, find it difficult to produce a surplus for market. Smallholders account for 80 per cent of the group. The geographic area targeted remains unchanged under the additional financing.

C. Components, outcomes and activities

16. SAPP has three components, each of which will benefit from the additional financing.

17. Component 1 — adaptive research. Improved agricultural techniques will be further refined to suit specific agro-ecological conditions. The component has two subcomponents: 1.1, adaptive research, and 1.2, seed certification and maintenance. There are two outputs under this component: a) — action research programmes which develop/refine GAP packages adapted to various agro-ecological and socioeconomic contexts; and b) — ongoing processes for certifying legume seeds for multiplication and farmers' use.

18. Component 2 — farmer adoption of sustainable GAPs. SAPP facilitates the dissemination and adoption of GAPs in order to increase crop yields, diversify production, reduce yield variability and labour, and improve soil health through improved, integrated soil and water management packages. There are two subcomponents.

19. Subcomponent 2.1 — improved agricultural extension. SAPP has implemented a number of interventions under the five key activities, namely: stakeholder participation and R&D linkages; agricultural extension support and promotion services; integrated agricultural extension management at local level; capacity strengthening of farmers and their organizations; and household nutrition improvement. In order to consolidate, safeguard and sustain the gains made during implementation of these interventions, it will be necessary to extend the programme so that some critical activities can be completed.

20. Subcomponent 2.2 — access to key agricultural inputs. SAPP aims to improve and increase access to key agricultural inputs for sustained adoption of GAPs. Many farmers experience problems in adopting GAPs due to the lack or high price of key inputs, particularly legume seeds and small livestock.

21. Component 3 — programme management and knowledge management. This focuses on putting in place strategies, systems, guidelines and organizational arrangements and structures to facilitate smooth programme implementation.

D. Costs, benefits and financing

Programme costs

22. Original programme costs, including contingencies, were estimated at around US$51.1 million. Component 1 costs amounted to US$5.4 million (11 per cent of total); component 2 cost US$40.5 million (79 per cent); and component 3 cost US$5.2 million (10 per cent).

23. Total costs for the additional financing are estimated at US$20 million (approximately MWK 14.9 billion). Component 1 accounts for US$1.06 million (5.3 per cent of costs); component 2 costs US$17.54 million (87.7 per cent); and component 3 costs US$1.4 million (7 per cent). The new total would be US$71.1 million. The additional financing, including finance gap and scaling-up, should be implemented over 3 years.

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

	*Original financing**	*Additional financing for financing gap*	*Additional financing for scaling-up*	*Total*
IFAD loan	22 850	4 200	5 854	32 904
IFAD grant**	22 850		3 719	26 569
Other cofinanciers			1 417	1 417
Beneficiaries	1 224		2 000	3 224
Borrower/recipient	4 231		2 800	7 031
Total	**51 155**	**4 200**	**15 789**	**71 145**

* See table in document EB 2011/104/R.19 for detailed breakdown.
** Inclusive of a Programme Preparatory Facility Grant of US$ 0.6 million

Table 2
Additional financing: programme costs by component/subcomponent and financier
(Thousands of United States dollars)

					Additional						
	Additional IFAD loan		*Additional IFAD grant*		*Other cofinanciers*		*Beneficiaries*		*Borrower/ recipient*		*Total*
Component/ subcomponent	*Amount*	*%*	*Amount*	*%*	*Amount*	*%*	*In-kind*	*%*	*Cash*	*%*	*Amount*
1.1 Adaptive research	827	8	-	-	-	-	-	-	123	4.4	951
1.2 Seed certification and maintenance	91	1	-	-	-	-	-	-	12	0.4	104
2.1 Improved agricultural extension	5 283	53	2 620	70	236	17	1 588	79	2 535	90.5	12 263
2.2 Access to key agricultural inputs	2 583	26	1 099	30	1 181	83	412	21	-	-	5 275
3.1 Programme management and knowledge management	1 222	12	-	-	-	-	-	-	115	4.1	1 336
3.2 Support to ASWAp secretariat	47	0	-	-	-	-	-	-	14	0.5	61
Total	**10 054**	**50**	**3 719**	**19**	**1 417**	**7**	**2 000**	**10**	**2 800**	**14**	**19 989**

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

					Additional						
	Additional IFAD loan		*Additional IFAD grant*		*Other cofinanciers*		*Beneficiaries*		*Borrower/ recipient*		*Total*
Expenditure category	*Amount*	*%*	*Amount*	*%*	*Amount*	*%*	*In-kind*	*%*	*Cash*	*%*	*Amount*
1. Vehicles	105	1	-	-	-	-	-	-	-	-	105
2. Equipment & materials	3 531	35	3 719	100	618	44	1 376	69	49	1.7	9 293
3. Technical assistance, training, workshops and studies	5 647	56	-	-	799	56	624	31	-	-	7 069
4. Salaries and allowances	341	3	-	-	-	-	-	-	2 619	93.6	2 960
5. Incremental operating costs	429	4	-	-	-	-	-	-	132	4.7	561
Total	**10 054**	**50**	**3 719**	**19**	**1 417**	**7**	**2 000**	**10**	**2 800**	**14**	**19 989**

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

	PY1		*PY2*		*PY3*		*Total*
Component/subcomponent	*Amount*	*%*	*Amount*	*%*	*Amount*	*%*	*Amount*
1.1 Adaptive research	345	4.9	298	4.9	308	4.5	951
1.2 Seed certification and maintenance	41	0.6	39	0.6	24	0.3	104
2.1 Improved agricultural extension	4 399	62.2	3 557	59.1	4 307	62.4	12 263
2.2 Access to key agricultural inputs	1 847	26.1	1 712	28.5	1 716	24.8	5 275
3.1 Programme management and knowledge management	418	5.9	388	6.5	530	7.7	1 336
3.2 Support to ASWAp secretariat	19	0.3	20	0.3	22	0.3	61
Total	**7 069**	**35**	**6 014**	**30**	**6 906**	**35**	**19 989**

Financing and cofinancing strategy and plan

24. The Government of Malawi originally financed all recurrent personnel costs, including salaries and allowances for government staff assigned to the programme, as well as taxes levied on the procurement of goods and services (US$4.2 million — 8.3 per cent of total costs). Beneficiaries contributed 50 per cent of the cost of cooking stoves under the post-harvest management subcomponent as well as toolkits provided to tinsmiths (US$1.2 million — 2.4 percent of total costs). Apart from investment costs, IFAD financed 100 per cent of the operational and maintenance costs of vehicles and motorcycles. Overall, IFAD financing amounted to US$45.7 million (89.3 per cent of total costs).

25. The US$20 million of additional financing includes US$2.8 million in cofinancing from the Government of Malawi (14 per cent of total costs), US$13.78 million from IFAD (69 per cent of total costs), US$1.4 million from the private sector (7 per cent of total costs) and US$2 million from beneficiaries (10 per cent of total costs).

Disbursement

26. Disbursement of the original financing was made on a quarterly basis through IFAD replenishments of SAPP designated accounts (DAs). The additional financing will use the existing DAs, with the 2020/21, 2021/22 and 2022/23 financial years receiving disbursements of 35 per cent, 30 per cent and 35 per cent respectively.

Summary of benefits and economic analysis

27. The good programme impact has also resulted in a highly favorable economic and financial analysis. SAPP's financial profitability was estimated by building financial models for farm and crop budgets, livestock pass-on, seed multiplication and a simple vertical integration of micro-enterprise funded through the VCF. The crops models were built for five districts in the SAPP implementation area — one of them working as a proxy for both Blantyre and Chiradzulu. The analysis was performed on pure and mixed stands of maize with groundnuts, beans and pigeon peas. Almost all the agricultural models show positive results, with a range of incremental gross margins from US$5/ha to US$291/ha (under a full development scenario). All other models also show positive incremental margins. Expected increases in yields, production and sales show a high impact on household incomes and consumption.

28. The economic analysis only considers incremental economic benefits and costs with aggregated models valued at economic prices. It was made with conservative adoption rates and parameters for the number of beneficiaries participating in the livestock schemes, as well as a gradual approach for the increase in yields. Net incremental benefits were calculated for a period of 20 years, aggregating each model's total number of beneficiaries. The economic internal return rate (EIRR) for the additional financing is 28.4 per cent and net present value is US$22.6 million, with a discount rate of 12 per cent, considered as the opportunity cost of capital for

Malawi. Economic profitability was also checked for the programme's new total cost (original and additional financing), giving an EIRR of 14.3 per cent and a net present value (NPV) of US$6.7 million.

29. Finally, a sensitivity analysis was made to test the main profitability indicators and results. It shows that the programme's EIRR and NPV are still positive and robust under all the scenarios tested. For example, under the pessimistic scenario of a reduction in programme benefits at around 20 per cent, EIRR would be 23.5 per cent (and 11 per cent for the new total original and additional financing) and the NPV would be US$14.4 million (US$2.6 million for the new total original and additional financing).

Exit strategy and sustainability

30. The exit strategy identifies six focus areas: (i) institutional strengthening in seed supply system; (ii) capacity-building; (iii) coordination and collaboration; (iv) community empowerment; (v) financing; and (vi) monitoring, evaluation and knowledge management as mechanisms for sustaining impact. These focus areas will ensure significant long-term environmental and socioeconomic benefits to communities.

31. Other key elements of the exit and sustainability strategy include:

- resource mobilization: promoting self-reliance among farmers through generated own resource, village loans and savings;
- capacity-building: continuing to train front-line staff and district stakeholder panel representatives in articulating farmers' needs;
- following up farming arrangements promoted between seed companies and farmers' groups multiplying seed;
- enhancing seed inspection through use of government-trained para-seed inspectors from districts and Agricultural Development District (ADD) levels who will complement the seed services unit;
- strengthening local leadership involvement, ensuring that farmers are complying with local arrangements in small livestock pass-on and conservation agriculture;
- integrating programme data from the SAPP Management Information System (MIS) into the National Agriculture MIS;
- integrating programme activities into the existing District Agriculture Extension Services System (DAESS) and further sensitizing local communities using the DAESS, fortnightly training sessions, radio and TV.

III. Risk management

A. Risks and mitigation measures

32. Risks include drought events; inadequate institutional capacity to implement planned activities; macroeconomic and political instability; and scarcity and lack of capacity among service providers. These may be mitigated by: promoting adoption of irrigation through financing from the VCF; timely resource disbursement; capacity-building of staff, farmers and service providers; promoting adoption of GAPs that are more resilient to climatic extremes, especially droughts; and carbon sequestration in soil organic matter. The financial management function is performing properly, the main issue being difficulty in receiving refunds on taxes or obtaining tax exemption. This risk is being addressed through close dialogue with the Malawi revenue authority. Furthermore, designing the additional financing in United States dollars will avoid exchange rate losses. An extensive programme contingency plan by SAPP addresses the risk of slower implementation due to

COVID-19. Among other measures, the programme will frontload activities that build resilience among beneficiaries to the virus.

B. Environment and social category

33. A Social Environmental and Climate Assessment Procedures (SECAP) review note is available for the additional financing, as required by criteria for the submission of applications. Moreover, SAPP has an existing environment and social management framework whose matrix is included in the SECAP review note. SAPP interventions also have site-specific environmental and social management plans developed in a participatory manner. According to the review, SAPP has the potential to generate significant environmental and social benefits. SAPP has monitored the use of agrochemicals, including herbicides and chemical fertilizers, to ensure that there is no build-up of residues in the soil or contamination of surface or groundwater resources. Overall, the programme presents few environmental risks adequately manageable as they are site-specific and predominantly reversible. Based on the SECAP, and like the original financing, SAPP is therefore considered a category B project.

C. Climate risk classification

34. SAPP target groups are entirely dependent on natural resources (such as seasonal crops, rainfed agricultural gardens) affected in the last decade by climate trends and/or specific climate events. SAPP targets smallholders vulnerable to climate variability and climate-related shocks. Climate will likely affect agricultural productivity (crops and livestock), access to markets and/or the incidence of pests and diseases for the programme's target groups.

35. SAPP will continue to invest in institutional development and capacity-building for rural institutions (such as farmers' groups) in climatically diverse areas and in activities for vulnerable farmers. SAPP is thus moderately sensitive to climate risks and therefore requires a basic integration of climate issues to be considered during the programme's extension phase. In addition to the GAPs promoting climate resilience, the programme offers opportunities for strengthening indigenous climate risk management capabilities into its core activities and for addressing climate resilience through policy dialogue regarding agricultural strategies and policies.

D. Debt sustainability

36. Malawi's external debt is at moderate risk of distress, with some absorption space. Fiscal discipline should be strengthened to avoid accumulation of domestic debt at high interest. To enhance resilience, efforts should be made to further diversify the economy, broaden the revenue base and strengthen public financial management.[1]

IV. Implementation

A. Compliance with IFAD policies

37. SAPP is implemented in the framework of the National Agricultural Investment Plan (NAIP) which is compliant with IFAD policy and the objectives of SAPP. Implementation of the original SAPP and the additional financing will be in line with the Country Strategic Opportunities Programme, the Development Assistance Strategy and all other IFAD policies on financial management and procurement.

38. Although SAPP was designed prior to the IFAD11 mainstreaming commitments, it complies with the IFAD action plans on gender, nutrition and youth. With the additional financing, SAPP will continue to apply household methodologies to effectively contribute to gender equality and women's empowerment. SAPP will, as before, also explicitly target youth with specific activities and resources. SAPP has mainstreamed nutrition through schemes such as capacity-building and awareness-

[1] International Development Association and the International Monetary Fund. Malawi: Joint Debt Sustainability Analysis — 2018 Update.

raising, and activities such as integrated household farming, as well as livestock pass-on, all of which improve dietary diversity at household level.

B. Organizational framework

Management and coordination

39. The Ministry of Agriculture and Food Security (MoAFS) implements SAPP with the Head of the NAIP secretariat overseeing programme implementation.

40. Direct management of SAPP on a day-to-day basis is the responsibility of the SAPP programme management unit (PMU). The PMU includes the national programme coordinator, M&E officer, programme accountant, procurement officer, knowledge management officer, communication officer and supporting staff.

41. Responsibility for implementing SAPP components 1 and 2 lies with the technical departments: Agricultural Research Services; Agricultural Extension Services; Land Resources Conservation; Animal Health and Livestock Development; and Crop Development. They provide the technical leadership in implementing the different activities. The Department of Agriculture Extension Services provides leadership in implementing component 2 whereas the Department of Agricultural Planning Services is responsible for M&E and Knowledge Management and Communication Strategy (KM&C — subcomponent 1.2).

42. The ADDs and District Councils are responsible for field operations under component 2, under the control of the ADD Programme Managers and ADD officers respectively.

Financial management, procurement and governance

43. The SAPP financial management team can administer the additional financing without requiring any major adjustments. The accounting system allows adequate traceability of the programme's financial transactions.

44. Through TOMPRO accounting software, SAPP expenditure reports are analysed by component and category while preparation of withdrawal applications is facilitated. Adequately trained, the Justification Accountants supporting the Ministry of Finance, Economic Planning and Development will thus be working with a simple off-the-shelf accounting package.

45. The National Audit Office of Malawi performs the programme's external audit. Financial audit reports are submitted on time and the quality is in line with IFAD standards.

46. The Government's 2017 Public Procurement and Disposal of Assets Act will govern all programme procurement except for international competitive bidding which will follow the prevailing World Bank guidelines. The MoAFS procurement officer, assigned full-time to SAPP, will be in charge of SAPP procurement based on the 18-month procurement plan.

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

47. Routine monitoring is undertaken by all M&E officers and desk officers at district, ADD and department levels. SAPP has a full-time M&E officer from the MoAFS Department of Agricultural Planning Services (DAPS). DAPS' M&E Unit manages MoAFS' M&E system for all MoAFS projects, including those under the NAIP. An annual implementation report is prepared within 60 days of the end of the fiscal year with all M&E officers. This report forms the basis for an annual NAIP review. The agriculture sector review then feeds into the Malawi Growth and Development Strategy review mechanism. Additional studies are undertaken to evaluate achievement of programme goals and objectives. A SAPP logical framework integrates the indicators selected from the IFAD core indicators, as well as general and sector-specific (NAIP) indicators.

48. Through a comprehensive KM&C Strategy, SAPP supports major learning processes to change practices and raise awareness of more efficient and sustainable approaches to farming. A number of activities facilitate: (i) testing, evaluating and demonstrating improved farming approaches; (ii) on-farm adaptive trials and demonstrations; (iii) technical training and study tours; (iv) support for farmer-to-farmer learning; and (v) close two-way communication between research and extension.

49. Within SAPP, KM processes ensure that generated knowledge is systematically identified, analysed, documented and shared. This knowledge contributes to improving the key incentives, instruments, services and institutions that comprise the agricultural and rural policy framework. It also supports capacity-building and institutional strengthening activities for several stakeholders, including service providers, farmers' organizations and government departments.

D. Proposed amendments to the financing agreement

50. The financing agreement will be amended to incorporate the additional financing of US$20 million which, together with the original financing, amounts to US$71.1 million contributed by IFAD, the Government of Malawi, beneficiaries and the private sector. Not included in the original financing agreement, private sector contribution will be added.

V. Legal instruments and authority

51. A financing agreement between the Republic of Malawi 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.

52. The Republic of Malawi is empowered under its laws to receive financing from IFAD.

53. 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

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

> RESOLVED: that the Fund shall provide a loan on highly concessional terms to the Republic of Malawi in an amount of seven million three hundred thousand special drawing rights (SDR 7,300,000) 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 Debt Sustainability Framework grant to the Republic of Malawi in an amount of two million seven hundred thousand special drawing rights (SDR 2,700,000) and upon such terms and conditions as shall be substantially in accordance with the terms and conditions presented herein.

Gilbert F. Houngbo
President

Updated logical framework incorporating the additional financing

Results Hierarchy	*Indicators*						*Means of Verification*			*Assumptions*
	Name	*Baseline*	*Mid-Term*	*Original Target*	*AF Target*	*End Target*	*Source*	*Frequency*	*Responsibility*	
Outreach	**1.b Estimated corresponding total number of households members**						Annual progress report	Annually	M&E & Component leader	
	Household members - Number of people			1000000	303 750	1 303 750				
	1.a Corresponding number of households reached						Annual progress report/ Database	Annually	M&E & Component leader	
	Non-women-headed households - Number			120000	36450	156450				
	Women-headed households - Number			80000	24300	104300				
	Households - Number			200000	60 750	260 750				
	1 Persons receiving services promoted or supported by the project								M&E	
	Males - Number			100000	30 375	130 375				
	Females - Number			100000	30 375	130 375				
	Young - Number			60000	9 113	69 113				
	Non young - Number			140000	21 262	161 262				
	Total number of persons receiving services - Number of people			200000	60 750	260 750				
Project Goal Contribute to reduction of poverty and improved food security among the rural population.	**Prevalence rates for rural poverty in project districts decline by 20%**						1) Baseline and final impact / RIMS survey 2) KAP food survey 3) Integrated household panel survey (IHPS) conducted by the National Statistical Office (NSO) 4) Agriculture Production Estimates Survey (APES) conducted by the Department of Agricultural Planning Services with NSO	Every five years		Absence of significant external shocks (economic, climatic, etc.)
	Rural poverty rate - Percentage (%)	49.2		39		39				
	Households experiencing one hungry season decreased from 29% to 21% in project districts (RIMS)							Every five years		
	Households - Percentage (%)	29		21		21				
	Targeted households with improvement of at least 20% in household assets ownership index (RIMS)									
	Households - Percentage (%)			30		30				
	Prevalence of chronic malnourished children decreased									
	Chronic malnourished children - Percentage (%)	35		30		30				
	Targeted households with increased dietary diversification (ASWAp 3)									
	Households - Percentage (%)			50		50				
Development Objective A viable and sustainable smallholder agricultural sector employing good agricultural practices (GAPs)	**Increase of land under improved management practices (GAPs)**						1) Baseline and final impact / RIMS survey 2) KAP survey on GAPs and other adoption surveys (ASWAp, ASWAp-SP) 3) Annual outcome survey covering farmers' perception on			1) Farming system resilient to climatic shocks 2) Farmers are well linked to input and output markets
	Increase - Percentage (%)			30	10	40				

Results Hierarchy	*Indicators*						*Means of Verification*			*Assumptions*
	Name	*Baseline*	*Mid-Term*	*Original Target*	*AF Target*	*End Target*	*Source*	*Frequency*	*Responsibility*	
	Targeted households reporting improvement in fertility and reduction in use of inorganic fertilizer for similar or higher crop yield						the GAPs (focus groups, key informants)			
	Households - Percentage (%)			50		50				
	1.2.4 Households reporting an increase in production							Annually	M&E	
	Households - Percentage (%)			50		50				
	Women-headed households - Number			40 000	12 150	52 150				
	Non-women-headed households - Number			60 000	18 225	78 225				
	Young-headed households			30 000	9 113	39 113				
	Non-young-headed households			70 000	21 263	91 263				
	Households - Number			100 000	30 375	130 375				
	3.1.4 Land brought under climate-resilient practices							Annually	DAES/DLRC	
	Hectares of land - Area (ha)									
Outcome 1. Appropriate agricultural technologies/GAPs developed and understood by potential beneficiaries	**Targeted households who perceived that legume varieties produced by research for intercropping with cereals are suitable**						1) Annual outcome survey covering farmers' perception on the GAPs released / promoted by research (focus groups, key informants) 2) Socio-economic survey 3) KAP survey on GAPs 4) Project baseline			GAP packages suitable for adoption by target groups will be identified and accepted by potential beneficiaries.
	Households - Percentage (%)			50		50				
	Technologies evaluated that meet farmer criteria with respect to yield, fit in cropping system, food (seed size, colour, cooking, taste), storage characteristics									
	Technologies - Percentage (%)			60		60				
	% of farmers participating in the evaluation of GAPs in on-farm trials are women and % of them indicate that GAPs respond to their concerns									
	Female farmers - Percentage (%)			50		50				
	Farmers indicating that GAPs respond to their concerns - Percentage (%)			35		35				
	1.2.2 Households reporting adoption of new/improved inputs, technologies or practices									
	Households - Percentage (%)			50		50				
Output 1.1 Action research programmes which develop/refine GAP packages adapted to various agro-ecological and socio-economic contexts	**GAP technologies adapted and released by DAR disaggregated by commodity and area of focus**						1) Extension circulars on GAP release 2) Reports of trials and demonstration 3) Measurements of crop productivity 4) Annual outcome survey covering farmers' perception of technologies tested on-farm and of key informants (lead farmers, AEDOs, etc.) 5) Reports of annual review meetings			1) Suitable GAPs already exist on the shelf; Staff have skills 2) Germplasm available through collaboration with CGs 3) Farmers actively participate in adaptive research activities 4) Consultation of farmers by research
	GAP technologies - Number			20		12				
	Beans Varieties - Number									
	Cowpeas variety - Number									
	Agronomic technologies - Number									

Results Hierarchy	*Indicators*						*Means of Verification*			*Assumptions*
	Name	*Baseline*	*Mid-Term*	*Original Target*	*AF Target*	*End Target*	*Source*	*Frequency*	*Responsibility*	
	Stress tolerant varieties recommended/released for various agro-ecologies in Malawi (disease, nutrient, parasitic weeds and water)									
	Varieties - Number			8		8				
	Number of GAPs released that reduce labour for women									
	GAPs - Number									
	Government officials and staff trained (RIMS)									
	Males - Number			360		360				
	Females - Number			240		240				
Output 1.2 On-going processes for certifying legume seed for multiplication and farmer use	**Estimated demand for pre-basic and basic seed for legume by species is covered by the production of DARS**						1) Reports 2) Focused survey of seed multiplication sites			1) Budget availability 2) Weather conditions conducive 3) Basic and G1 seed available in adequate quantities
	Demand - Percentage (%)			50		50				
	Quantity of legume seed certified annually by SSU, disaggregated by main species									
	Legume seed - Number									
	Beans - Number									
	Cowpeas - Number									
	Groundnuts - Number									
	Pigeon peas - Number									
	Soyabeans - Number									
	Seed produced by local farmer groups being QDS certified									
	Seeds - Percentage (%)			50						
Outcome 2. Widespread farmer adoption of crops and livestock GAPs leading to improved agricultural productivity and nutrition	**Lead farmers have improved knowledge and skills in GAPs of their speciality and operate at least one demonstration plot per annum**						1) Lead farmers' database 2) Quarterly and annual progress reports from districts and implementing partners 3) Survey on extension staff and lead farmers' knowledge and skills 4) KAP GAPs survey 5) Baseline and final impact / RIMS survey			Farmers will be willing and able to procure the necessary inputs to sustain use of GAPs after support ends
	Farmers - Number of people			10000	3 000	13 000				
	Women - Percentage (%)			50		50				
	Targeted farmers consider that at least 2 GAPs have been useful to improve their farming system, disaggregated by gender									
	Farmers - Percentage (%)			50		50				
	Males - Percentage (%)			60		60				
	Females - Percentage (%)			40		40				
	Targeted farmers satisfied with agricultural advisory services disaggregated by gender									
	Farmers - Percentage (%)			50		50				
	Males - Percentage (%)			60		60				
	Females - Percentage (%)			40		40				
	Targeted farmers satisfied seed availability and access, disaggregated by gender						1) AOS 3 Lead farmers' database 2) Quarterly and annual progress reports from districts and implementing			
	Farmers - Percentage (%)			50		50				
	Males - Percentage (%)			60		60				
	Females - Percentage (%)			40		40				

Results Hierarchy	*Indicators*						*Means of Verification*			*Assumptions*
	Name	*Baseline*	*Mid-Term*	*Original Target*	*AF Target*	*End Target*	*Source*	*Frequency*	*Responsibility*	
							partners 3) Survey on extension staff and lead farmers' knowledge and skills 4) KAP GAPs survey 5) Baseline and final impact /			
	Village/community plans formulated (RIMS)						1) Lead farmers' database 2) Quarterly and annual progress reports from districts and implementing partners 3) Survey on extension staff and lead farmers' knowledge and skills 4) KAP GAPs survey 5) Baseline and final impact / RIMS survey			
	Plans - Number			2682		2682				
	1.2.2 Households reporting adoption of new/improved inputs, technologies or practices									
	Households - Percentage (%)			50		50				
	3.2.2 Households reporting adoption of environmentally sustainable and climate-resilient technologies and practices									
	Households - Percentage (%)			50		50				
	1.2.8 Number of women reporting improved quality of their diets									
				12 000	5 600	17 600				
Output 2.1 Improved agricultural extension services accessible to women, men and youth groups (raising awareness and sensitizing about use of GAPs)	**1.1.4 Persons trained in production practices and/or technologies**						1) Lead farmers' database 2) Quarterly and annual progress reports from districts and implementing partners	Quarterly	DCD/DAHLD	1) Adequate number of suitably qualified extension service providers will be available 2) Adequate research-extension-farmer linkages
	Men trained in crop - Number			50000	25 000	75 000				
	Women trained in crop - Number			50000	25 000	75 000				
	Men trained in livestock - Number			50000	25 000	75 000				
	Women trained in livestock - Number			50000	25 000	75 000				
	Total persons trained in crop - Number of people			100000	50 000	150 000				
	Total persons trained in livestock - Number of people			100000	50 000	150 000				
	Households accessing goats on pass on							Quarterly	DAHLD	
	Total HHs - Number			16 590	4 505	21 095				
	Non-women-headed households			8 295	2 253	10 548				
	Women-headed households			8 295	2 253	10 548				
	Households accessing chickens on pass on							Quarterly	DAHLD	
	Total Hhs - Number			16 590	7 241	23 831				
	Non-women-headed households			8 295	3 621	11 916				
	Women-headed households			8 295	3 621	11 916				
	People accessing facilitated advisory services (RIMS)									

Results Hierarchy	Indicators						Means of Verification			Assumptions
	Name	Baseline	Mid-Term	Original Target	AF Target	End Target	Source	Frequency	Responsibility	
	Males - Number			72000	33 120	105 120	1) Lead farmers' database 2) Quarterly and annual progress reports from districts and implementing partners		DARS/DAES/ DCD/DLRC/D AHLD	
	Females - Number			62280	33 631	95 911				
	Number of farmer groups/ projects accessing VCF									
	Number			550	460	1 010				
	People accessing development funds (RIMS)						1) Lead farmers' database 2) Quarterly and annual progress reports from districts and implementing partners			
	Males - Number			100000	5 000	105 000				
	Females - Number			50000	2 500	52 500				
	3.1.4 Land brought under climate-resilient practices						1) Lead farmers' database 2) Quarterly and annual progress reports from districts and implementing partners			
	Hectares of land - Area (ha)			20000	10 000	30 000				
	3.1.2 Persons provided with climate information services						Progress Reports	Annually	DLRC	
	Males - Number			60 000	20 000	80 000				
	Females - Number			40 000	15 000	55 000				
	Young - Number			30 000	5 000	35 000				
	Not Young - Number			70 000	30 000	100 000				
	Persons provided with climate info services - Number			100 000	35 000	135 000				
	2.1.2 Persons trained in income-generating activities or business management									
	Males - Number			97 040						
	Females - Number			74 576						
	Young - Number									
	Not Young - Number									
	Persons trained in IGAs or BM (total) - Number			171 616						
	2.1.3 Rural producers' organizations supported									
	Rural POs supported - Number			3 600						
	Total size of POs - Number of people									
	Males - Number			38 880						
	Females - Number			38 880						
	Young - Number									
	Not Young - Number									
	Women in leadership position - Number			2 000						
Output 2.2 Women, men and youth target group has	**MT of improved legume seeds produced by year by seed producer farmer groups**						1) Records maintained by partners engaged to undertake seed multiplication and			It will be possible to engage suitable partners for seed
	Legume seeds produced - Weight (t)			900	200	1 100				

Results Hierarchy	*Indicators*						*Means of Verification*			*Assumptions*
	Name	*Baseline*	*Mid-Term*	*Original Target*	*AF Target*	*End Target*	*Source*	*Frequency*	*Responsibility*	
access to necessary inputs for sustained adoption of GAPs							distribution 2) Lead farmers' database 3) Quarterly and annual progress reports from districts and implementing partner			multiplication and distribution, agro-dealer support and rural financial services
	1.1.3 Rural producers accessing production inputs and/or technological packages									
	Males - Number									
	Females - Number									
	Young - Number									
	Not Young - Number									
	Total rural producers - Number			10 000						
	2.1.3 Rural producers' organizations supported						Records			
	Rural POs supported - Number			500						
	Total size of POs - Number of people			10 000						
	Males - Number			5 000						
	Females - Number			5 000						
	Young - Number									
	Not Young - Number									
	Women in leadership position - Number			250						
	1.1.7 Persons in rural areas trained in financial literacy and/or use of financial products and services									
	Males - Number			6 354						
	Females - Number			7 166						
	Young - Number			769						
	Not Young - Number									
	1.1.8 Households provided with targeted support to improve their nutrition						Records, progress reports			
	Households - Number			25 000	11 000	36 000				
	Males - Number			10 000	4 000	14 000				
	Females - Number			15 000	7 000	22 000				
	Young - Number			5 000	1 500	6 500				
	Households using cook stoves						Progress reports	Semi-annually		
	Total HHs - Number			25 000	5 550	31 000				
	Non-women-headed households - Number			10 000	2 220	12 220				
	Women-headed households - Number			15 000	3 330	18 330				

Updated summary of the economic and financial analysis

Table A
Financial cash flow models

Table A summarizes the most representative financial models including the cash flow for 10 years (in local currency) and profitability indicators.

A)		Model'net incremental benefits (USD)																		
		Blantyre & Chiradzulu			Lilongwe West & East			Chitipa			Nkhotakota			Balaka			Chicken Pass-on	Goats Pass-on	VCF Chicken	Seed multiplication
		Maize	Maize/ppea	Maize/bean	Maize	Maize/grnut	Maize/bean	Maize	Maize/grnut	Maize/bean	Maize	Maize/ppea	Maize/grnut	Maize	Maize/ppea	Maize/grnut				
FINANCIAL ANALYSIS	PY1	-56	-12	-50	-46	-67	102	-51	-36	-34	-46	-8	-76	-68	-4	46	-83	-387	-124	48
	PY2	-16	23	3	-15	-21	187	-5	-9	-10	-15	40	-32	-61	60	113	-14	39	34	94
	PY3	35	67	71	25	38	294	52	25	21	24	101	23	-51	139	198	36	50	34	141
	PY4	86	111	138	64	96	401	110	59	51	62	162	78	-41	219	282	36	67	34	187
	PY5	86	111	138	64	96	401	110	59	51	62	162	78	-41	219	282	36	169	34	187
	PY6	86	111	138	64	96	401	110	59	51	62	162	78	-41	219	282	36	169	34	187
	PY7	86	111	138	64	96	401	110	59	51	62	162	78	-41	219	282	35	169	34	187
	PY8	86	111	138	64	96	401	110	59	51	62	162	78	-41	219	282	34	169	34	187
	PY9	86	111	138	64	96	401	110	59	51	62	162	78	-41	219	282	15	169	34	187
	PY10	86	111	138	64	96	401	110	59	51	62	162	78	-41	219	282	15	169	34	187
Increase in Gross margin (%)		150%	17%	116%		30%		260%	15%	8%	24%	43%	38%		2007%	92%	78	399	6.699	1.093
Increase in Gross margin (USD)		40	82	87	4	59	221	60	27	15	3	42	98	- 86	167	207	23%	23%	26%	-
Increase in Return to Family labor		120%	10%	74%		14%		203%	6%	16%	20%	22%	20%		1499%	56%				

Table B
Programme costs and logframe targets

Table B provides information on total project costs (broken down by component) and beneficiaries (broken down by category). This table also includes logframe targets as per the EFA.

B)				
PROJECT COSTS AND INDICATORS FOR LOGFRAME				
TOTAL PROJECT COSTS (in Million USD)		$ 20,0	PMU	1
Beneficiaries	**60.750**			
Cost per beneficiary	**329,22**		**Adoption rates**	**75%**
Components and Cost (000 USD)		**Outcomes and Indicators**		
Component 1	A. Adaptive Research	Farmer managed on-farm trials		98
		Hectares served with Inputs for pre-basic and basic seeds		17
Component 2	B. Farmer adoption of GAPs	Farmers with access to stoves		6.000
		Lead farmers supported		1.000
Component 3	C. Programme Management and Coordination	PMU		1

Table C
Main assumptions and shadow prices

Table C shows the basic assumptions on yields and process for the main inputs and outputs. The economic section shows shadow prices used in the conversion.

C)	MAIN ASSUMPTIONS & SHADOW PRICES			
FINANCIAL	**Output**	% Increase in yields	**Input prices**	Price (Kw)
	Maize	145%	NPK	420
	Maize / Pigeon pea	144%	Urea	370,00
	Maize / beans	56%	Seed maize	1550
	Maize / groundnuts	56%	Sacks (50kg)	200,00
ECONOMIC	Official Exchange rate (OER)	746	Economic discount rate	12%
	Shadow Exchange rate (SER)	767	Financial discount rate	6,5%
	Standard Conversion Factor	1,03	Non tradable goods CF	1,00
			Output CF	1,12
	Labour Conversion factor	0,31	Input CF	0,82

Table D
Beneficiary adoption rates and phasing

Table D shows the total number of project beneficiaries, subdivided into activities and phased following the inclusion pattern envisaged by the project and reflected in the EFA and COSTAB.

D)				
Calendar	**2020-21**	**2021-2022**	**2022-2023**	**Total**
Agricultural Models				
Lilongwe District	7.776	7.776	7.776	23.328
Acumulated	7.776	15.552	23.328	-
Blantyre District	1.944	1.944	1.944	5.832
Acumulated	1.944	3.888	5.832	-
Chirdzulu District	1.458	1.458	1.458	4.374
Acumulated	1.458	2.916	4.374	-
Balaka District	1.944	1.944	1.944	5.832
Acumulated	1.944	3.888	5.832	-
Nkhotakota District	1.782	1.782	1.782	5.346
Acumulated	1.782	3.564	5.346	
Chitipa District	1.296	1.296	1.296	3.888
Acumulated	1.296	2.592	3.888	
Livestock Models			**Farmers**	**48.600**
Goats	1.354	1.797	1.354	4.504
Chicken	2.172	2.897	2.172	7.242
VCF Model	1.920	1.680	1.920	5.520
Seed Multiplication	500	500	500	1.500
Cooking Stoves	2.000	2.000	2.000	6.000
	Others avoiding double counting			**12.150**
	Total			**60.750**

Table E
Economic cash flow

Table E presents the overall project aggregation. Include the net incremental benefits of each financial model in economic terms, converted using shadow prices (table C) and multiplied by the number of beneficiaries (table D). Net incremental costs are to present all additional project costs. Last column indicates net cash flow to be used to calculate project profitability indicators such as NPV and economic IRR (EIRR).

E)										
In 000 USD										
Economic Analysis	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Total incremental benefits livestock	-$ 479	-$ 750	-$ 539	$ 1.012	$ 2.596	$ 3.904	$ 4.774	$ 5.325	$ 5.612	$ 5.539
Total incremental benefits crop	-$ 10	$ 7	$ 206	$ 880	$ 2.406	$ 3.280	$ 2.824	$ 3.734	$ 3.659	$ 2.772
VCF Vertical Integration Model	-$ 194	-$ 97	-$ 58	$ 209	$ 209	$ 209	$ 197	$ 198	$ 197	$ 209
Cookings Stoves	$ 94	$ 193	$ 293	$ 299	$ 293	$ 293	$ 293	$ 299	$ 293	$ 293
Seeds Multiplication Scheme	$ 156	$ 322	$ 523	$ 469	$ 469	$ 469	$ 469	$ 469	$ 469	$ 469
Total Benefits	-$ 433	-$ 326	$ 425	$ 2.869	$ 5.972	$ 8.154	$ 8.556	$ 10.025	$ 10.229	$ 9.282
Total Incremental Costs	$ 5.555	$ 4.502	$ 5.290	$ 1.174	$ 1.174	$ 1.174	$ 1.174	$ 1.174	$ 1.174	$ 1.174
Benefits-Costs	-$ 5.988	-$ 4.827	-$ 4.866	$ 1.695	$ 4.799	$ 6.981	$ 7.383	$ 8.851	$ 9.056	$ 8.108
IRR	**28,4%**									
NPV USD '000 @12%	**$ 22.595,0**									

Table F
Sensitivity analysis

The results show that the Scaling-Up phase can face significant drops in benefits and still be highly profitable. As an example, a drop of 50% in benefits would take the IRR to 20.9%.

F)	Adoption Rates	
	IRR	NPV (Kw)
base scenario	28,4%	22.594,95
costs +10%	26,3%	20.768,71
costs +20%	24,4%	18.942,47
costs +50%	19,8%	13.463,74
benefits +10%	30,6%	26.680,69
benefits +20%	32,6%	30.766,43
benefits -10%	26,1%	18.509,22
benefits -20%	23,5%	14.423,48
benefits -50%	20,9%	10.414,99
benefits postipated 1 yr	23,6%	17.337,38
benefits postipated 2 yrs	20,1%	12.757,79