IFAD
Investing in rural people

Republic of Malawi

Enhancing the Resilience of Agro-ecological Systems Project (Global Environment Facility - Integrated Approach Pilot)

Detailed design report

Main report and appendices

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East and Southern Africa Division

Programme Management Department

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Currency equivalents

Currency Unit	=	Malawian Kwacha (MK)
US$1.0	=	MK 580

Weights and measures

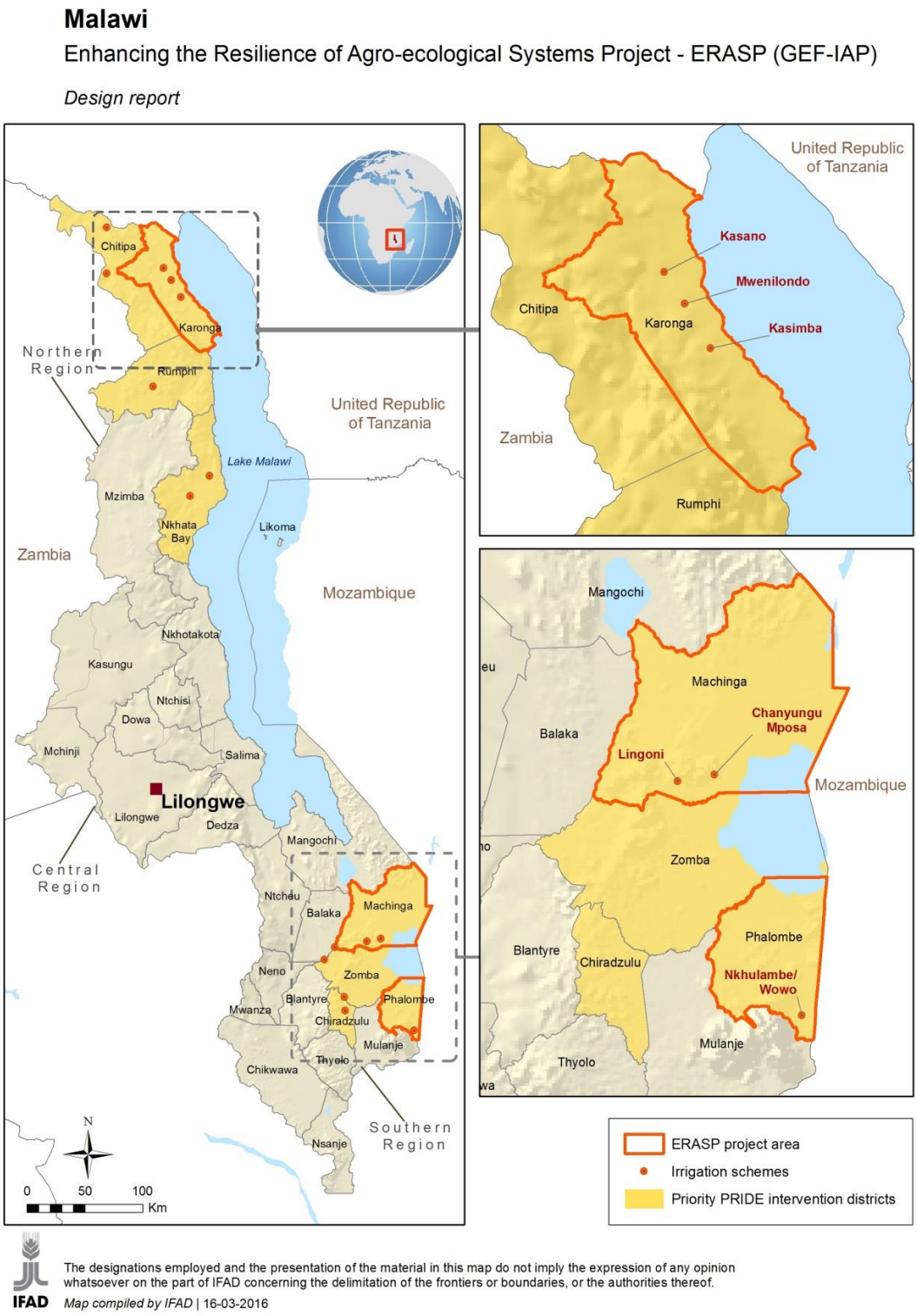
1 kilogram	=	1000 g
1 kg	=	2.204 lb.
1 kilometre (km)	=	0.62 mile
1 metre	=	1.09 yards
1 square metre	=	10.76 square feet
1 acre	=	0.405 hectare
1 hectare	=	2.47 acres

Abbreviations and acronyms

ASWAp	Agriculture Sector Wide Approach
AWPB	Annual Work Plan and Budget
CA	Conservation Agriculture
CAADP	Comprehensive Africa Agriculture Development Programme
CAMP	Catchment Area Management Plans
CBNRM	Community-based Natural Resource Management
COSOP	Country Strategic Opportunity Programme
CRT	Conventional Ridge Tillage
CMC	Catchment Management Committee
DADO	District Agriculture Development Officer
DAES	Department of Agriculture Extension Services
DATAR	Diversity Assessment tool for Agro-Biodiversity and Resilience
DC	District Councils
DIO	District Irrigation Officer
DOI	Department of Irrigation
EAD	Environmental Affairs Department
EIRR	Economic Internal Rate of Return
EPA	Extension Planning Area
ERASP	Enhancing the Resilience of Agro-Ecological Systems Project
Ex-Act	Ex-Ante Carbon Balance Tool
FAO	Food and Agriculture Organisation
FGDs	Focus Group Discussions
FISP	Farm Input Subsidy Programme
FMA	Financial Management Assessment
FY	Financial Year
GALS	Gender Action Learning System
GAPs	Good Agricultural Practices
GEBs	Global Environmental Benefits
GDP	Gross Domestic Product
GHG	Greenhouse Gas Emissions
GEF	Global Environment Facility
GEF-IAP-FS	GEF Integrated Approach Pilot Program Fostering Sustainability and Resilience for Food Security in Sub-Saharan Africa
GFCS	Global Framework for Climate Services
GIS	Geographical Information System
GOM	Government of Malawi
HH	Households
ICT	Information and Communications Technologies
IFAD	International Fund for Agricultural Development
IRLADP	Irrigation Rural Livelihoods and Agricultural Development Programme
IAP	Integrated Approach Pilot
KM	Knowledge Management
LDSF	Land Degradation Surveillance Framework
LRCD	Land Resources and Conservation Department
MET	Meteorological (Services)
M&A	Monitoring and Assessment
M&E	Monitoring and Evaluation
MDG	Multilateral Environmental Agreements
MEA	Millennium Development Goal
MK	Malawian Kwacha
MOAIWD	Ministry of Agriculture Irrigation and Water Development
MOLHUD	Ministry of Finance, Economic Planning and Development
MoFEDP	Ministry of Lands, Housing and Urban Development
MoLGRD	Ministry of Local Government and Rural Development
MONREM	Ministry of Natural Resources, Energy and Mining
MPAT	Multi-dimensional Poverty Assessment Tool
MTR	Mid-Term Review
NAPA	National Adaptation Programme of Action
NASFAM	National Smallholder Farmers Association of Malawi
NCCIP	National Climate Change Investment Plan
NEAP	National Environmental Action Plan

NGO	Non- Government Organisation
NRM	Natural Resources Management
NPV	Net Present Value
NTFPs	Non-Timber Forest Products
NRM	Natural Resource Management
NSO	National Statistics Office
ODPP	Office of Directorate of Public Procurement
PCO	Programme Coordination Office
PDO	Project Development Objective
PCR	Project Completion Report
PRIDE	Programme for Rural Irrigation Development
RIMS	Results and Impact Management System
SAPP	Sustainable Agriculture Production Programme
SDG	Sustainable Development Goal
SLM	Sustainable Land Management
TA	Technical Assistance
TLC	Total Land Care
ToC	Theory of Change
UNDP	United Nations Development Programme
USD	United States Dollar
VFAs	Village Forest Areas
VNRMC	Village Natural Resource Management Committee
WRU	Water Resource Unit
WUA	Water User Association

Map of the project area



Executive Summary[1]

1. **Background.** The Integrated Approach Pilot (IAP) program on Fostering Sustainability and Resilience for Food Security in Sub-Saharan Africa (GEF-IAP-FS) is co-financed by the Global Environmental Facility (GEF) and targets agro-ecological systems where linkages between the need to enhance food security and the opportunities for generating global environmental benefits are evident. The program aims to promote the resilience and sustainable management of ecosystems services and to climate-proof food production systems. At the same time, it will safeguard the long-term productive potential of critical food systems in response to changing human needs. Anchoring the IAP firmly in local, national and regional policy frameworks will enable more sustainable and more resilient production systems and approaches to be scaled up across the targeted geographies. Enhancing the Resilience of Agro-ecological Systems Project (ERASP) is funded from the Land Degradation, Biodiversity and Climate Change Mitigation focal areas of Malawi's GEF allocation.

2. The concept for the ERASP was endorsed by the Government of Malawi (GoM) and approved as one of 12 country projects in Africa under the GEF-IAP-FS by the GEF Council in June 2015. Each country project will contribute to the collective impact of the GEF-IAP-FS, which is intended to inform approaches to food towards win-win solutions between food production and maintaining ecosystem services, in the face of increased climate variability and shocks. The regional program will generate knowledge exchange, deliver training; develop knowledge management products and have an advocacy function which draws upon and creates visibility for the anticipated success stories from the country projects at the level of sub-regional and regional bodies within the context of food security debates and policy making. IFAD is the Lead Agency for the GEF-IAP-FS.

3. ERASP is fully aligned with the GoM's Growth and Development Strategy II (2011-2016), the Agricultural Sector Wide Approach (ASWAp) and the 2010 Agricultural Policy, and the 2015 National Climate Change Investment Plan. The project will support the implementation of the National Water Resources Act passed in 2013, which establishes Catchment Management Committees for catchment conservation and management and the 1997 Forestry Act which established Village Natural Resource Management Committees (VNRMCs). The project will directly contribute to seven of the 17 Sustainable Development Goals (SDG) as well as contribute to targets and goals of three important UN multilateral environmental Conventions (land degradation, biodiversity and climate change). ERASP is aligned to the IFAD Strategic Framework 2016-2025, the IFAD 2012-2015 Malawi Country Strategic Opportunities Programme (COSOP) and the incoming COSOP, which is being designed with a focus on improved access to food, income and assets as well as enhanced resilience to external shocks.

4. **Rationale and Approach.** The ERASP will build primarily on the Programme for Rural Irrigation Development (PRIDE) as the co-financing baseline investment. PRIDE was approved by IFAD's board in December 2015 and aims to transform smallholder farming within an intervention area covering about 15 medium-sized irrigation schemes prioritized in Malawi's National Irrigation Master Plan and Investment Framework (2015) in Northern and Southern Malawi. Irrigation infrastructure, climate-smart agricultural practices for rain-fed and irrigated land and market linkages are the 'game-changers' that will support this transformation. The other baseline

[1] Mission composition: Ms Paxina Chileshe, Climate Change Adaptation Specialist; Ms Rikke Grand Olivera, Senior Technical Specialist, Natural Resources Management, IFAD; Ms Jessica Troni, Economist and Climate Change Specialist, Consultant (technical team leader); Ms Elisa Distefano, Monitoring and Evaluation Specialist, Consultant; Mr. Giacomo Branca, Economist, Consultant.

investment that ERASP will benefit from is the IFAD supported Sustainable Agricultural Production Programme (SAPP), which will provide support for establishing and/or strengthening village saving and lending clubs and share approaches to promote conservation agriculture practices.

5. Two risks in the wider landscape may impact medium to long -term sustainability of the PRIDE irrigation investments. The first is the level of sedimentation washed down from the upper catchments which has been shown to raise maintenance costs and over time lead to flooding; and the second is securing sufficient surface water to feed the irrigation systems, considering also the impacts of climate change on rainfall variability in Malawi. The mitigation of these two risks requires effective land and water management in the wider catchment area. Secondly, 70 percent of the hectares covered by PRIDE are rain-fed areas, which used to benefit from surface waters that have lower flows, many of which run dry for longer periods of the year. This is caused by a combination of climate change and the effects of catchment degradation including deforestation and lack of vegetation cover and results in floods as well as dry spells and droughts which undermine food security and growth.

6. The solution to be supported by this project is an integrated strategy in three main areas. The first area is joint natural resources management at landscape level through development of catchment management plans and establishment of catchment management committees, provisioned for under the 2013 Water Resources Act. The emphasis will be on achieving evidence-based and coordinated development planning based on a pathway to achieving a shared vision for resources governance and sustainable use in the catchment. VNRMCs will be formalised and will be given the tools needed to develop and enforce village level land use plans in line with the overall catchment plans. The second area of intervention will be to conserve the wider catchment area and rehabilitate the land, in order to improve ecosystem services and secure the medium-term benefits of the irrigation investment. This will be done through fuel wood efficiency measures; promoting sustainable production and harvesting of biomass energy resources from communally managed woodlots and pilot small biogas systems; and increasing the incentives to protect forested areas through production of non-forest timber products (NTFPs). Land rehabilitation in sensitive catchment areas will also be carried out. The third area of intervention will be to improve soil fertility, soil moisture availability and farm management strategies including diversification of crop varieties in order to raise agricultural resilience, productivity and nutritional security. Monitoring and assessment of ecosystem services, resilience and food security in the catchment areas will be carried out in order to: monitor progress and effectiveness of the implemented measures; allow for adaptive catchment planning and management; provide evidence for promoting policy mainstreaming; and strengthen the sustainability of ERASP outcomes.

7. Achieving sustained food security will require increasing the returns from sustainable land management to a level that enables people to move out of poverty, recognising that this can only be achieved through an integrated agricultural and natural resources development approach given the high population densities and small landholdings. The approach taken is a programmatic blending of complementary development strategies to achieve this objective. The long-term sustainability of ERASP activities and attainment of the development objective is dependent on, (a) achieving ownership by the local communities of the catchment management plans (b) providing the tools and means for those plans to be implemented and enforced, and (c) realising economic benefits for households and communities from sustainable land management. ERASP has a strong emphasis on training and skills development and integrated planning approaches as the means to delivering catchment management benefits.

8. The added value of ERASP to PRIDE lies in three areas. The first is ERASP focuses on a comprehensive planning process for the sub-catchments, including PRIDE sites, while PRIDE focuses on the institutional architecture as it relates to the functioning of the irrigation schemes. The second is that ERASP adds an agro-ecological approach to improving food security which will

complement PRIDE's livelihood and marketing approach. In this, ERASP has developed a comprehensive strategy to reduce land degradation, as one of the pathways to improve food security, through biomass energy efficiency, biomass energy production and forest land and water conservation measures. The third is that while PRIDE has a major focus on irrigation, high value crops, value addition and marketing, ERASP will raise agricultural yields on rain-fed farming systems through climate-smart and conservation agricultural methods, supported by credit provision through village lending and saving clubs (SAPP investments).

9. ERASP has prioritized for investments in catchment area management, five of the most vulnerable catchment areas with PRIDE investments. The catchments were selected through a two-step process reflecting the project's targeting priorities. The criteria for selection among the catchments of 15 PRIDE investment sites included: i) level of food insecurity; ii) district average maize production per ha; iii) rainfall variability measured over the period 1985-2012; iv) drought occurrence measured over the last 20 years; v) flood risk; and vi) soil erosion measured over the last 20 years. In general the catchments in the south are more vulnerable than in the north. A second selection step included a further situation diagnostic based on focus group discussions and a household survey where 323 randomly sampled respondents were interviewed. As a result five sub-catchments of PRIDE investment sites in three districts (two in Karonga, two in Machinga and one in Phalombe) were selected for the ERASP interventions covering an estimated 35,000 hectares and involving at least seven Extension Planning Areas (EPAs).

10. The target group of the ERASP is defined as smallholder farmers in the selected catchment areas of the PRIDE investment sites. The project aims to reach 32,100 households in three Districts. Within this group, a primary target group comprises households that are particularly food insecure and produce mainly for subsistence, willing to seek increased land and water productivity through catchment area conservation and sustainable land management practices. The global environmental benefits that the ERASP will generate include scaling up rehabilitation of ecosystem goods and services (carbon stocks, productive land, and diversity of genetic resources for food and agriculture) in the selected catchments that contain the agricultural productive systems on which the target group of smallholders depend for their livelihoods and food security.

11. The Goal of the project is to improve food and nutrition security of rural communities in the targeted catchment areas. The Project Development Objective (PDO) is to enhance the provision of ecosystem services and improve the productivity and resilience of agricultural systems of vulnerable rural poor. This objective encompasses three sub-objectives of addressing land degradation, loss of agro-biodiversity and climate change adaptation and mitigation. Through catchment management and SLM practices, supported by access to market and credit facilitated by the baseline investments, the project aims to reduce food insecurity from an average of four to five months in the five catchments to less than two months, a 20 percent reduction in child malnutrition, and reaching 25,680 farmers (30 percent being women) reporting yield increase above 20% from rain-fed crop and livestock production.

12. The Ministry of Agriculture, Irrigation and Water Development will be the Executing Agency, as it is for the PRIDE investment and will be the main accountable entity for the project results. The Environmental Affairs Department will provide joint management oversight with the Department of Irrigation. Implementation of ERASP will be managed by the PRIDE Programme Coordination Office (PCO) comprised by dedicated and highly qualified personnel competitively recruited from the labour market. An environmental specialist will be recruited to coordinate ERASP together with similar components in PRIDE. S/he will report to the PRIDE Programme Coordinator. The catchment management committees will be coordinated by the three Water Resources Officers belonging to the existing network of hydrometric Districts (which follow catchment boundaries). In turn, land-use planning and natural resources management at the

village level will be coordinated by the District Water officials. The extension network already facilitates the action planning at the village level.

13. Total ERASP costs including price and physical contingencies, duties and taxes are estimated at USD 10.6 million over the seven-year Project implementation period. Of this amount about USD 1.4 million (13% of total project costs) represents the foreign exchange content, USD 1.6 million (15%) are duties and taxes. Total base costs amount to USD 9.7 million, while physical and price contingencies are estimated to add to this amount another USD 0.3 and 0.5 million (corresponding to 3 and 5% of the base costs) respectively. Investment costs account for 90% of the base costs (and recurrent costs for remaining 10%). Project investments are organized into four components: (i) Multi-stakeholder institutional framework for integrated catchment area management; (ii) Scaling up catchment level, sustainable land management practices; (iii) Monitoring and assessment of ecosystem services, resilience and food security; and (iv) Project coordination. Funds allocated to Project management and coordination amount to about USD 0.5 million or 3% of the baseline Project costs.

14. The overall Economic Internal Rate of Return (EIRR) of the Project is estimated at 27.5 percent (base case) which is above the opportunity cost of capital in Malawi estimated at 25 percent (see Table 2 above), indicating the economic convenience of the Project. The EIRR is estimated in a conservative way as it is based only on the assumption that only 80 percent of target farmers will adopt technology packages promoted by the Project. In case of higher percentage adoption, the EIRR will increase. The Net Present Value (NPV) is USD 7 million over the 20-year period of analysis, with the benefit stream based on the quantifiable benefits that relate directly to the activities undertaken following implementation of the components. These figures are considered as reasonable given the fact that benefits are estimated in a very conservative way. The EIRR was subject to sensitivity analysis in order to measure variations due to unforeseen factors and account for risk. Criteria adopted in the sensitivity analysis are: 10, 20 and 50 percent cost over-run, 10 and 20 percent increase in benefits, and 10 to 50% benefits decrease.

15. The environmental and social categorisation of PRIDE is A entailing Environmental and Social Impact Assessments to be conducted before the installation of irrigation infrastructure. However, the ERASP activities such as the catchment management and scaling up of sustainable land and water conservation measures and agro-livestock systems will have site specific impacts that are reversible. Therefore an environmental and social management plan will be developed for these activities according to requirements for Category B. The catchment management activities are expected to reverse land degradation and provide other benefits such as improved water security and quality. Environmental and health risks from pesticides will be mitigated through integrated pest management reducing the use of chemical pesticides.

16. The climate risk classification is moderate. Climate variability is already having a negative impact on agricultural productivity in Malawi. These are some of the risks that ERASP will be addressing. The soil and water conservation activities as well as incorporating meteorological forecasts into farm planning methodologies will enhance the resilience of the target communities.

17. Sustainability of the project approach will be generated through a strong incentive framework. Three main benefits streams are expected, two of which raise the returns to SLM. The first is increased agricultural productivity including value addition (to be provided under PRIDE); the second is expanded livelihood options derived from non-timber forest products, and the third is the time and cash savings derived from easier access to firewood and water and from reduced medical expenses due to water borne diseases in flood events as well as the averted care burden. The equitable sharing of benefits will be ensured through effective implementation of the CAMPs and the VNRMC plans. The use of recognised local level structures (Traditional Authorities and the VNRM groups) in the implementation of village-based NRM plans, which provides a pathway for

scaling up, is an integral part of the project strategy. Formalising the VRNMS into legal entities in order to boost their enforcement capacity will reinforce the benefits streams.

Summary tables of the Economic and Financial Analysis

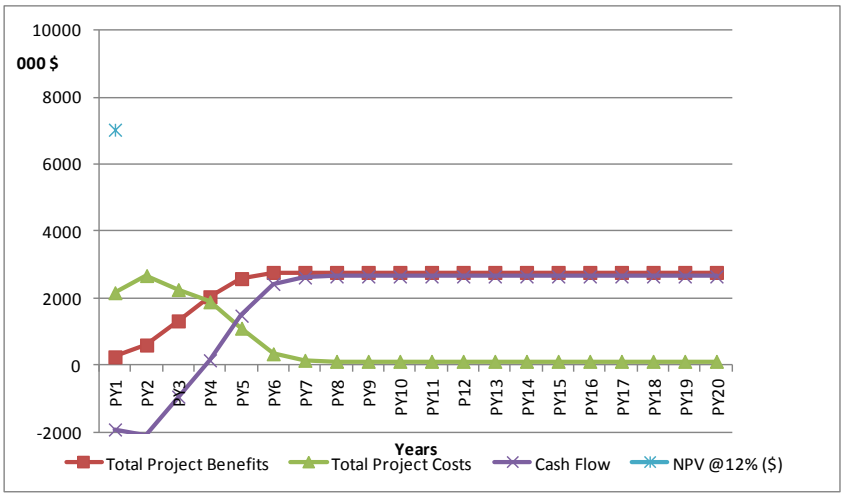
Financial returns for HH business models

Project activities	Model name	Wop/WP	Return to family labour	NPV @ 25%	B/C ratio	Annual net income before family labor	Annual net income after family labor
			USD/day	USD		USD	USD
Baseline	Maize_rainfed_conventional	WoP	1.9	362	1.5	139	150
	Groundnut_rainfed_conventional	WoP	0.8	138	1.2	80	35
Improved agriculture practices and catchment management	Maize_MSD_planting basins	WP	5.2	759	1.8	256	192
	Maize_MSD_ripping	WP	4.0	791	1.9	249	200
	Maize_MSD (ripping) & Agrofores	WP	3.7	719	1.8	231	182
	Maize_MSD (ripping) & SWC	WP	3.5	593	1.6	216	150

Direct Project Beneficiaries and Phasing

Project activities	Intervention areas & beneficiaries		Households reached									Total area
			2017	2018	2019	2020	2021	2022	2023	Total	Total incl. HH members	Ha
Improved agriculture practices and catchment management	On-farm tree planting	n.	65	65	65	65	-	-	-	259	1,297	200
	Establishment and maintenance of contour ridges in catchment areas	n.	1,297	1,946	1,946	1,946	1,038	-	-	8,171	40,856	6,000
	Improved agriculture practices (leaders - demonstration sites)	n.	1,297	1,946	1,946	1,946	1,038		-	8,171	40,856	6,300
	Sub-total		2,659	3,956	3,956	3,956	2,075	-	-	16,602	83,009	12,500
	Adopters of improved agriculture practices (followers)	n.	-	2000	3,000	3,000	3,000	1,600	-	12,600	63,000	48,510
Totals		n.	2,659	5,956	6,956	6,956	5,075	1,600	-	29,202	146,009	61,010
Phasing in		%	9	20	24	24	17	5	0	100		
Adoption rate 80%		%	7	16	19	19	14	4	0	80		

Flow of project economic costs and benefits



Sensitivity analysis for informed decision-making

	Base case scenario	Cost increments			Benefits increments		Benefits decrease			Benefits delay		Minimum number of beneficiaries
		+10%	+20%	+50%	+10%	+20%	-10%	-20%	- 50%	1 year	2 year	12,506
EIRR	**27.5%**	24.6%	22.1%	16.6%	30.7%	33.9%	24.3%	21.0%	10.7%	21.6%	17.8%	12.0%
NPV ($)	7,032,283	6,222,151	5,412,019	2,981,623	8,545,643	10,059,004	5,518,923	4,005,562	- 534,519	5,154,200	3,477,341	-

Logical Framework

A more detailed logical framework that will serve as the basis for the results-based management of the project is presented in Appendix 7
M = Machinga; P = Phalombe; and K = Karonga
Baseline figures will be adjusted during the first project year when the MPAT, LDSF, RIMS survey and DATAR is applied

Results Hierarchy	Indicators				Means of Verification			Assumption
	Name	Baseline	Midterm	End Target	Source	Frequency	Responsibility	
Goal To improve food and nutrition security of rural communities in the targeted catchment areas	- months of food insecurity disaggregated by gender of household head	Average 4-5 months[2]		< 2 months for all households	MPAT survey	Project start, mid-term and completion	PCO/DOI	
	- reduction in child malnutrition, measured by the incidence of wasting (RIMS level III – PRIDE indicator)	Tbd		20% reduction	RIMS survey			
Development Objective To enhance the provision of ecosystem services and improve the productivity and resilience of agricultural systems of vulnerable rural poor.	- farmers reporting yield increase (>20% above baseline) from improved rain-fed and livestock agricultural production disaggregated by gender of household head (RIMS 2.2.2 PRIDE indicator)	0 farmers	5,000 farmers	25,680 farmers (at least 30% from women headed households)	RIMS survey	Every two years	PCO/DOI	No major impacts of climate shocks, access to financial services, policies remain conducive to SLM practices, and 80% adoption rate of SLM practices among farmers receiving project services
	Total outreach: - Smallholder farmer households receiving project services, differentiated by gender and wealth class (RIMS 1.8.1 mandatory PRIDE indicator)	0 HH	15,000 HH	32,100 households (30% female headed)	Project progress reports (PPR)	Semi-annual		
Outcome component 1								Strengthening of the WRA and the

[2] 27% of households in EPAs in targeted catchments experience food insecurity >6 months per year, 31% experience 4-5 months, and 30% experience 2-3 months (baseline study conducted during project preparation).

Sub-catchment management committees (sub-CMC) in place as an effective NRM planning and coordination mechanism	- Sub-CMC operational after three years with active participation of upper, mid, and downstream communities (RIMS 2.1.4)	0 sub-CMCs operational in selected sub catchments	≥ 5 sub-CMCs operational	≥ 5 sub-CMCs operational	PPR	Semi-annual	PCO/DOI	hydrometric district offices will progress as planned by the government
Outputs component 1 Catchment area management plans (CAMP) developed and approved by CMCs Village natural resources management committees (VNRMC) established/ strengthened and implementing CAMP priority actions.	- CAMPs developed and approved (RIMS 1.1.13) - Groups established, men, women and youth participating, and percent of women in leadership positions (RIMS 1.1.10, 1.1.11, 1.1.12)	0 CAMP for targeted WRUs 20 existing VNRMC	≥ 5 CAMPs 40 VNRMC, > 636 participants	≥ 5 CAMPs 66 VNRMC, > 1050 participants (50% women, 15% youth, and 30% women in leadership positions)	PPR PPR	Semi-annual Semi-annual	PCO/DOI PCO/DOI	
Outcomes component 2 Agro-biodiversity and SLM practiced up-scaled for catchment conservation and increased sustainability of farming system productivity and improved resilience to drought and floods.	- Farmers experiencing having sufficient water for crop and livestock production needs. (RIMS 2.2.4) - reduction in GHG emission and increase in sequestration (RIMS 2.1.8)	5,500 farmers 0		16,600 farmers 0.03 million tons CO_2eq emission avoided 1.74 million tons CO_2eq sequestered	MPAT survey Ex-Act	Project start, mid-term and completion Project start, mid-term and completion	PCO/DOI	Degradation hotspots are adequately identified and prioritized in the catchment management plans, and the project and the sub-CMCs successfully engage all stakeholders in catchment management and adoption of improved SLM practices
Outputs component 2 Reforestation and natural	- Ha reforested or recovered	0 ha	200 ha	565 ha	LDSF	Project start,	PCO/DOI	

regeneration of vegetation cover (multiple use native species) in woodlots and along river banks and in upper catchment areas						mid-term and completion		
Efficient cook stoves introduced/ scaled up to reduce wood demand	- Households adopting efficient cook stoves	300 households with efficient cook stoves	7,500 HH	11,320 households with efficient cook stoves	Household survey	Every 2 years	PCO/DOI	
Honey and other NTFP small business established/expanded as incentives for forest conservation.	- Households benefitting and annual income generated from NTFP - (disaggregated by gender)	50 HH 3,572 USD/year		856 HH 29,240 USD/year	PPR	Semi-annual	PCO/DOI	
Improved soil and water management practices scaled up in sub-catchments (terraces and contour ridges/bounds, Conservation Agriculture, ISFM, IPM, integrated agroforestry and livestock systems securing nutrient recycling).	- Farmers adopting improved soil and water management practices and ha where they are applied - Annual income generated from goats and chickens (disaggregated by gender)	<2,000 farmers <1,800 ha	10,600 farmers 8,000 ha	16,600 farmers (40 percent women, 25 percent youth, and 30 percent women lead farmers) 12,500 ha covered	Household survey	Every 2 years	PCO/DOI	
Drought tolerance, pest resistance and other beneficial characteristics from indigenous crop/animal varieties incorporated in diverse crop and livestock systems to increase resilience to climate variability and increase availability of nutritious food in local food systems	- ha covered and indigenous plant/crop/ animal varieties used per ha	700 ha covered by agro-biodiverse systems as defined in DATAR 4-6 plant/crop/ animal varieties used per ha		2,000 ha covered by agro-biodiverse systems as defined in DATAR 6-10 plant/crop/ animal varieties used per ha	DATAR	Project start, mid-term and completion	PCO/DOI	
Outcome component 3								
Improved evidence-base for SLM and NRM decision-	- GEB monitoring and assessment tools (Exact,	0 district governments and	3 districts	At least 3 district government and 2 central	PPR	Semi-annual	PCO/DOI	Policy makers and programme designers are

making and upscaling at community, district and central government levels	LDSF, DATAR) and protocols integrated in partner district governments and institutions and information used for policy and programme design decision support	partner institutions have integrated and use information from GEB monitoring tools		level government institutions				interested in using improved evidence information for policy adjustments and programme design
Outputs component 3								
Staff and community youth trained in application of carbon balance assessment (Ex-Act), LDSF and biodiversity	- Number of district and government staff trained by the project	0	70 staff trained	60 district staff and 20 national level staff trained	PPR	Semi-annual	PCO/DOI	
monitoring tool (DATAR) and use of information management system	- number of youth from communities trained	0	40	50 youth from communities trained (40% women)	PPR	Semi-annual	PCO/DOI	
Land degradation surveillance framework (LDSF) network designed and implemented	- LDSFs for sub-catchment areas completed	0 LDSFs installed	3 LDSF installed	LDSF completed for at least three catchment areas	PPR	Semi-annual	PCO/DOI	
Ex-Act, DATAR and MPAT monitoring tools applied	- Sub-catchments where Ex-Act, DATAR and MPAT monitoring tools are applied	0 sub-catchments	5 sub-catchments	5 sub-catchments	PPR	Semi-annual	PCO/DOI	

I. Strategic context and rationale

A. Country and rural development context

1. Malawi is a densely populated landlocked country with an area of 118,484 km^2, of which 24,000 km^2 is fresh water. With a human development index of 0.414, Malawi is ranked 174th out of 187 countries (2014), while for its gender development index it ranked 116th out of 208 countries (2013). The agricultural sector contributed an average of 30% to the GDP between 2005-2013[3]. Real GDP growth rates averaged less than four percent during the 1990s. The country's population was approximately 10 million in 1998, growing to 13 million ten years later (2008 population census), and estimated to be 17 million today[4]. Population growth is almost three percent per annum, contributing to one of the lowest per capita GDPs in the world.

2. Six million smallholder farmers contribute more than 70% to agricultural GDP. Malawi's economic performance is therefore dependant on how the smallholder farmers perform.Land holdings are shrinking and becoming more fragmented. Marginal areas have been brought under cultivation, and fallowing has been replaced by continuous cropping using conventional tillage practices of ridging. Recurrent drought and declining terms of trade have magnified these problems. The current account deficit of nearly 13% of GDP is financed by donor grants and development credits, with little foreign direct investment.

3. The third Integrated Household Survey (IHS3, 2011) estimates that 51% of the population lives below poverty line with 25% being ultra-poor. Recent poverty estimates show a worsening of an already dire situation with over 74% of the population living below the poverty line and about 30% living in absolute poverty. Over 90% of the poor live in rural areas and many are dependent on subsistence farming on customary land, cultivating small and fragmented landholdings that have dwindled to an average of 0.9 ha in 2013[5].

4. The two main farming systems are: maize mixed (covering 75 percent of cropland) and cereal-root crop mixed in the south (15 percent of cropland). In good rainfall years with favourable prices and access to inputs, Malawi is able to produce around 3.0 million tonnes of maize, which is above the self-sufficiency level. In poor seasons, many households are food insecure and the rural poor incur high levels of malnutrition for a range of reasons that include low access to food in terms of quantity, quality and diversity, low education and lack of knowledge in food processing and utilisation; and cultural beliefs which deny women and children consumption of high nutritive value foods. Rural areas have a higher proportion of both stunted and underweight children, 36% and 18% respectively compared to urban areas with 31% and 12% respectively.

5. Land and other natural resources are threatened by the high demand. Deforestation rate is estimated to be between 1 to 2.8 percent, representing an annual average loss of 164,500 to 460, 600 hectares[6]. 2.5 million hectares of forest resources were lost between 1972 and 1992, which is over 40% of Malawi's forest resource[7]. Forests are being cleared for housing and agriculture primarily driven by population growth and for fuel wood and charcoal production[8]. The vast majority of the population depend on wood for cooking. Although the estimated annual supply of all biomass is 42.4 million cubic meters of solid wood equivalent which is estimated to be 2.7 times the demand (15.8 million cubic meters), the spatial distribution is uneven: surpluses are found in the northern regions but shortages are reported in central and southern regions, and the costs of transportation are

3 FAO 2015.

4 This estimate is based on a baseline of 13 million in the year 2008 and a population growth rate of 2.8%

5 Integrated Household Panel Survey Report 2010-2013

6 Draft National Forest Policy of Malawi, 2013

7 USAID (2010) Community-based Natural Resource Management Stocktaking Assessment: Malawi profile.

8 Draft National Forest Policy of Malawi, 2013

too high to fix this problem. The diminishing standing stock means that a diminishing amount of biomass can be sustainably harvested and the deforestation is contributing to land degradation and reduced water retention capacity in the catchments. Recent assessments show that land degradation affects over 40% of land in Malawi (38,912 km^2) and costs 9.5-11% of GDP annually[9].

6. Future projections for further increases in deforestation and land degradation are startling. With the population increases expected, if more is not done to increase agricultural productivity then an estimated 740,000 hectares of forest and woodland (representing 37% of the 2008 forested area) will need to be cleared to provide farmland to meet the expected food requirements[10], which will further place pressure on wood fuel availability in central and southern regions of the country. The Malawi Biomass Energy Strategy indicates that at current trends, 82% of the population is projected to remain reliant on biomass energy in 2020. One study estimates that demand will exceed 100 million tonnes per year by 2030 while the sustainable supply of biomass should be no more than 10 million tonnes per year[11].

7. The sheer numbers of poor people who drive deforestation and land degradation in marginal and sensitive catchment areas do so for lack of alternative sources of energy and livelihoods. Afforestation programmes are not meeting the demand for fuel wood and people are forced to make use of the low growth rate, indigenous forests on customary land, where harvest rates exceed sustainable yields. Women and children are disproportionately affected by forest degradation as they spend more time searching for firewood with impacts on productivity, schooling and personal security and wellbeing. Recent research findings for Malawi show that increased child labour, displacement of higher value activities, malnutrition, greater susceptibility to diseases and breakdown of social cohesion including violence were reported as the negative effects of deforestation.

8. Soil loss due to land degradation was estimated by the World Bank in 1992 to average 20 tons per hectare per year, which is estimated to contribute to crop yield reduction of between four to 11 per cent per year, and estimated losses of USD15 million in the agriculture sector in 2007. In 2015 a FAO study found the national average soil loss rate was 29 ton/ha/year.[12] Soil loss leads to a chain of adverse environmental effects. Soil is washed off the land into rivers causing sedimentation and siltation of rivers and reservoirs, with negative impacts on fish spawning grounds as well as reduction in water quality. Sediment deposition of 300-400 tonnes per hectare per year is reported at the mouth of the Likangala River in 2002[13]. Another report indicates that sand sedimentation around Mzimba water intake for the Northern Regional Water Board was to be moved 17 kms upstream to overcome sedimentation problems[14]. And in Blantyre, approximately 30% of Mudi Dam, an important supplier of water to the city, is estimated to be filled with silt as well as water weeds due to eutrophication[15]. The wide-scale use of chemical fertilizers means that, with soil erosion, an overload of nutrients are leaching into rivers and water bodies leading to eutrophication, fish mortality and risks to human health. The risk of infestation of invasive aquatic weeds was found to be medium to very high for most areas of Malawi[16].

9. Land degradation negatively affects agricultural productivity. Unfertilised maize yield in the 1960s was 1.7 tonnes per hectare and has fallen below one tonne per hectare in the last 10 years. The declining production capacity of the land is attributed to a number of reasons including the deterioration of the soil structure and fertility caused by inappropriate land use and management practices and weak extension services, limited access to water, weak input markets, and limited

[9] Kiptoo, K.O. and Mirzabaev, A. (2014)
[10] Malawi Biomass Energy Strategy 2009
[11] Kambewa, P. and Chiwaula, L. (2010)
[12] FAO and Malawi's Land Resources Conservation Department, 2015
[13] Malawi State of Environment Report (2013)
[14] National Water Resources Masterplan (2013): Chapter 5.
[15] State of Environment Report (2013)
[1616] Ibid.

access to financial services and markets. Post-harvest losses (estimated at 30%) are another significant drain on livelihoods and natural resources.

10. The challenge today is to find sustainable ways to increase the productivity of smallholder farmers at a rate faster than the population growth. The government response over the years has been input subsidies, which have helped to increase smallholder crop yields but at the cost of long term soil fertility and farmer dependence on the subsidies to continue with their meagre livelihoods. Farmers are vulnerable to changes in the size and scope of the input subsidy programme. Without the subsidy, access to fertiliser and improved seeds is beyond the reach of most farmers. Chemical fertilisers also have an environmental cost. GoM estimated in 1994 that the cost associated with replacing soil nutrients in the form of organic fertilisers was equivalent to USD 300 million annually[17].

11. An added and growing complication in shifting Malawi to a more productive, sustainable development pathway are climate shocks. Malawi is vulnerable to a number of climatic hazards, the critical ones being floods, droughts and dry spells, strong winds, hailstorms, pest infestations and disease epidemics. Nearly all droughts in Malawi have been associated with the El Nino Southern Oscillation (ENSO) phenomenon. Flood disasters in Malawi result from three key synoptic systems: the Inter Tropical Convergence Zone, the Zaire Air Boundary/Congo Air Mass, or tropical cyclones. Significant loss of indigenous varieties and crop species from farmer's fields means that pest and diseases resistance and drought tolerance have also gone lost increasing vulnerability of cropping systems

12. Climate change projections for Malawi indicate mean temperature increases of between 2 and 3 ^{o}C by 2050, with longer and more intense heatwaves. Annual rainfall may remain at current levels but the variability will increase, with an expected increase in the intensity of rains during the wet season of November to April and drier periods during the dry season of May to October. Rivers in Malawi are sensitive to changes in rainfall. Anecdotal evidence also suggests that agricultural losses due to pests, which can be as high as 30 to 40%, will also be affected by rainfall and temperature changes.

13. While Malawi has significant volumes of water in its lakes and rivers, its per capita water availability is low and is expected to halve by 2025. In addition, the annual distribution of rainfall matters in ensuring water availability for user needs. Water resources are vulnerable to climate change, over-abstraction, catchment degradation caused by deforestation, pollution from agricultural activities, mining and industry, proliferation of invasive aquatic weeds and other species, and waste due to poor maintenance of infrastructure. Water catchments and buffer zones have been cleared for irrigated farming land, and there are competing demands for land along rivers and around water bodies.

14. The identification of the issues around sustainable land management was first done in the 1995 National Environmental Action Plan (NEAP). Nine key environmental issues were identified which included soil erosion, deforestation, water resources degradation and depletion, high population growth and climate change. These issues are still pertinent and more urgent today than ever.

15. Despite these disastrous development trends and indicators, there are reasons for cautious optimism. Rural development projects have proved themselves able to improve agricultural productivity and livelihoods. Credible Conservation Agriculture (CA) systems have been developed in Malawi showing yields that are higher by 11 to 70% for all sites compared to conventional ridge tillage (CRT) (and more so in drier years), and a labour saving of 47 to 33% for sole maize and intercropped maize respectively are found compared to CRT. The main issue is one of continuity of the initiatives over the longer-term and the institutional support and resources to scale up farmer's adoption. One of

[17] Malawi State of Environment Report (2013)

the main confounding factors is government under-staffing (departmental vacancy rates of 70% are not uncommon) and weak policy and institutional coordination.

B. Rationale

16. The ERASP will primarily build on the Programme for Rural Irrigation Development (PRIDE), which is the co-financing baseline investment. In addition it will make programmatic links with the Sustainable Agriculture Production Programme (SAPP), which is supporting rain-fed agriculture and research and extension services for the adaptation and adoption of Good Agricultural Practices including in particular CA. PRIDE aims to transform smallholder farming within an intervention area covering about 15 medium-sized irrigation schemes prioritized in Malawi's National Irrigation Master Plan and Investment Framework (2015) in northern and southern Malawi. Irrigation infrastructure, climate-smart agricultural practices for rain-fed and irrigated land and market linkages are the 'game-changers' that will support this transformation. The selected areas include some 5,200 hectares of irrigated land, and 12,300 hectares of rain-fed land. An estimated 19,500 smallholder households, representing a population of approximately 975,000, will be targeted by the Programme.

17. The economic rationale for PRIDE is based on: (i) improved agricultural productivity and reduction of post-harvest losses in the rain-fed and irrigated farming systems as a result of the application of Good Agricultural Practices; and (ii) increased cropping intensities and high value crop cultivation on irrigated lands. Headline performance targets in the target area are for an 80% reduction in number of households below the poverty line; an 80% reduction of child malnutrition; 15,000 households with a 20% improvement in household ownership index and 17,000 households applying climate-smart agricultural practices.

18. Two risks in the wider landscape may impact medium to long -term sustainability of the PRIDE irrigation investments. The first is the level of sedimentation washed down from the upper catchments, which has been shown to raise maintenance costs and over time lead to flooding. The second is securing sufficient surface water to feed the irrigation system, considering also the impacts of climate change on rainfall in Malawi. The mitigation of these two risks requires effective land and water management in the wider catchment area. In addition, 70% of the hectares covered by PRIDE are rain-fed areas which used to benefit from surface waters that experienced lower flows such that many streams are now dry for longer periods of the year. This means that rain-fed farming has lost an important source of resilience and instead is now largely dependent on seasonal rainfall which falls in shorter periods with heavier bursts, interrupted by dry spells. This combined with the effects of catchment degradation and the loss of key ecosystem functions such as flood regulation, water infiltration and recharging of the aquifer, and maintenance of soil integrity means that floods as well as dry-spells and droughts are regular occurrences, undermining food security and growth. Furthermore, reductions in rainfall infiltration are already affecting groundwater resources and communities are reporting increased rates of boreholes which are drying-up across the country. The environmental challenges outlined above were also reported in the SECAP Preparatory study for Malawi (2015).

19. The solution proposed by this project is an integrated agricultural and natural resources-based development strategy in the catchment areas which provide the water source for the PRIDE investments. The aim is to reduce deforestation and land degradation as means of mitigating the siltation and water shortage risks of the irrigation investments and support livelihoods and food security for in particular upstream but also other communities in the catchment not benefitting from the PRIDE investment. The first area of support is joint natural resources management at landscape level through development of catchment management plans and establishment of catchment management committees, provisioned for under the 2013 Water Resources Act. The emphasis will be on achieving an evidence-based, coordinated development planning based on a pathway to achieve that shared vision regarding resources governance and sustainable use in the catchment. Village Natural Resources Management Committees (VNRMC) will be formalised and will be given the tools needed

to develop and enforce village level land use plans in line with the overall catchment plans. The second area of intervention will be to conserve the wider catchment area and rehabilitate the land, in order to improve ecosystem services including global environmental benefits as well as to secure the medium-term benefits of the irrigation investment. This will be done by reducing demand for fuel wood through efficient cook stoves and charcoal kilns; promoting sustainable production and harvesting of biomass energy resources through communally managed woodlots and pilot small biogas systems; and increasing the incentives to protect forested areas through non forest timber products (NTFPs). Land rehabilitation in sensitive catchment areas will also be carried out. The third area of intervention will be to improve soil fertility, soil moisture availability and farm management strategies including diversification of crop varieties in order to raise agricultural resilience, productivity and nutritional security. Monitoring and assessment of ecosystem services, resilience and food security in the project areas will be carried out in order to monitor progress and effectiveness of the implemented measures in the catchments and allow for adaptive catchment planning and management , provide evidence for promoting policy mainstreaming and to strengthen the sustainability of ERASP outcomes.

Complementarity with PRIDE investment

20. ERASP applies an ecosystem-based approach to improving food security, which is complementary with the infrastructure-based approach undertaken in PRIDE. The added value of ERASP to PRIDE lies in three areas. The first is ERASP focuses on a more comprehensive landscape planning process for the sub-catchments, including PRIDE sites, while PRIDE focuses on the institutional architecture as it relates to the functioning of the irrigation schemes. The second is that ERASP adds an agro-ecological approach to improving food security, which will complement PRIDE's livelihood and marketing approach. In this, ERASP has developed a comprehensive strategy to reduce land degradation, as one of the pathways to improve food security, through biomass energy efficiency, biomass energy production and forest land and water conservation measures. The third is that while PRIDE has a major focus on irrigation, high value crops, value addition and marketing, ERASP will raise agricultural yields on rain-fed farming systems through climate-smart and conservation agricultural methods, supported by credit provision through village lending and saving clubs (SAPP support).

21. The relationship and added value of attaching the two concepts together for better irrigation ecosystem services outcomes will be tested; positive results will be documented and up-scaled to other PRIDE sites and present an important advocacy platform to secure political support for expanding ecosystem-based management, which is an urgent need given the situation context of population, poverty and reliance on the natural resource base for livelihoods and food (explained in Section 1).

22. Table 1 summarises the technical components, sub-components and outputs of the ERASP and the PRIDE to indicate the value addition of ERASP to PRIDE.

Table 1 Main points of complementarity between ERASP and PRIDE

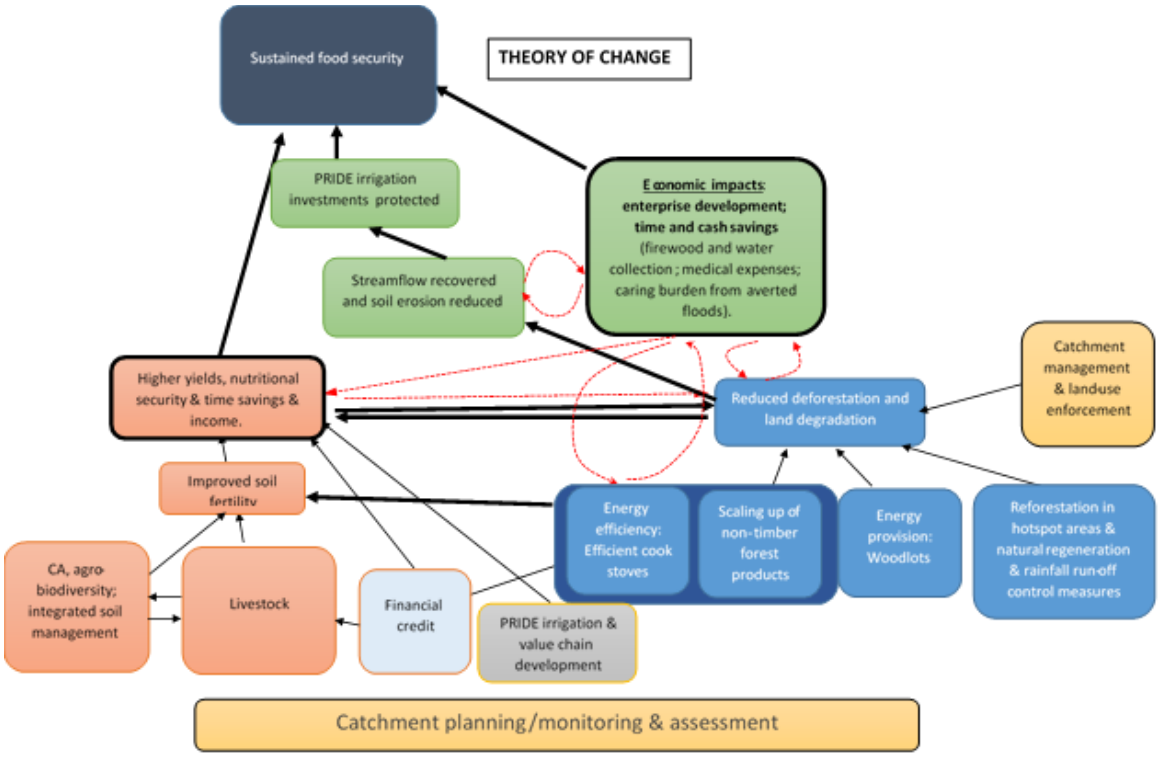
PRIDE		ERASP	
Programme framework	**Main activities**	**Complementary activities**	**Comment on complementarity**
Component 1: Irrigation Development and Catchment Management		**Component 1: Multi-stakeholder institutional framework for integrated catchment area management.** **Component 3: Monitoring and assessment of ecosystem services, resilience and food security.**	
Sub-component 1.1 Land and Water Governance	Preparation stage for all investments on the management, operation and maintenance of irrigation schemes by WUAs	Catchment management plans supported at the level of the catchment and the villages. Land degradation and poverty monitoring frameworks	Comprehensive planning and capacity development process based on quantitative evidence as well as community views. A range of livelihoods options will be supported, thereby increasing the returns to

		established to build the evidence base for further investments in catchment management.	catchment management. Monitoring systems will capture medium to long term impact data that can be used for advocacy and planning purposes.
Sub-component 1.2 Irrigation System Development	Investments in built physical infrastructure to regulate water flows in the catchment.	Investments in natural physical capital to build up the capacity of the ecosystem to regulate water flows.	Focusing on the upper catchment from where rivers originate for longer–term sustainability. Monitoring systems will capture medium to long term impact data that can be used for advocacy and planning purposes.
Sub-component 1.3 Soil and Water Conservation	Soil and water conservation investments in the PRIDE areas.	Soil and water conservation investments in the upper catchments associated with the PRIDE areas.	Focusing on the upper catchment from where rivers originate, for longer–term sustainability. Monitoring systems will capture medium to long term impact data that can be used for advocacy and planning purposes.
Component 2: Agriculture and Market Linkages		**Component 2: Scaling up catchment-level, sustainable land management practices.**	
Sub-component 2.1 Improved Agricultural Practices	Climate smart agriculture (CA, smart use of inputs); climate information services; optimisation of irrigation scheduling; post-harvest management; integrated pest management. A focus on high value products in the irrigated areas.	Same except for irrigation scheduling, with the addition of livestock (small stock). Focus is on improving the productivity of subsistence farming,	Focusing on the upper catchment from where rivers originate, for longer–term sustainability. .
Sub-component 2.2 Market Linkages	Farmer business schools, producer groups, commodity platforms, market studies and start-up facility.		Work through PRIDE investment for value addition support. Improved access to credit will reducing food insecurity and the pressure on soils by diversifying and adapting livelihoods.
Sub-component 2.3 Mainstreaming nutrition	Dietary diversity surveys; Extension and training on nutrition; homestead food production; improved cooking stoves.	None. Cooking stoves will be supported as a key strategy to reduce pressure on deforestation.	Focusing on the upper catchment from where rivers originate, for longer–term sustainability. A three pronged strategy to reduce deforestation will be followed through energy efficiency, energy production and forest protection.

Theory of Change

23. The theory of change (ToC) for this project is indicated in Figure 1 below. This is essentially how the outputs and outcomes are expected to interact in causal relationships to deliver the objective. The objective is food security that is sustained over time because the basis of it – natural capital – is protected and managed sustainably, together with market-oriented support provided under the baseline projects, which aim to increase returns to land to a level that enables people to move out of poverty. The aim would be to reverse the downward spiral of environmental degradation and negative economic impact that is the result of open access natural resource use, by providing sustainable natural resource-management solutions that confer economic benefits such as increased agricultural productivity and enterprise development. These benefit streams provide the main incentive mechanism to maintain these land management systems into the future.

Figure 1 ERASP Theory of Change[18]



24. There are two main areas of focus for the project. The first is improving agricultural productivity through integrated soil fertility management, conservation agriculture approaches and agro-biodiversity, which directly aims to deliver the food security objective. The second, parallel area of action is on catchment management including reducing deforestation, reforestation and regeneration of vegetation cover, establishment of terraces, contour bounds and ridges on slopes, and water retention and infiltration measures. The aim is to secure river flows and prevent soil erosion and siltation problems, and floods, thereby protecting the PRIDE irrigation investments and rain-fed areas, contributing to sustained food security over the longer term. Resilience to climate change will be

[18] The bold arrows depict the main outcome – objective connections. The red lines indicate the incentive framework which is expected to propel a virtuous cycle of catchment management into the future, Access to savings and loans is essential to enable the development of natural-resource based enterprises, including agricultural value chains (agro-dealers, equipment and other inputs) as well as relieving pressure on forestry resources to meet immediate needs.

brought about both in the work undertaken with farmers in the farmer field schools to develop farming strategies that anticipate and accommodate climate variability and in the strategy to increase agro-biodiversity with drought tolerant and disease resistant native species. In addition, catchment rehabilitation and management will increase the overall agro-ecosystem resilience including prevention of potential floods and amelioration of the effects of dry periods through improved flow regulation of rivers, land based rehabilitation such as contour bunds will slow down surface run-off and trees will be planted as protection mechanisms against floods and mudslides on hilly areas and along river banks. ERASP intends to rehabilitate and put under sustainable management 13,065 ha of land.

25. The project intends to raise incomes, expand livelihood options and improve food security through three benefit streams. Higher returns to land management are expected through the blended nature of ERASP with PRIDE. Higher agricultural productivity will be one benefit stream. Enterprise development based on natural resources will be another[19]. Other positive social impacts from improved catchment management are reported regarding time and cash savings for women and children in collecting water and firewood and averted costs from a reduced incidence of flooding[20]. Spin-off benefits could include retention of children in school.

26. The ToC and the project's logical framework were validated by an extensive process of stakeholder consultations, which is explained in Appendix 4. The main findings from the baseline study, together with the indicators that will measure the causal relationships, are also summarised in Appendix 4. The baseline challenges point to the opportunity space for supporting farmers in improved management of forest, land, soil and water resources and approaches for greater agricultural productivity. It highlights the need to address the lack of sustainable sources of biomass energy head-on and it supports the idea of agro-biodiversity.

Alignment with global conventions and national policies

27. The project will directly contribute to seven of the 17 Sustainable Development Goals (SDGs), namely SDG1: ending poverty, SDG2: ending hunger and malnutrition, achieving food security and promoting sustainable agriculture, SDG 5: achieving gender equality, SDG 6: ensuring availability and sustainable management of water and sanitation for all, SDG 13: taking urgent action to combat climate change and its impacts, SDG 15: protecting, restoring and promoting the sustainable use of terrestrial ecosystems, forests, combat desertification, reverse land degradation and halt biodiversity loss and SDG 16: promoting peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.

28. The project will contribute to the four strategic objectives in the 10-year strategic plan and framework (2008 – 2018) of the Convention to Combat Desertification, namely i) improving the living conditions of affected populations (livelihood diversification, reduced land degradation and vulnerability to drought); ii) improving the condition of affected ecosystems (reduce land degradation and increase land productivity) iii) generating Global Environmental Benefits (GEBs) through increasing biodiversity and carbon stocks and iv) mobilise resources to support implementation of the Convention through developing enabling policy environments. The project will also contribute to its five operational objectives of advocacy, awareness raising and education; creation of policy frameworks, increase knowledge and strengthening knowledge sharing systems; capacity building; and accessing financing and technologies.

[19] An indication of the economic benefits stemming from the wood fuel industry have been estimated at 6.1 percent of GDP (2010)[19], the number of people deriving livelihoods from the commercial fuel production could be in the region of 200,000[19], which is significant compared to the numbers of people employed in the formal sector in Malawi. Another finding is that forests contribute over 30 percent of rural income[19]. Another reported indicated that charcoal creates 200 to 350 job-days per Terajoule consumed, compared to 80 to 100 for electricity, 10 to 20 for LPG and 10 for kerosene, indicating the potential for a sustainable local industry and economy. There is potential to expand this given the current gaps in natural resources management.
[20] Byers, T.E. (2015)

29. The project will contribute to the Aichi Biodiversity goals and targets (2011 – 2020) under the Convention on Biological Diversity, specifically to four of the five strategic goals (and related targets) which are i) reducing the direct pressure on biodiversity and promoting the sustainable use ii) improving the status of biodiversity by safeguarding ecosystems, species and genetic diversity iii) enhancing the benefits from biodiversity and ecosystem function and iv) enhancing implementation through participatory planning, knowledge management and capacity building.

30. The project will contribute to the 2015 Paris agreement under the Framework Convention on Climate Change in the areas of greenhouse gas mitigation, and adaptation to climate change through the work to reduce vulnerability to floods and droughts, as well as the work to develop information and knowledge management systems and links to policy makers for scaling up of successful approaches.

31. The recently published National Climate Change Investment Plan (2015) prioritises sustainable land use practices such as: (a) development and promotion of adoption of soil and water conservation structures; (b) increasing access to land and improving the ease and speed of land titling; (c) reducing degradation in priority areas with SLM practices generating climate change adaptation and mitigation benefits; (d) promoting improved crop productivity and diversification of crops and; (e) promoting increased livestock productivity and production focusing on increasing the number and quality of various livestock by ensuring animal health and controlling diseases.

32. The project is aligned with IFAD's Strategic Framework 2016-2025 which has as its development goal the investment in rural people to enable them to overcome poverty and achieve food security through remunerative, sustainable and resilient livelihoods, The three strategic objectives are to i) increase rural people's productive capacities ii) increase rural people's benefits from market participation and iii) strengthen the environmental sustainability and climate resilience of rural people's economic activities. IFAD's three main outcomes are to i) develop enabling and regulatory frameworks at the national and international levels ii) increase investment in rural areas and iii) improve country-level capacity for rural policy and programme development, implementation and evaluation. The ERASP clearly contributes to IFAD's development goal, strategic objectives and its outcomes.

33. The project is aligned with the IFAD Malawi COSOP 2010-2015 which has two strategic objectives: i) natural resources management and ii) sustainable agricultural input and produce markets. The COSOP argues that Malawi's slow progress in addressing increasingly difficult development challenges calls for innovative approaches, which recognise the close linkages between poverty and environmental degradation. The Project will also support the implementation of the new Malawi COSOP, which is being designed with a focus on improved access to food, income and assets as well as enhanced resilience to external shocks. The recommendations from the SECAP preparatory study regarding a catchment management approach aligns well with the project design. IFAD's comparative advantage in Malawi is based on a solid foundation of partnership with the Government of Malawi since 1980s, working on irrigation and smallholder farmer empowerment through community organizations.

34. The project's outcomes and outputs will support policies and strategies in Malawi. The Malawi Growth and Development Strategy II (2011-2016) is the overarching medium term strategy to achieve the country's long term development objectives. Agriculture is a key strand of the first theme in it – Sustainable Economic Growth - with specific objectives to increase agricultural output and diversification and reduce land degradation. Natural resource management is another strand of Theme 1 which aims to increase forest cover and increase the livelihood returns of forestry to people, and advocates for improved land use planning. Climate change, environment and natural resources are a key priority area that cut across the six priority themes.

35. The 1997 Forestry Act provides for the management of forests on customary land in order to protect the water catchment and land resources. It creates a Forest Administration, a Forest Management Board, Forest Reserves, Customary Land Forests, afforestation and forest protection

procedures and a Forest Development and Management Fund. Section 33 of this Act provides legal mandate for the VNRMCs to make rules governing natural resources management in their area of jurisdiction. The National Water Resources Act, 2013 establishes a Water Resources Authority and Catchment Management Committees (CMCs) to advise officers in the Authority on issues of water resources conservation, use and allocation; and the granting, adjustment, cancellation or variation of any water permit. The CMC is responsible for the management strategy of its catchment as well as the establishment and operation of the Water User Associations (WUA) at the smaller catchment scale.

36. The draft National Agricultural Policy (2015) has various chapters to it such as inputs and markets, food and nutrition security; agricultural research and development; land resources management; crop production; fisheries and livestock. There is no recognition of the environmental causes and effects of agricultural productivity, for example, the importance of soil fertility and sustainable land management approaches, or the interconnections between land and water resources. Policy support for Component 2 of this project comes in the section on agricultural research and development where it advocates strengthening the research-extension-farmer and other service providers' linkage to increase uptake of technologies; to promote stability of agricultural production by developing drought and pest-tolerant varieties of crops; to institutionalise villages as entry points for organising extension packages; to strengthen farmer organisations; and to promote credit markets for purchasing agricultural inputs. There is also a somewhat vague objective on providing guidelines and strategies for sustainable land use which speaks to Component 1 of ERASP.

37. The Agriculture Sector Wide Approach (ASWAp) 2010-2015 (Malawi's answer to the CAADP process) identifies key program and investment areas needed to achieve productivity growth of six percent annually, increases in food security, diversification of crop production and improvements of nutrition and incomes amongst the rural population. The ASWAp three focus areas are: 1) Food security and risk management; 2) Agri-business and market development and; 3) Sustainable land and water management. At this point, the ASWAp secretariat in MoAIWD is developing plans for a second phase of ASWAp implementation.

38. The Forestry Policy (1996) provides a framework for sustainable production and conservation of wood resources and recognises the importance of wood fuels in the national energy supply and the need to bring about sustainability improvements in their production and supply, as well as reducing dependence on them through fuel switching and energy efficiency technologies. It also recognises the importance of forest products (wood fuels and charcoal) in improving the quality of life in rural communities and providing a stable local economy. The Policy provides direction on sustainable harvesting of forest resources through VNRMCs. The 2013 draft Forestry Policy reiterates these sentiments, setting out Policy Outcomes and objectives that improve the contribution of forest-based goods and services to the sustainable development of the country.

39. The central line taken by the 2003 Energy Policy regarding biomass energy is that it is undesirable and that fuel switching to electricity and other energy alternatives is needed in order to reduce demand for wood fuels and associated land degradation. The 2009 Malawi Biomass Energy Strategy takes the more sanguine view that as wood fuels will continue to feature prominently in Malawi's energy mix, that it is not only essential but that there is also a significant market opportunity to develop a sustainable natural resource market around wood fuels. In the draft 2015 Energy policy, the sustainable use of biomass energy through energy efficiency technologies is one of the seven headline policy objectives, and one of seven policy priorities areas. Within this, the aim is to become a carbon neutral country by 2035, as well as reducing wood fuels to 50% of the energy mix, reduce the proportion of household using traditional open cook stoves to 40% by 2035 among others, together with a whole host of policy statements.

40. Notwithstanding the support from sector level policies and strategies noted above, what is conspicuously absent is an overall policy on land management that harmonises the sector level policies and tackles the cross-sectoral nature of land degradation. Formal coordination structures

between departments and Ministries are weak, undermined by high staff turnover and institutional instability. The project will contribute to a process of greater harmonisation of policies and strategies through its work in Component 1 on catchment level planning and the evidence base generated in Component 3, which should feed into the planning units of different planning departments and Ministries.

II. Project description

A. Project area and target group

Geographic coverage and targeting

41. The geographical targeting of ERASP will focus on the PRIDE WRUs in Karonga, Machinga and Phalombe. This was arrived at through a two-step selection process reflecting the project's targeting priorities. The GEF financing has been prioritized for investments in wider catchment area management increasing ecosystem services and the sustainability and benefits from the PRIDE investments in five of the most vulnerable catchments[21] (see map page vi). To identify the most vulnerable catchments in the first step the following criteria were used to compare all catchments with PRIDE shortlisted investments[22]: i) level of food insecurity; ii) district average maize production per ha for the last eight years; iii) rainfall variability measured over the period 1985-2012; iv) drought occurrence measured over the last 20 years; v) flood risk; and vi) soil erosion measured over the last 20 years.

42. Applying these criteria it is clear that the catchments in the north are relatively better off than the ones in the south, though they are all poor and experience periodic food insecurity. To be able to learn about barriers and enabling conditions for upscaling from comparing the differences in conditions between north and south it was decided to select at least some catchments from a northern district. As a result four districts one in the north and three in the south, (Karonga, Machinga, Phalombe and Zomba) with eight PRIDE investment sites were initially selected for the second step consisting in a further situation diagnostic including a household survey where 323 randomly sampled respondents were interviewed. The household survey was complemented by focus group discussions (FGD) with farmers and with district officers. The situation diagnostic showed that the population in the catchments in Zomba turned out to be more food secure than the population in the catchments in the other three districts and therefore the district was dropped. ERASP investments will cover two catchments with PRIDE investments in Karonga, two in Machinga and one in Phalombe covering an estimated 35,000 hectares and involving at least seven Extension Planning Areas (EPAs).

43. **Target population**: The target group of the project is defined as smallholder farmers in the selected catchment areas of the PRIDE investment sites. The project aims to reach 32,100 households in the three districts. Within this group, a primary target group comprises households that are particularly food insecure and produce mainly for subsistence willing to seek increased land and water productivity through land and water landscape level governance and catchment area conservation and sustainable land management (SLM) practices. ERASP will be implemented in specific Extension Planning Areas (EPAs), which is the lowest agricultural administrative unit in Malawi.

[21] According to the Irrigation Master Plan of Malawi (2014) the country has 17 water resources areas (WRA) defined by natural hydrological boundaries of major catchment areas with a manageable size and representing homogeneous parameters within themselves. The WRA are subdivided in 78 water resource units (WRU) again following natural hydrological boundaries for this subdivision. The catchments selected for the ERASP are subareas under the WRUs defined to capture the catchment impact area of the PRIDE investments.

[22] There is a possibility that the baseline irrigation schemes that currently underpin this selection may not go ahead due to technical, economic and financial viability issues. If this transpires, catchment selection may need to be updated

44. The EPAs where the project is expected to be located are extremely poor. The baseline situation study carried out for the design of this project revealed that average land holdings are about a hectare, with Machinga having the smallest landholding (0.69 ha). Land ownership is usually governed by customary tenure systems but there are a few households who rent land to increase crop production. Less than 40% of households own basic assets such as mattress, furniture and radios, although just over about half own livestock, bicycles and cell phones. Sixty percent of those that did not own radios, bicycle and cell phones were women. Average household annual income was equivalent to USD244 (USD213 for women and USD281 for men), meaning a daily income of USD 0.67 per household. This is far below the international poverty line of USD 1.90 per person per day[23]. An average of 2.5 people per household is available to provide agricultural labour. People were educated mostly to primary school level.

45. **Crops cultivated**: Crops grown in the 2014/2015 cropping season (Table 13, Appendix 2) confirm the overall dominance of maize as the main stable crop grown by all households followed by pigeon pea, rice, groundnut and cassava. Most crops are for own consumption but cotton, pigeon pea and cassava as well as vegetables grown with small scale irrigation in the dry season are also for sale. Most farmers have adopted the improved varieties (hybrid and OPV maize) and indigenous varieties are only grown at a small scale (less than 10% of the cultivated land). The low diversity and dominance of a few crops may contribute to the food security vulnerability to rainfall variability and climate shocks.

46. **Livestock:** Fifty two percent of the households in the survey own livestock though the number per household is low (one to two chickens and goats per household, Table 12, Appendix 2). With the exception of Karonga, where households also have cattle, the most common livestock are goats and chickens, but also pigs, sheep, ducks and rabbits are raised by some households. The livestock are mainly kept for food (meat and eggs), income and manure. In most cases, the income raised is used to buy farm inputs and food during food shortages

47. **Food security and nutrition.** The main source of food and income for over 65% of the households is agriculture followed by non-farm labour income (less than 12%) and business (less than eight percent). Some households in Karonga and Machinga depend on charity, following natural disasters that have struck the area. Communities are food insecure almost every year. In years of bad rains this is about eight months and in years of good rains it is about three months. Female headed households are more food insecure than male headed ones. Nutritional security is also low. Access to different food groups is a challenge to many households. Grains, vegetable and fruits are eaten almost every day while legumes (and fish in Karonga) are eaten a few times per week. Some foods like eggs, oils, and meat are rarely eaten. In general, there are very few households who eat all the six food groups in a day.

48. **Gender**. The situation diagnostic of the target population indicated that women have a significant bigger workload than men, less say over land and water resources and decisions regarding income generating activities. Seventeen percent of the sampled households were female-headed (lower than the national average) and in these households women are responsible for all farming activities. Women in all households are responsible for planting, weeding and harvesting. Women are also burdened by additional responsibilities such as collection of water, firewood, fetching and preparing food, caring for the sick and other household chores. The baseline study revealed that distances walked for firewood could be as far as four km in Phalombe, while less than one km in Machinga and Karonga, and that malaria and cholera is more prevalent due to unsafe water especially during floods. Respondents also said that during the dry season most wells and rivers dry up which means having to queue for water in boreholes. Women prefer crops that contribute to household food security where men prefer crops for sale. Men decide over the sale of cattle, goats

[23] World Bank (2015) Policy Research Note: Ending extreme poverty and sharing prosperity: progress and policies.

and pigs, while women can decide over chickens. Women gather firewood for household consumption where men seem to only be involved in gathering firewood for sale and charcoal production. It was noted that due to increase in the demand for women's roles at the household, boys in all cultures have started to play certain roles that in the past were mainly for girls and women such as collecting water. Boys and girls also seem to have equal access to attend to school. Most of the women/girls roles are carried out on a daily basis and are routine activities while men's roles are mostly demanded when need arises.

49. The project's targeting mechanism will be closely aligned with the PRIDE and ensure equitable participation of women, men and youth at all levels including involvement in catchment area land and water use governance and planning and in provision of services such as training and capacity development and eventual inputs for catchment area conservation and SLM. The project includes an explicit strategy to improve women's decision-making capacity and empowerment as a key driver of improving agricultural productivity in the project areas. The project will train trainers to use the Gender Action Learning System (GALS) tools to roll-out the methodology to the communities. The main measures and activities are summarised in the Targeting Strategy Matrix in Appendix 2.

50. The project support for reforestation and the planting of wood lots as well as the increased water availability from improved catchment conservation will have direct impacts on women's lives by reducing workload and saving time for firewood gathering and water collection. The introduction of efficient stoves will also have health benefits, primarily benefitting women and children.

B. Development objective and impact indicators

51. The Goal of the project is to improve food and nutrition security of rural communities in the targeted catchment areas. The Project Development Objective (PDO) is to enhance the provision of ecosystem services and improve the productivity and resilience of agricultural systems of vulnerable rural poor. This objective encompasses three sub-objectives of addressing land degradation, loss of agro-biodiversity and climate change adaptation and mitigation. Through catchment management and SLM practices, supported by access to market and credit facilitated by the baseline investments, the project's impact indicators includes reduction in food insecurity from an average of four to five months in the five catchments to less than two months, a 20% reduction in child malnutrition and benefitting 25,680 farmers (30% of which being women) reporting yield increase above 20% from rain-fed crop and livestock production.

52. The GEF resources will be used to scale up the catchment management approach articulated in the PRIDE to cover a larger area at the catchment level, thereby increasing the likelihood of creating impact given the inter-connectivity between upstream and downstream users in the catchment areas. The grant resources will be used to i) conserve the wider catchment through participatory land-use planning, catchment management strategies and related enterprise development that support greater returns to land management and protect the benefit streams from the PRIDE irrigation investment; ii) to improve the productivity and diversification of agriculture, through SLM practices and use of agro-biodiversity, which are expected to sustainably increase production, limit new encroachments on forest and increase returns to agriculture; and iii) to develop the evidence base on the links between agro-ecosystem health and food security and resilience and the use of data and information in catchment management plans, District Development Plans , budgeting decisions and ultimately in policy adjustments.

C. Outcomes/Components

53. The Project objectives will be achieved through three technical components: Component 1 Multi-stakeholder institutional framework for integrated catchment area management; Component 2 Scaling up catchment level, sustainable land management practices; and Component 3 Monitoring and assessment of ecosystem services, resilience and food security. For Component 1, the National

Water Resources Act (2013) and 1997 Forestry Act establish the institutional architecture, which this project will implement in selected areas to achieve a catchment management planning process led by CMCs established at the sub-catchment level (sub-CMCs) and complemented by the VNRMCs. Component 2 provides the support to implement the plans and thereby generate economic benefits to the communities in return for sustainable management of their resource base. Component 3 adds ecosystem impact monitoring and assessment systems to enable monitoring of the effectiveness of the implementation of the catchment plans and development of the evidence base for further iterations of the catchment and village planning processes beyond the project grant.

54. Implementation of the Components will be through government structures, in particular through District officers and the network of extension officers.There will be an emphasis on training and skills development among District planning and extension structures for delivery of the project components, a strengthening of the extension network to reach the recommended ratio of one extension worker per 750 farmers, as well as strengthening of coordination systems at the District level through the application of an integrated planning approach. Enterprise capacity will be promoted in order to secure benefit streams that will contribute to SLM and achieve food security. At the outset, an organisational, capacity and training needs assessment will be undertaken for implementation of the three components in order to develop an implementation work plan for capacity development and strengthening.

Component 1: Multi-stakeholder institutional framework for integrated catchment area management

55. Component 1 is the planning foundation for the entire project. This Component will develop five sub-catchment management plans. Component 1 aims to build capacity and joint ownership among different government and non-government stakeholders and community members (representing up-mid- and down-stream resources users) on the issue of catchment management following a shared vision of how communities wish to see their catchment developed. The planning process will include participatory land-use mapping of current use, users and degradation hotspots and drivers, negotiation and agreement on a land-use plan and development of by-laws for access and user rights for land and water resources, as well as a set of measures to rehabilitate the catchment. Component 3 on the monitoring and assessment frameworks will contribute to evidence base on land degradation, vegetation cover and biodiversity trends, which will inform on the effectiveness of the planning and management process through the sub-CMCs and CAMPs and future iterations of the catchment management plans.

Outcome	Outputs
1. At least 5 sub Catchment Management Committees (sub-CMC) in place as an effective NRM planning and coordination mechanism	1.1 1,050 people (of which 50% are women and 15% are youth) trained in catchment area management and climate change risk reduction through community awareness campaign and training plan, and sub-CMCs established; 1.2 At least 5 Catchment area management plans (CAMP) developed and approved by sub-CMCs; 1.3 66 VNRMCs established/strengthened and implementing CAMP priority actions (>1050 participants of which 50% women, 15% youth, and 30% women in leadership positions).

56. The project will establish five sub-CMCs to protect five PRIDE irrigation sites, covering at least seven EPAs in three Districts. These sub-CMCs will be coordinated by the three Water Resources Officers belonging to the existing network of hydrometric Districts (which follow catchment boundaries). These District Water Officers will convene District officials in their regular coordination

structures traditional authorities and selected community representatives to participate in the catchment diagnostic and planning process and discuss the implications at EPA level of the CAMPs approved by the sub-CMCs. In turn, land-use planning and resources management at the village level supporting the implementation of the CAMPs will take into account customary governance systems and traditional authorities and be coordinated by the District Water officials. These water officials are currently focusing on water and sanitation issues but are having their remit widened to cover water resources management in response to the 2013 Water Resources Act. The extension network already facilitates the action planning at the village level, supported in part through the Local Development Fund, a fiscal transfer mechanism from central government to the Districts and the project will strengthen this through a programme of trainings. Research assessments detailed in Activity 1.3 will be undertaken through experienced and qualified service providers.

57. A review of the existing village plans and priorities, as well as capacity and training needs assessment of these structures to deliver integrated catchment planning will be developed together with an implementation strategy regarding the data, information, training needs and the planning/facilitation needs to enable the development and implementation of the CAMPs. Gaps in the extension network will be filled through the recruitment of facilitators for the VNRMCs and extension work under Component 2. Coordination with neighbouring District officials through the sub-CMCs will be necessary in order to avoid displacing deforestation and land degradation outside the project boundaries. The project will include an engagement strategy to promote women in decision-making in the sub-CMC and the VNRMCs for effectiveness as well as an equity perspective. The engagement strategy will also seek the involvement of youth. The planning process at the catchment and village level will follow the steps outlined below.

58. **Activity 1.1: Establish the sub-catchment management committees (sub-CMC)**. ERASP will develop a mobilisation strategy that will consider how best to structure the sub-CMC in order to provide a motivated and balanced representation that allows for equitable participation of all constituencies in catchment management.

59. **Activity 1.2: Establishment of the catchment area management plan (CAMP) team**. The CAMP team will map out the catchment area, and establish the sub-CMC and VNRMCs, which will support catchment management at the village level.

60. **Activity 1.3: Diagnostic and assessment** studies will be undertaken to investigate and understand the physical, tenure related and socio-economic causes and effects driving the forest, land, soil and water-related degradation and use problems in the catchment. The research findings would input to the CAMP and stimulate awareness among the VNRMCs and the sub-CMC about catchment management and conservation.

61. **Activity 1.4: Catchment area management plans developed** and agreed by catchment management committees. Milestones for implementation of the CAMPs and the supporting VNRMC plans and a tracking mechanism for implementation progress and effectiveness on an annual basis will be developed with the sub-CMCs and VNRMCs.

62. **Activity 1.5: Village-level land-use and resources management plans developed** in line with the CAMPs. The project will help the legal registration of the VNRMCs, under provision of the 1997 Forestry Act. Registering the groups as legal entities will enable communities to develop by-laws, which enforce the CAMPs and village land-use and resources management. Village catchment plans will be integrated into the District Development Planning process as per the usual channels.

Activity 1.6 Public awareness materials produced in the local language.

Component 2. Scaling up catchment level, sustainable land management practices

63. The Component aims to implement the actions prioritised in the CAMPs and in village level plans developed under component 1 with emphasis on scaling-up the adoption of catchment

conservation and SLM practices at the wider catchment level. The interventions will focus on landscape level catchment conservation and management to reduce GHG emissions, land degradation prevalence, and flood risk and increase the availability of surface water during dry periods as well as improving agronomic practices in farmers' fields that will result in sustainable intensification of agricultural production benefitting at least 16,600 farmers. Given the biophysical and farming system differences between the targeted catchments and in the importance of different drivers for catchment degradation, the catchment level CAMPs and village level plans will determine the shape of each of the intervention strategies and the degree of emphasis placed on the various activities. Given the limited budget, the CAMP and village level plans should be prioritised to fit the budget. The project will work on the assumption that bringing tangible economic benefits to communities will provide the incentive for the sustainable management of the natural resources in their surroundings – a key principle of community-based natural resource management.

64. Component 3 will support the continued monitoring and assessment of the outcomes of the component 2 interventions to provide evidence of, in particular, higher and more regulated river flows to support agricultural livelihoods. The project will aim to make the case to politicians and District and Central Government about the nature, feasibility and effectiveness of community NRM as the foundation for productive agricultural practices, sustainable wood fuel supply (an essential plank of the country's energy mix), expanded livelihood options and the positive social and in particular the economic spin-offs for women and children.

65. Implementation of this component will be through government structures, in particular through District officers, the network of extension officers and the lead farmer model, supported where necessary by qualified facilitators to be recruited. The organisational capacity and training needs assessment undertaken in preparation for Component 1 will also address the knowledge, skills, motivational and coordination needs and challenges at the District and extension level with regards to wider adoption of SLM and agro-biodiversity practices as well as provide timely climate information for farmer's decision making. Service providers will be contracted in where specific technical advice is needed in the implementation of specific outputs such as installation of biogas units and energy efficient cook stoves. Developing of methodologies and 'how to' guidance manual will be produced in English and the local language for every output in this Component. Training curricula at the District and extension network level will be updated with material on policy and legal frameworks, catchment management and natural resources management, ecosystem, monitoring and assessment, conflict management and facilitation skills among others.

Outcome 2 Agro-biodiversity and SLM practices up-scaled for catchment conservation and increased sustainability of farming system productivity and improved resilience to droughts and floods Indicators: - 16,600 Farmers experiencing having sufficient water for crop and small stock production needs - Flood risk index reduced from high to medium - Land degradation prevalence reduced from 46-60% to less than 40% - 0.03 million tons CO2eq emission avoided and 1.74 million tons CO2eq sequestered - Average stream flows feeding irrigation schemes maintained or increased - Reduction in sedimentation affecting irrigation schemes
Outputs 2.1. Reforestation and natural regeneration of vegetation cover (with native species with honey, fodder and other production potentials) in 565 ha in woodlots and along river banks and in upper catchment areas; 2.2 11,320 households with efficient cook stoves introduced/scaled up to reduce wood demand and avoid deforestation; 2.3 5 Efficient charcoal kilns and sustainable supporting woodlots established in the 5 sub-

catchments;

2.4 At least 5 alternative energy projects (biogas, solar energy, etc.) approved for funding by the challenge fund and made operational;

2.5 Honey and other NTFP small business established/expanded for 856 households as an incentive for forest conservation;

2.6 Improved soil and water management practices scaled up adopted by 16,600 farmers in 12,500 ha in sub-catchments terraces and contour ridges/bunds, (climate-smart agriculture and CA, integrated soil fertility management(ISFM); integrated pest management (IPM); integrated agroforestry and small stock systems securing nutrient recycling);

2.7 Drought tolerance, pest resistance and other beneficial characteristics from indigenous crop/ animal varieties incorporated in diverse crop and livestock systems in 2000 hectares to increase resilience to climate variability and increase availability of nutritious food in local food systems;

2.8 Meteorological forecasts reaching 10.600 farmers and integrated into farming planning and decision making (drought tolerant and short cycled varieties, crop diversification, planting date, land preparation, pest management).

The activities to support catchment level upscaling of SLM practices will include:

66. **Activity 2.1 Measures implemented in hotspot areas to recover river flows, prevent soil erosion and avoid flooding.** This would include reforestation and/or assisted regeneration of vegetation cover in hotspot areas to prevent flooding increase infiltration and recharge of the aquifer and stop the loss of top soil, through terraces, ridges or bunds along the contours of the slope. Where appropriate and agreed between District Officers and communities, natural regeneration methods including enrichment planting will be implemented. Some of the recommended native species with multiple uses include *Terminalia sericea*, *T. stenostachya*, *Tamarindus indica* and *Adansonia digitata*[24].

67. **Activity 2.2 Cook stoves.** Biomass (defined as firewood, charcoal, crop residues and animal dung) accounts for about 90% of energy supply, mostly in the form of wood fuel for cooking in rural areas. This drives land degradation with impacts on soil erosion and weak flow regulation resulting in droughts and floods. Fuel wood consumption can be decreased by 34 to 61% by using efficient cook stoves depending on the model, emissions of carbon monoxide and particulate matter can be reduced with up to 75%[25], leading to, cost and time saving and health benefits to the household. Successful pilots of cook stoves that promoted high adoption rates have been reported[26] and will be replicated

68. GoM's target is for distribution of 2 million cook stoves[27], therefore ERASP represents a small fraction of the national ambition. Still the impact in the project areas could be significant. An estimate of the hectares that could be saved with the adoption of improved cook stoves for the target population is some 130 hectares annually, based on a 2 kilograms per household daily saving on fuel wood, a target population of 11,000 households, and taking a conversion rate based on research carried out in a forest reserve in Malawi[28]. This benefit is larger than estimated current deforestation rates in the three catchments under consideration[29].

[24] USAID (2010).
[25] 2015 Draft energy policy
[26] Zalengera et al (2014)
[27] 2015 Draft Energy Policy
[28] Misanjo,E. & Kamanga-Thole, G. (2015)
[29] Deforestation rates in the target sub-catchments are estimated at 19 hectares annually in the District Officials consultation meeting held in the second design mission for ERASP.

69. Linked to the efficient cook stove and agro-biodiversity (see activity 2.7) promoting activities, the project will implement a nutrition and food preparation training targeting women, which will be developed under PRIDE.

70. **Activity 2.3 Sustainable charcoal production:** The charcoal industry is one of the largest industries in Malawi. No official estimates are available but a 2007 report estimates that six million bags are produced annually amounting to 231 tonnes, produced by 46,500 mostly individual, small-scale producers[30]. These producers have little negotiating power and are regularly exploited by intermediaries and who capture just a small fraction of the final value of the product[31]. Fifty thousand hectares of indigenous forests are estimated to be cut down annually for charcoal production[32]. Under the 1997 Forest Act, charcoal can be produced only under licence.

71. Based on demand from the villages and in line with their catchment management plans, ERASP will support charcoal producers to build high efficiency charcoal kiln together with establishment of sustainable woodlots that can eventually feed the charcoal kiln. Improving traditional earth kilns can increase the efficiency from 10-12 percent to 23 percent. The intention will be for sustainable charcoal groups to form and become licensed and so kick start a cleaner charcoal supply line to urban centres.

72. **Activity 2.4 Wood lots.** In spite of Malawi's high population densities, an enormous potential for woodlots is indicated in official reports. A total of 2,565 communally managed forest areas have been established throughout the country. The three targeted districts: Karonga, Machinga and Phalombe have 41, 21 and 112 village forest areas (VFAs) respectively. The project will support the VNRMCs in assessing their fire wood and wood for construction needs (considering savings from the introduction of efficient cooking stoves – activity 2.2), the status and capacities of the existing wood lots and formulate management plans for VFAs.

73. **Activity 2.5 Other NTFPs**. Honey production is an option, which provides a good opportunity for income earning for young people as well as environmental co-benefits in terms of pollination services busting forest and vegetation recovery. Other NTFPs include mushrooms, fodder, fruits and traditional medicines. Small village producer groups will be trained in business management, processing and linkages to market. The baseline study showed that NTFPs are already a livelihood activity for household and communities.

74. **Activity 2.6 Alternative energy:** Biogas seems to be the most promising rural energy alternative to fuel wood for cooking in Malawi. Solar, non-traditional biomass (e.g. crop residues), hydro, wind and geothermal are potential energy resources that could enhance Malawi's energy security[33]. ERASP will establish a small innovation fund to support community initiatives on alternative energies, borrowing the concept from the World Bank-supported Shire River Basin Project, which has reportedly been successful in attracting energy innovative research and implementation projects through a similar fund.

75. **Activity 2.7 Improved soil and water conservation practices in farmers' fields**. Although credible SLM practices have been developed in Malawi, adoption rates are still low and dis-adoption after project support has ended are high. In a recent study, adoption barriers were shown to be due to a range of factors, the most important being weak access by women to extension services, the quality of the demonstration plot, the frequency of support by extension workers and lack of equipment and capital[34]. Experiences from SAPP show, that in years with dry spells fields where CA[35] and other SLM

[30] Kambewa, P. et al (2007) Charcoal, the reality: A study of charcoal consumption, trade and production in Malawi.
[31] Neufeldt et al (2015)
[32] http://www.globalenvision.org/2009/02/24/malawis-charcoal-dependency
[33] Zalengera et al (2014)
[34] Salephera consulting (2015) ASWAP-SP Technology Adoption Study Report

practices are applied have consistently higher yields compared to conventional fields. ERASP will provide qualified extension and research support to building farmer's experimental learning and adaptive management skills through farmer field schools (FFS) and the lead farmer-follower farmers model also applied by SAPP.

76. There are various guidelines that have been written on SLM practices in Malawi including the Guidelines for Implementing Conservation Agriculture in Malawi produced by the National Conservation Agriculture Task Force (NCTFA 2015 guidelines) that can inspire the district extension. In addition, collaboration with the Shire River Basin Project to share training materials developed under both projects will be established. Likewise, the WOCAT database and information system for SLM practices will be an important source of information to draw from[36].

77. **Agro-forestry** will be part of the menu of SLM technologies and practices to improve soil and water conservation. Tree planting options include mini-woodlots variable rotation; single or double-row hedging around fields and homesteads on a rotational basis for purposes of wind breaks, to slow down erosion, and as live hedges for animal control; and pollarding mature trees along boundaries and in fields for fodder, poles and fuel.

78. Organic fertilizers and pesticides and rational minimum use of agro-chemicals will be promoted through **ISFM and IPM** including the use of compost and manure, mulching processes, crop rotation and intercropping, and **integrated crop livestock systems** using a diversity of drought tolerant and diseases resistant varieties (see activity 2.7). Regarding livestock, focus will be on small-stock (goats and chickens), which has been shown to be effective in building resilience to changing patterns of climate variability. These will be promoted primarily as a source of nutritional security, especially important given very low levels of protein consumption taking advantage of nutrient recycling between trees, animal and crop production. The project will be using the pass-on package and scheme developed by the Department of Animal Health and Livestock Development and implemented also in the SAPP project based on indigenous chickens.[37]

79. **Activity 2.8 Agro-biodiversity:** Significant agro biodiversity has already been lost from small holder production systems in Malawi. Indigenous plant and animal genetic resources with tolerance and resistance characteristics suited to local pressures are no longer available in local seed systems, which narrows climate change adaptation options for small holders and limit diversification resilience strategies. The baseline study carried out during the project design indicated that indigenous crop varieties are cultivated on less than 10% of crop land in the targeted catchments.

80. The project will support crop diversification strategies for reasons of nutrition and food security and resilience to rainfall variability. Resilient farming strategies will require diversification at the level of crops and varieties, as well as genetic diversity. Local and indigenous varieties have a high degree of genetic diversity. These crops include sorghum, finger millet, pearl millet, yams and cowpeas. There are only few experiences in Malawi in terms of promoting agro biodiversity as a resilience and nutrition security strategy. However, the Malawi Plant Genetic Resources Center (MPGRC) has through a small grant project[38] and in collaboration with NGOs and district officers supported farmers

[35] CA in Malawi often includes only one or two of the three CA principals (minimum soil disturbance, soil coverage and mulching, and legume crop rotation/inter cropping) depending on climate challenges and farm suitability and does in its conceptualization also include pitch planting and addition of organic manure and is often combined with agroforestry integrating fertilizer nitrogen fixing trees with good yield results

[36] https://www.wocat.net/en/knowledge-base.html

[37] A package of 4 female and 1 male goat is given to a subgroup of farmers within VNRMCs who will pass on the first offsprings in a similar package to other members of the group, who will then do the same and so on. In the case of the indigenous chicken the package is 9 hens and 1 rooster and a recipient should pass a similar package on to two other VNRMC members

[38] A grant provided from the Benefit Sharing Fund under the International **Treaty** on **Plant Genetic Resources** for Food and Agriculture (ITPGRFA)

in participatory research projects selecting indigenous and local varieties for (back) integration into cropping systems.

81. This activity will be led by the MPGRC in direct collaboration with district officers and extension services and will scale up the include support to small action research and indigenous crop development involving farmers in selecting and testing indigenous varieties. The objective will be to improve the productivity and shortening the maturity and at the same time take advantage of these varieties' adaptation to local environmental conditions, in particular stresses from diseases and pests, and their nutrition values. This subcomponent will also support training of farmers in seed multiplication and organisation of seed multiplication groups, linking up with local informal seed exchange and trading systems, and establishment of community seed banks to insure local availability of seeds backed up by copies in the national gene bank.

Activity 2.9 Agro-met forecasts. The five year strategic plan of the Department of Climate Change and Meteorological Services (2011-2016) indicates that the Department does not have sufficient monitoring and prediction systems for weather and climate and that the monitoring network is also not sufficient. The project will build on and extend/scale-up to the catchments covered by the project the methodology developed under the Global Framework for Climate Services (GFCS) Adaptation programme in Africa on 'training of agricultural research and extension to produce and disseminate agro-climatic advisories. The aim was to develop extension messages on the most appropriate crop and livelihood options in relation to the seasonal forecast for the area.

Component 3. Monitoring and assessment of ecosystem services, resilience and food security.

82. The aim for this Component is three-fold: first to improve CMCs, District and national capacity to systematically measure, evaluate and document progress in improving ecosystem services and resilience and the linkages to increased food security for the target population in the catchments and as such the effectiveness of the implementation of the CAMPs (developed in component 1 and implemented in component 2). This will enable more informed decision-making on SLM, adaptation and enhanced food security in future iterations of the CAMPs. Second to create a standardised evidence base for catchment management to support national level upscaling of ecosystem approaches to increased resilience, local food security and global environmental benefits (GEB) including through policy adjustments and integration in the design of investment programmes. Third to serve as critical inputs to the GEF-IAP-FS monitoring by facilitating comparison and aggregation of overall results, highlighting common elements among different country projects approaches.

Outcome	Outputs
3. The evidence-base improved for SLM and NRM decision-making and upscaling at community, district level and central government levels. - GEB monitoring and assessment tools (Exact, LDSF, DATAR) and protocols integrated in partner district governments and institutions and information used for policy and programme design decision support - Model for participatory catchment land-use	3.1 90 District and 20 national level staff and 50 youth trained in biophysical assessment tools, and information systems developed in districts 3.2 Land degradation surveillance framework (LDSF) network designed and implemented in 3 catchments 3.3 10 stream flow monitoring stations upgraded/installed (financed by PRIDE) 3.4 Ex-Act, DATAR and MPAT monitoring tools applied in 6 sub-catchments;

planning and management and application of SLM practices up-scaled in other catchments with PRIDE investment	3.5 6 knowledge management products produced to support upscaling and policy processes[39].

83. Monitoring of ecosystem services in Malawi is not systematic at district level and mostly based on visual perceptions. However, some capacities do exist at national level for example at the Land Resources Conservation Department (LRCD); the National Water Resource Authority; Forestry Department and the Spatial Data Centre in the Department of Surveys which hosts and manages in collaboration with the National Statistics Office and other technical ministries, the Malawi Spatial Data Portal (MASDAP)40 a web-based tool that has the potential to support GIS based monitoring systems. The LRCD has supported districts in applying the Revised Universal Soil Loss Equation to assess soil erosion and identify hotspots for intervention. Nevertheless data collection, analysis, storage and retrieval can be challenging because of: i) inadequate funding, ii) lack of training and instruments to measure key parameters and establish functional databases (for example in the use of remote sensing and GIS analysis, training on data capture and management), and iii) shortage of frontline staff The District level structures for monitoring and reporting are present but require support to work effectively.

84. Building on the already existing capacities, the GEF-IAP-FS includes adding an assessment dimension to the conventional M&E with focus at documenting progress in improving ecosystem services and resilience and the linkages to increased food security for the target population. For this end the assessment tools offered under the GEF-IAP FS and supported by programme partners include the Land Degradation Surveillance Framework (LDSF) supported by ICRAF, the Ex-Ante Carbon Balance tool (Ex-Act) for calculating project carbon benefits developed by FAO and widely used by IFAD and partners, and the Diversity Assessment tool for Agro-Biodiversity and Resilience (DATAR) supported by Bioversity. These tools will be complimented by the IFAD developed Multi-dimensional Poverty Assessment Tool (MPAT), which includes a module on resilience and the Results and Impacts Monitoring System (RIMS) household survey tools which will also be applied by the PRIDE. For more information on the specific indicators the different tools will be monitoring see Appendix 7. The outputs listed above will be achieved through the following activities:

85. **Activity 3.1Training of Staff and community youth**. District and national level staff and interested youth from the catchment areas will be trained to measure and continuously follow-up on ecosystem indicators by applying the LDSF, EX-Act and DATAR tools. The monitoring and assessment tools will be integrated into the monitoring and planning procedures of District offices. Skills development in data management and reporting will be included in the capacity and training plan to be developed (see para 57).

86. **Activity 3.2 application of the ecosystem assessment tools.** Most of the training under activity 3.1 will be provided as part of the actual application of the tools. In the first project year the baseline and targets for carbon and agro biodiversity monitoring will be adjusted and the project will support the design and establishment of the LDSF sampling sites as well as data collection and analysis. This will be supported by ICRAF (LDSF), Bioversity (DATAR) and eventual FAO (Ex-Act) as needed.

87. **Activity 3.3 Application of socioeconomic and gender monitoring tools.** IFAD's MPAT will be integrated into the Project's M&A framework to assess and monitor rural livelihoods, household assets and access to quality NR, food and nutrition security and resilience in the targeted areas.

[39] Knowledge products can be fact sheets, learning notes, policy studies, thematic studies, videos, etc.
[40] http://www.masdap.mw/

MPAT will be accompanied by a set of gender-relevant survey indicators from the Women's Empowerment in Agriculture Index (WEAI) as well as the RIMS survey.

88. **Activity 3.4 support for upscaling and policy processes.** The project results will generate broader lessons about how the catchment planning and governance and well as management and conservation practices are generating improved ecosystem services and food security through specific strategies for improving farmer's adoption rates and gender equality and involvement of youth. To support the maximum use of the project results emphasis will be placed on developing case studies, human interest stories as well as reporting on quantitative results. These findings will be lifted to the national level through a knowledge management strategy detailed in Section III.C. Support will also be given for consolidation of experiences for further advocacy through MEA processes such as convention reporting and strategies (NBSAP, NAP, NAPA) and in MEA fora such as UNREDD or Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services to promote wider application.

D. Lessons learned and adherence to IFAD policies

89. The recent FAO study (2015) on adoption of SLM practices identifies drought in water stressed areas and support from extension officers or NGOs as key drivers for farmer's adoption. Department of Land Resources and Conservation mentions, from their experience, the importance of: incentives in terms of increasing farm income from year one; keeping costs low for the implementation of SLM practices; provision of substantial capacity building to change the mind-set of farmers; and the organisation of farmers in groups facilitating their joint experimental learning and eventually access to markets. Stakeholders have highlighted the need to harmonise extension messages in order to avoid confusion and achieve better impact.

90. The lessons learned from IFAD's involvement in Malawi, which are contained in the COSOP 2010-2015 include weak local government capacity, which necessitates competent NGOs and private sector for selected aspects of services delivery; high management costs because of the prevailing context of weak capacities; and barriers regarding entrenched dependency and aversion to change, risk, entrepreneurial capacity and even project ownership among the poor, which need to be overcome. ERASP will mitigate these risks by an emphasis on developing planning capacities, awareness and dialogue around catchment management; develop the evidence base for catchment management.

91. Other lessons learned can be gleaned from similar investments implemented in Malawi during the current COSOP programme cycle. The closest one is IRLADP. Lessons learned from this, which are directly relevant to this project echo the lessons learned contained in the COSOP, namely that capacity development is essential for project ownership and sustainability; there is a huge variation in farmers' motivation, level of ownership of catchment conservation activities between districts and communities, as well as leadership skills, and that the demand-driven extension approach is the best way to motivate farmers and introduce new technologies, implying the need for realistic targets and expectations on project reach..

92. Lessons learned from community based management forest management in Malawi[41] offer insights into the way to approach community planning processes, the main ones being that adequate time is needed to conduct a careful process of community institutional strengthening; home-grown solutions have to build on existing power structures – especially traditional authorities – rather than imposing a one size fits all. Where VNRMCs have marginalised such authorities they have usually failed; and an active Traditional Authority is essential; Natural resource management should go beyond forestry initiatives.

[41] IIED (2008); Shackleton, S. & Campbell, B. (2001)

93. Efforts to implement community based natural resource management (CBNRM) go back to 2000 in the COMPASS projects supported by USAID. The strategic plan, tools, mechanisms and procedures for implementation of the CBNRMs were never taken forward because the initiative was facilitated by a project and was not anchored in an institution that would continue the activity. The lesson learned here is that implementation of catchment management plans needs to be anchored in institutional ownership and leadership

94. The main lessons learned from projects implemented in Malawi focussing on natural resource management and adaptation to climate change (GEF financed and AfDB implemented CARLA), European Union funded project on “Improved forest management for sustainable livelihoods programme (IFMSLP)” are that local communities and existing institutions should be actively involved in planning and implementation of interventions on natural resource management. The capacity development approach should be well developed, this should include the development of training manuals and knowledge products in local languages; value addition and marketing are important for sustainability.

95. Experiences from projects on small stock interventions implemented by the Department of Animal Science at Lilongwe University of Agriculture and Natural Resources that included small stock pass-on activities indicate some key lessons are the need to tailor the approach according to farmer preference and capacities, including training for the whole breadth of issues in animal husbandry (housing; feeding, feed production and conservation; animal health, breeding, management including marketing). Drugs should be provisioned. Selective breeding and selection will improve small stock productivity.

96. On energy efficiency cook stoves; though there have been a few initiatives that have been implemented, the lessons learned are harder to access. The Movement for Bio-energy Advocacy Utilization, Learning and Action (MBAULA) project provides some direction. Cook stoves vary in terms of raw materials used, investment costs, efficiency and scale of utilization. The most widely adopted stoves are the chitetezo mobile cook stoves which are compatible with other energy sources such as crop residues and briquettes. MBAULA experience indicates the need for capacity building of technical staff on how to monitor the quality and efficiency of the cook stoves. Awareness campaigns should be conducted on the use of energy efficient stoves.

97. On renewable energy, lessons learnt are that achieving sustainability of community-based renewable energy projects is challenging and requires training of local expertise for operation and maintenance and financial literacy. It also requires addressing cultural and other situational issues around the operation of the systems. Where communities contributed to project costs or where a technology was selected by the community there was a higher sense of ownership and commitment to finance the system’s maintenance.

98. ERASP will mitigate the risks and take up the lessons learnt highlighted above by working through the PRIDE/ERASP PCO, which will be well staffed with technical specialists; an emphasis on developing planning capacities at all levels; awareness and dialogue around catchment management and identification of measures that address community challenges and is suitable for their situations; developing the evidence base for catchment management with District officials and communities and using that as the basis for planning processes to empower and enable continuation of the planning processes. The one to two year planning period in Component 1 will provide the preparatory phase for Component 2 outputs, which should provide enough time to sensitise communities and build ownership in the process.

99. Implementation arrangements have been structured to promote sustainability of the project activities. Implementation of this component will be through government structures, in particular through District officers and the network of extension officers, and the structures established by the Water and Forest Acts. Sustainability will be promoted through supporting a motivated and knowledgeable extension service through recruitment of facilitators to fill the gaps, greater technical

support to farmers from the extension network and investing in work ‘enablers’ at the extension level. Participatory approaches used for the agricultural component will support farmers' own priorities based on their knowledge of what works and challenges in order to ensure relevance. Developing of methodologies and ‘how to’ guidance manual will be produced in English and the local language for every output in Component 2. The knowledge management strategy provides for development of communication materials in local languages.

100. Service providers will be contracted in where specific technical advice is needed to produce specific outputs such as installation of biogas units and energy efficient cook stoves and provision of financial literacy training. For the energy efficiency and renewable energy activities, motivated people in the communities will be selected and trained to install and maintain the systems, based on proven models, in order to enable sustainability.

101. Based on IFAD's Social Environment and Climate Assessment Procedures (SECAP) the environmental and social categorisation of PRIDE is A entailing Environmental and Social Impact Assessments to be conducted before the installation of irrigation infrastructure. However, the ERASP activities such as the catchment management and scaling up of sustainable land and water conservation measures and agro-livestock systems will have site specific impacts that are reversible. Therefore an environmental and social management plan will be developed for these activities according to requirements for Category B. The catchment management activities are expected to reverse land degradation and provide other benefits such as improved water security and quality (SECAP Review Note, Appendix 14). The climate risk classification is moderate. Climate variability is already having a negative impact on agricultural productivity in Malawi and these are some of the risks that ERASP will be addressing. The soil and water conservation activities as well as incorporating meteorological forecasts into farm planning methodologies will enhance the resilience of the target communities (SECAP Review Note, Appendix 14).

102. ERASP also adheres to IFAD's NRM, Gender and Targeting and Land policies. The project adheres to the principle of promoting the recognition and greater awareness of the economic, social and cultural value of natural assets. This will be done through the support to establishment of watershed management committees and the sensitization and training activities targeted at community based natural resource management (CBNRM) groups. The criteria for project site selection takes cognisance of poverty levels and also geographic targeting based on the location of the PRIDE sites for the sub-catchment selection. The irrigation schemes also result in self-targeting as the beneficiaries are communities living in close proximity to the scheme and within the sub-catchment area. The indicators for the project will be gender disaggregated and an analysis on gender differences particularly in NRM and agriculture production has been undertaken as part of the design process. The land access and tenure security will be addressed mainly through the baseline PRIDE. The principles such as obtaining Free Prior and Informed Consent from affected communities that will be followed in PRIDE will apply to the ERASP (See Appendix 14).

III. Project implementation

A. Approach

103. Implementation of the project will be through government structures, in particular the District officers and extension network, which will be strengthened to augment the numbers on the ground as well as capacities and capabilities to support VNRMCs and farmer groups (see paragraphs 57, 58 and 67 for more details). This will ensure that there is institutional support for the project activities after the grant ends.

104. Sustainability of the approach will be through the development of a strong incentive framework, supporting a motivated and knowledgeable extension service; fully participatory approach that harnesses indigenous knowledge and farmer to farmer knowledge sharing and; attention to working with men’s and women’s groups separately. The use of recognised local level structures (Traditional

Authorities and the VNRM groups) in the implementation of village-based NRM plans provides a pathway and is an integral part of the strategy. A strong knowledge management strategy will support sustainability (see Section III.C and IV.D for more details).

105. The ERASP will have a catalytic effect to reach a wider set of households and land area beyond the immediate project boundary by working through the five sub-CMCs, which can be linked to the larger-scale CMCs to be established under the Water Act, and the promotion of SLM in the additional sites under PRIDE and other subsequent programmes from Government and other development partners. The project will directly target 13,000 hectares of land rehabilitation and SLM and an estimated 35,000 under catchment area management plans in three Districts protecting five PRIDE irrigation sites. A simple extrapolation to the other 10 PRIDE irrigation sites could mean an additional 35,000 hectares of land under sustainable planning and management, bringing the total to 70,000 hectares directly and indirectly impacted by the project. NASFAM could be an important part of the scaling up approach for sustainable agricultural development as the organisation has demonstrated success in achieving market-led production among smallholder farming groups. Partnership models will be explored during project start-up.

106. Other scaling up pathways will be the knowledge management strategy, which represents an advocacy platform that draws upon and creates visibility for the anticipated success stories from the country projects at the level of sub-regional and regional bodies within the context of food security debates and policy making, detailed in Section III.C. A financial plan to scale up the project approach, inclusive of evaluation findings of the project implementation experience, will be developed in preparation for the second National Workshop planned in Year 7 in order to attract internal and external financing for the approach.

107. An indicative list of activities to be undertaken in the first six months is provided in Table 2. These activities can be taken forward by the PRIDE/ERASP Environmental Specialist, who will already be place (as PRIDE due to start-up earlier). This inception phase work plan sets up the substantive work to be carried out in Components 1 to 3.

Table 2 First 6 months work plan

		Government mobilisation	Months				
#	**Activity**	**1**	**2**	**3**	**4**	**5**	**6**
1	Recruit regional environmental experts		P				
2	Recruit extension/facilitators		P				
3	Organisational, capacity and training needs assessment		P				
4	Procure working equipment for extension workers		P				
5	Develop training schedule for District and EPA trainings						
6	Develop workplan and process for catchment management.		P				
7	Baseline studies (LDCF, MPAT, Ex-Act, Agro-biodiversity)						

B. Organizational framework

108. The Ministry of Agriculture, Irrigation and Water Development will be the Executing Agency, as it is for the PRIDE investment. The Ministry will be the main accountable entity for the project results. The implementation will be by the PRIDE/ERASP Programme Coordination Office (PCO) comprising by dedicated and highly qualified personnel either from government or recruited from the labour market. The PCO, funded through PRIDE, will include a Programme Coordinator, and Specialists in

the following areas: Procurement; Financial Management; Institutions, Environment; Gender and Targeting; Irrigation; Agriculture & Value Chains; Planning, Monitoring and Evaluation. The latter will be charged with Knowledge Management as well. Given the spread to the northern and southern regions, there will be two Programme facilitation offices, staffed by coordinators.

109. ERASP will be managed by the PRIDE/ERASP Environmental Specialist. ERASP will finance two additional positions, which are regional environmental experts, who will be located in the northern and southern programme facilitation offices. These experts will coordinate the catchment and environmental management activities in the regional clusters and provide support for monitoring and assessment. An Environment Officer from EAD will be attached to the Environmental Specialist as part of capacity building for the Department.

110. Given the focus on environmental management, the PRIDE/ERASP Programme Coordinator will report directly to the Director of Environmental Affairs Department on ERASP as well as the Director of DOI. There shall be one holding account for both projects but two separate operating accounts for each of the projects. The Director of Environmental Affairs shall be the principal signatory to the independent ERASP operating account.

111. The PCO will ensure that adequate services are mobilised for the day to day implementation of activities. A two pronged approach will be followed including enabling relevant District and Extension planning area staff such as agriculture, land resources and environmental officers to enhance service delivery to the target communities and engaging service providers for capacity development where necessary. ERASP will seek partnership arrangements with different stakeholders for provision of goods and services, as necessary.

112. As detailed under PRIDE, the community level entry point for ERASP will be the traditional authorities and with the VNRMCs. The VNRMCs will play a key role during the planning and implementation phases. The VNRMC plans will be aligned to the catchment plans developed by the sub-CMCs.

113. As provided under the organisational framework of PRIDE, a Technical Advisory Team will be established representing departments concerned with the project implementation, including Land Resources, Extension, Research (under MOAIWD), as well as the Department of Land (Ministry of Lands, Housing and Urban Development), the Environmental Affairs Department (Ministry of Natural Resources, Environment and Mining); Department of Climate Change and Meteorological Services; the Debt and Aid Department of the Ministry of Finance, Economic Planning and Development; and others as needed. Strategic oversight will be provided by a Programme Steering Committee (PSC) comprising senior representatives of concerned Ministries, under the chairmanship of the PS (Irrigation & Water Development) of the Ministry of Agriculture, Irrigation and Water Development.

C. Planning, M&E, learning and knowledge management

Planning

114. ERASP's approach to planning, monitoring, evaluation and assessment and knowledge management (KM) will follow the strategy, planning and M&E framework of the PRIDE in line with the framework of the MOAIWD as well as the GEF-IAP-FS and IFAD requirements based on emerging best practices of the IRLADP, SAPP and other IFAD initiatives. The PM&EA Officer in the PRIDE/ ERASP PCO (financed by PRIDE) is responsible for planning, monitoring, reporting, evaluation and assessment, learning, knowledge management and communication, as well as ensuring appropriateness and efficiency of implementation related to targeting (food insecure, gender, youth, geographical).

115. Planning of project activities will be an on-going process coordinated by the PCO with support from the Environmental Specialist and the Regional Environmental Experts using standard procedures including the preparation of Annual Work Plans and Budgets (AWPB). The AWPBs will be

shared for consultation with local actors to ensure their engagement and support, while guaranteeing the pertinence of proposed specific activities and timeframes to local conditions and contexts. Only one AWPB will be prepared for ERASP and PRIDE under the PCO. The AWPB for the first year will be based on the ERASP Project Design Report and its annexes and prepared by a small team of experienced staff. Training will be given to the PCO in the preparation of AWPBs. Subsequent plans shall include results obtained by Component in the previous period, risks and mitigation actions, targets for the upcoming year and the estimated budget by category of expenditure and sources of financing, foreseen procurement; and the M&EA plan for the year.

116. A project inception workshop will be conducted within two months of project effectiveness with the full project team and relevant government counterparts. It is crucial to building ownership of the project's goals and objectives and presents the modalities of implementation and execution, as well as assists the PCO in developing the first AWPB. An inception workshop report will be prepared and shared with participants.

117. The PM&EA officer of the PCO will in close collaboration with DOI and EAD establish a management information system (MIS), using dedicated software to collect data from various levels. The MIS database will be aligned to the ERASP and PRIDE Logical Frameworks Indicators, which includes IFAD RIMS indicators. The MIS will also include MOAIWD, COSOP and National M&E master plan indicators. Web-portals for easy viewing by service providers and beneficiaries can be considered, if deemed relevant. External support will be recruited for designing and establishing the databases and IT infrastructure.

Monitoring and evaluation

118. The M&E system will be set up and managed by the PCO in close collaboration with the DoI and the EAD; it will be compatible with existing data systems in GoM and PRIDE. The full logical framework is presented in Appendix 7, which will be reviewed and eventually revised during the inception period to ensure accuracy and achievability. The requirements of the GEF-IAP-FS includes adding an assessment dimension to the conventional M&E with focus on documenting progress in improving ecosystem services and resilience and the linkages to increased food security for the target population. The assessment tools for this end are described in more details under the component 3 description above (section II C) and Appendix 7 The assessment dimension of the PM&EA framework will create evidence to support upscaling of ecosystem approaches to increase resilience, local food security and global environmental benefits.

119. The main outputs will be Quarterly Operational Reports, semi and annual Project Progress Reports, MPAT, Ex-Act, DATAR, LDSF and RIMS reports and a midterm external evaluations. Other products include project publications, in the form of journal articles, project briefs, etc. In addition, the PCO will submit to IFAD a Project Implementation Report (PIR) on an annual basis; as well as the GEF-6 GEF-IAP-FS Tracking Tool, three times during the project life. A programme completion report and an independent Terminal Evaluation will be carried out.

Learning and knowledge management

120. Knowledge management will be a process by which value is generated from project knowledge based assets. One of the main purposes of knowledge creation and sharing will be to support policy making by building a comprehensive body of evidence, lessons learned, and good practices. The project has a number of knowledge management strategies to strengthen project implementation and to keep a shared understanding and commitment to the project strategy.

121. The PM&EA officer supported by a part time knowledge management officer, the Environmental Specialist and the Regional Environmental Experts and district officers will ensure that stories are collected on a regular basis, providing factual information on changes and benefits achieved at local and catchment levels as well as documenting global environmental benefits and upscaling to other catchments. Such testimonies are especially relevant for documenting programme attribution to

higher level impacts. Photo archives will be kept as part of structuring qualitative information. To ensure an effective flow of information. The PM&EA Officer will develop simple and user-friendly tools for data collection, entry, processing and analysis. Standard forms and formats will be made available to ensure consistency in the way data is recorded, which will also be supported by the application of the LDSF, DATAR, Ex-Act and MPAT tools assessing local and global environmental and poverty reducing benefits.

122. Policy influencing will be achieved by the data and evidence generated through the environmental monitoring of the project interventions, such as river flow, decreased sedimentation and reduced soil erosion. This information will be used to make the case to politicians and District and Central Government about the nature, feasibility and effectiveness of catchment planning and conservation and community based ecosystem and natural resource management as the foundation for productive agricultural practices, sustainable wood fuel supply (an essential plank of the country's energy mix), expanded livelihood options and the positive social and economic spin-offs on women and children especially. Information will be produced that is eye-catching, reader-friendly, supplemented with audio-visual knowledge products. The project's geographical coverage represents catchments in the north as well as in the south with different agro-ecological zones, social organisation (patrilineal system in the north and matrilineal systems in the South) and tribes with different attitudes towards livelihood practices. The project findings will reflect what these differences mean for catchment management and the uptake of different technologies and practices, which could inform policy development.

123. Two national workshops will be held to showcase findings to senior policy makers and external partners. The first workshop will be held in Year 3 to disseminate the findings and progress on the catchment planning process. An additional aim will be to start the dialogue on the land-use trade-offs, strategies for increasing livelihood returns to land management and where policies could be harmonised with respect to promoting these landscape planning approaches, as well as the data that the project will generate to inform these debates. The second national workshop will be held in Year 7 (the last year of the project) to disseminate the project results. A financial plan to scale up the project approach, inclusive of evaluation findings of the project implementation experience, will be developed in preparation for the second national workshop in order to attract internal and external financing for the approach. A schedule for policy harmonisation regarding land use could also be agreed. Collaboration with the World Bank-supported Shire River Basin Project will be undertaken where possible to strengthen the policy messages and dissemination to senior policy makers.

124. Public awareness materials will be produced in the local language to raise awareness of the catchment management approach and to inform non-project communities and neighbouring Districts adopting similar strategies and approaches. These public awareness materials will include the diagnostic data and information that will be generated in the catchment planning process (Component 1). Developing of methodologies and 'how to' guidance manual will be produced in English and the local language for every output in Component 2. Fact sheets conveying methods, tools, results and case studies will be produced, along with human interest stories and audio-visual products. The emphasis will be on reporting on as much quantitative information as possible. Technical knowledge products will draw on and contextualise IFAD knowledge products where appropriate.

125. An annual learning exchange will be organised between district officials involved in the project as well as others in adjacent District on integrated catchment planning approaches. This approach will also help to replicate the project methods.

126. Together with the other 11 country projects under the GEF-IAP-FS the will contribute to the collective impact and learning of the program. The intention is to inform approaches towards win-win solutions between food production and maintaining ecosystem services in face of increasing climate variability and. Each country project has committed to participating in the peer-to-peer applied management opportunities, which are an integral part and distinct feature of this program, and which will be cost shared with the cross-cutting coordination and applied knowledge management and

capacity building ''hub'' project. Malawi will both participate in and host a regional knowledge exchange visit. Communities of practice will be set up on specific themes of interest and value to multiple GEF-IAP-FS countries, which will be defined during the program implementation.

127. In turn ERASP will benefit from participation in this program by accessing through the activities delivered by the hub project good practice from the other participating countries through peer learning, current thinking on food security policy as well as access to technical expertise on a cost sharing basis where there is interest from multiple project countries. The program will generate knowledge management products and have an advocacy function, which draws upon and creates visibility for the anticipated success stories from the country projects at the level of sub-regional and regional bodies within the context of food security debates and policy making. This program involves multiple GEF Agencies but IFAD is the Lead Agency. The program will be coordinated via a substantive cross cutting project worth $10.4m and with a full time task manager.

D. Financial management, procurement and governance

128. **Financial Management**: The financial management arrangements for the project will be based on those included in PRIDE. Transparency International's Global Corruption Perception Index score for Malawi in 2014 was 34 (scale 0- high risk and 100 -low risk), which is medium risk. Malawi is ranked 110 over 175 countries monitored. IFAD's Rural Sector Performance (RSP) score provides a focused assessment of the potential risk in the rural sector. It is an indicator of accountability, transparency and corruption in the rural areas. The 2014 RSP) score for Malawi is 3.75.which is also a medium risk category.

129. Although the Malawi Public Financial Management (PFM) systems will be used under ERASP, additional mitigation measures have been proposed to complement the country financial management systems. The PCO will use its own discrete accounting software using specific earmarked bank accounts. The PCO will be staffed with a financial controller recruited under performance contract to be supported with two assistant accountants under similar terms. Processing of ERASP day to day transactions will be off the Government IFMS. However, periodic returns will be provided by the programme to the Accountant General to enable the updating of the Government accounts.

130. **Project Level Financial Management Assessment (FMA):** In accordance with IFAD's Guidelines for financial Management assessment at design, a financial management assessment was carried-out for PRIDE. The view is that results derived for PRIDE shall be considered valid for ERASP as well. Overall, the assessment concluded that the proposed FM arrangements for PRIDE to be medium risk. The proposed arrangement will be managed by a dedicated PCO under the oversight and guidance of a MoAIWD-chaired PSC; and under the ultimate responsibility of the MoFEPD. Also, the designation of an Accounting Personnel to manage funds in the independent ERASP operating account will guarantee operational efficiency in overall FM. Appendix 8 provides further details.

131. **Procurement:** Procurement will be carried out for timely acquisition of goods, works or services, ensuring efficient use of resources in a fully competitive manner. The principles of public procurement, such as fairness, integrity and transparency, will be taken into consideration in all phases of the procurement process, emphasizing the accountability of the staff involved.

132. A procurement assessment was carried out on the completed IRLADP operations as part of the PRIDE design. The IRLADP was co-financed by the World Bank and IFAD. The assessment concluded that Malawi has a robust legal and institutional framework for public procurements. The Public Procurement Act introduced a new legal framework governing public procurement in Malawi. The framework provided for the establishment of the Office of Directorate of Public Procurement (ODPP), which, since becoming operational, has taken the lead on reorganising public procurement reform. Among the changes to the procurement system introduced by ODPP

was the complete decentralisation of the procurement process to the level of each public entity. The legal and regulatory framework is sound for efficient public procurement. The Public Procurement Act and Regulations adequately establish the institutional framework required to support public procurement, the stages of the procurement process, the main methods of procurement and their conditions for use, and the conditions for review and auditing.

133. Despite these overall encouraging trends, country procurement assessment by ODPP with UNDP support found issues that still need to be addressed to ensure that procurement processes in practice are fully compliant with the legislative and regulatory framework. Mitigations have been suggested in Appendix 9. There will be a Procurement Specialist in the PCO to ensure compliance with statutory procedures. For PRIDE and therefore ERASP, GOM procurement systems will be used, according to the GOM planning calendar. Due to the medium inherent risk ranking of the GOM procurement systems obtained at various assessments; the IFAD prior review thresholds for PRIDE/ERASP would be USD 50,000 for goods and services and USD 100,000 for works to start with.

E. Supervision

134. ERASP will be supervised, at the same time as PRIDE, jointly by GOM and IFAD every six months. Supervision missions will be accompanied by six-monthly progress reports, which will also provide an additional perspective on progress to the PSC meetings that will be scheduled after the supervisions. A limited number of implementation support missions will also be undertaken to support implementation progress, as recommended by the supervision missions.

135. The technical composition of supervision mission teams will vary, but fiduciary reviews will be a constant element. The fiduciary specialist will resolve any accumulated issues in finance and procurement during or shortly after each supervision mission. Terms of reference for the supervision missions will be prepared by the IFAD Country Programme Manager.

136. Towards the end of year three, a Mid-term Review will be conducted and include any necessary refocussing of the Project. A status report will be prepared ahead of the Mid-term Review, proposing and justifying realignment. In addition, surveys to gauge effects and impacts will be completed before the fielding of the Mid-term Review.

F. Risk identification and mitigation

137. The risks to the project and a risk mitigation strategy is summarised in the table below:

Table 3 Risks and risk mitigation strategy

Risk	Mitigation Measures	Level
SOCIAL: Lack of community participation; process becomes discredited through unmanaged conflicts	Seek the leadership of Traditional Authorities in the VNRM process. Upgrade facilitation and conflict management skills for extension workers. Build off existing village development plans. Allow enough time for community planning processes in order to develop ownership over the CAMPS.	Medium
SOCIAL: Low adoption of practices	Investments will be made in the extension network to support a motivated and knowledgeable extension service by recruiting facilitators to fill the gaps, greater technical support from the extension network and investing in work 'enablers' at the extension level to motivate for better quality demonstration sites. On the part of the farmers, participatory approaches used for the agricultural component will support farmer own priorities based on farmers' own knowledge of what works and challenges in order to ensure relevance. Adoption rates will be promoted through working with women and men's groups separately.	High
SOCIAL: Low level of benefits threaten	The project intends to raise incomes, expand livelihood options and improve food security through three benefit streams: agricultural	Low

sustainability of the initiative	productivity, forest-based enterprises and cash and time savings, especially to women and children.	
TECHNICAL: Low quality of lead farmers in the farmer field schools.	Lead farmers will be selected, trained and regularly supervised. Investments will be made in the knowledge base, capabilities and reach of extension services in the project areas, which will support the capacity development of lead farmers.	High
INSTITUTIONAL: Limited District level capacity	There will be an emphasis on training and skills development among District planning and extension structures for delivery of the project components, a strengthening of the extension network to reach the recommended ratio of 1 extension worker per 750 farmers, as well as strengthening of coordination systems at the District level through the application of an integrated planning approach. Small consultancies will be tendered to help develop the strategy for the overall capacity development, trainings and for targeted management pieces in the roll-out of the project components.	Medium
POLITICAL: Weak sustainability because the project approach is not led by nor nested in Malawian institutional structures.	For the project catchments, the project will implement the Water Resources Act by establishing sub-catchment committees under the National Water Authority. The project will strengthen village planning structures set up under the Decentralisation Act. The project will work through District Councils and extension structures.	Low
POLITICAL: Discontinuation of practices once the project ends	Develop tangible benefits from the catchment management planning process. Invest in human capacity (technical & leadership skills) and coordinating structures. Incentivise commitment by demonstrating results and building capacities.	Medium
ENVIRONMENTAL: project leads to greater deforestation in surrounding areas	Catchment management committees will be the mechanism used for further dialogue and awareness raising of areas surrounding the project implementation sites. Project support should be focused on bringing into discussion the District officers and community leaders from neighbouring villages, which also would help with replication of the project approach.	Medium
ENVIRONMENTAL: reforestation does not succeed because of low survival rate of seedlings	The project will use local knowledge and experiences to select whether planting or assisted regeneration will work best. Plant in January during the rains and only seedlings that are more than 30cms. Community protection of the planted area will be required – polythene tubes and fencing for seedling protection are included in the budget; ownership for enforcement and management of the protected areas will be secured through the village land-use maps, formalisation of village groups and developing by-laws.	Low
ENVIRONMENTAL: Extreme floods and droughts wipe out project gains	The project is aimed at reducing these risks through its work on catchment management, with impacts in river flow regulation; soil and water conservation and decision-making that takes seasonal and shorter-range forecasts into consideration. But in the short-term, during project implementation, these risks could indeed be experienced. The impact will be reduced by increasing the capacity of households to bounce back from the loss through i) micro-credit facilities established in baseline projects ii) ensuring that community seed banks and storage facilities are placed on higher ground iii) knowledge and skills transfer which will enable getting sustainable production models re-started.	Medium

138. IFAD has developed a Complaints Procedure for "Alleged Non-Compliance with its Social and Environmental Policies and mandatory aspects of Its Social Environmental and Climate Assessment Procedures". Parties adversely or potentially adversely affected by IFAD-funded projects and programmes may bring issues to the Fund's attention using SECAPcomplaints@ifad.org. The IFAD website provides a clear summary of the steps involved and guidance on how to report issues.

IV. Project costs, financing, benefits and sustainability

A. Project costs

139. Total ERASP costs including price and physical contingencies, duties and taxes are estimated at USD 10.6 million over the seven-year Project implementation period. Of this amount about USD 1.4 million (13% of total project costs) represents the foreign exchange content, USD 1.6 million (15%) are duties and taxes. Total base costs amount to USD 9.7 million, while physical and price contingencies are estimated to add to this amount another USD 0.3 and 0.5 million (corresponding to 3 and 5% of the base costs) respectively. Investment costs account for 90% of the base costs (and recurrent costs for remaining 10%). Project investments are organized into four components: (i) Multi-stakeholder institutional framework for integrated catchment area management; (ii) Scaling up catchment level, sustainable land management practices; (iii) Monitoring and assessment of ecosystem services, resilience and food security; and (iv) Project coordination. Funds allocated to Project management and coordination amount to about USD 0.5 million or 3% of the baseline Project costs. A summary breakdown of the Project costs by component and sub-component is also shown in Table 4. Project summary and detailed costs are provided in Appendix 11.

Table 4 Project Costs Summary, by Year and by Component (base costs, 000 USD

	2017	2018	2019	2020	2021	2022	2023	Total
1. Multi-stakeholder institutional framew ork for integrated catchment area management	202	735	582	240	60	55	13	1,887
2. Scaling up catchment level, sustainable land management practices	1,305	1,655	1,726	1,510	722	378	46	7,343
3. Monitoring and assessment of ecosystem services, resilience and food security	163	137	58	160	60	68	163	807
4. Project coordination unit	180	68	64	65	66	67	50	560
Total PROJECT COSTS	1,850	2,595	2,430	1,975	908	568	271	10,598

Project Costs by Expenditure Categories

140. The expenditure accounts are based on the standardisation that IFAD is adopting after phasing its Loan and Grants System. A summary breakdown of the Project costs by expenditure category is shown in Table 5.

Table 5 Project Costs by Expenditure Categories

				Foreign	Base
	Local	Foreign	Total	Exchange	Costs
		(US$ '000)		%	% Total
I. Investment Costs					
A. Works	459	81	540	15	6
B. Vehicles	82	83	165	50	2
C. Equipment and Materials	2,021	359	2,380	15	24
D. Studies and consultancies	548	98	645	15	7
E. Trainings	3,778	667	4,444	15	45
F. Co-funding	43	8	50	15	1
Total Investment Costs	6,929	1,295	8,224	16	84
II. Recurrent Costs					
A. Operations and maintenance	136	-	136	-	1
B. Salaries and allowances	1,417	-	1,417	-	14
Total Recurrent Costs	1,553	-	1,553	-	16
Total BASELINE COSTS	8,482	1,295	9,777	13	100
Physical Contingencies	285	23	308	7	3
Price Contingencies	453	60	513	12	5
Total PROJECT COSTS	9,220	1,377	10,598	13	108

B. Project financing

141. The following financiers will be contributing to the ERASP: IFAD (through a GEF grant), GOM and beneficiaries. The GEF grant will be made of USD 4 million from the System for Transparent Allocation of Resources (STAR) and a set-aside of USD 4 million for the ERASP. As far as the STAR funds are concerned, the breakdown is USD 1.5 million from the Land degradation focal area USD 1.0 million from the biodiversity focal area and USD 1.5 million from the climate change focal area. This amount includes agency fees and the project preparation grant.

142. Overall the grant from the GEF through IFAD (including STAR and IAP funds) will finance 67.5% of the Project costs (USD 7.15 million, i.e. the USD 8 million minus agency fees and project preparation grant). The government will finance the taxes and duties (USD 1.6 million, representing 15.1% of total costs). The estimate of taxes and duties was based on the rates in effect prevailing at the time of the design. In conformity with the principle that no taxes or duties would be financed out of the proceeds of the IFAD Loan/Grant, any future changes in the rates and/or structures of taxes and duties would have to be met by GOM. Beneficiaries will contribute USD 1.8 million representing about 17.3% of Project costs: it will consist mainly of unskilled labour in kind for the establishment and maintenance of terraces, contour ridges/bounds, and small water harvesting infrastructures on hillsides; on-farm tree planting and adoption of sustainable farming practices. The proposed financing plan is summarised in Table 6.

Table 6 Project Financing Plan (000 USD)

	GoM		IFAD GRANT		Beneficiaries		Total	
	Amount	%	Amount	%	Amount	%	Amount	%
1. Multi-stakeholder institutional framework for integrated catchment area management	285	15.1	1,602	84.9	-	-	1,887	17.8
2. Scaling up catchment level, sustainable land management practices	1,118	15.2	4,387	59.7	1,837	25.0	7,343	69.3
3. Monitoring and assessment of ecosystem services, resilience and food security	123	15.2	684	84.8	-	-	807	7.6
4. Project coordination unit	83	14.8	477	85.2	-	-	560	5.3
Total PROJECT COSTS	1,610	15.2	7,151	67.5	1,837	17.3	10,598	100.0

143. **PRIDE/ERASP overall financing**. Looking at the larger picture of the combined PRIDE/ERASP, overall financing amounts to 94.5 million USD. The USD million 7.1 funded by IFAD-GEF amounts to 7.6% of the overall project cost. In addition to this, IFAD will also fund 56% of the costs (half through a highly concessionary loan and half through a grant) and 7.5% through the ASAP grant. Remaining costs will be financed by: private sector contribution (3.2%) and DFID (0.5%). The beneficiaries' contribution is estimated at 9.6%. Government funding amounts to 15.5% of the overall costs. PRIDE/ERASP financing plan is shown in Table 7.

144. GEF funding for ERASP adds volume and value to PRIDE. ERASP increases the area interested in soil and water conservation activities, upper catchment management and improved agriculture practices. Consequently, the number of targeted households has increased from 17,500 (under PRIDE) to 49,000 (under overall ERAS/PRIDE Project). GEF resources add USD 1.6 million to the development of multi-stakeholder institutional framework for integrated catchment area management, USD 4.4 million to scaling up catchment level sustainable land management practices and USD 0.7 million to support Monitoring and assessment of ecosystem services, resilience and food security. The emphasis of this GEF contribution is on resilient agro-ecological systems, and the additional resources will fund activities complementary to PRIDE interventions. The lion share of GEF funds, about USD 4.6 million, has been allocated to investments in infrastructure for soil and water conservation and to scale-up catchment level sustainable land management practices.

Table 7: PRIDE/ERASP Financing Plan (000 USD)

	GoM		IFAD LOAN		IFAD GRANT		IFAD GRANT (GEF)		ASAP		DFID		Private sector		Beneficiaries		Total	
	Amount	%	Amount	%	Amount	%		%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
PRIDE Components																		
A. Irrigation development and catchment management																		
1. Land and water governance	504	0.5	1,035	1.1	1,368	1.4	-	-	232	0.2	-	-	-	-	172	0.2	3,311	3.5
2. Irrigation system development	9,597	10.2	15,241	16.1	16,368	17.3	-	-	-	-	-	-	-	-	6,953	7.4	48,159	50.9
3. Soil and water conservation	426	0.5	19	0.0	-	-	-	-	1,646	1.7	-	-	-	-	157	0.2	2,248	2.4
B. Agriculture for irrigation and rain-fed systems		-		-		-		-		-		-		-		-		-
1. Improved agricultural practices	806	0.9	1,280	1.4	600	0.6	-	-	4,711	5.0	-	-	-	-	-	-	7,397	7.8
2. Market linkages	1,081	1.1	1,699	1.8	6,881	7.3	-	-	-	-	498	0.5	3,000	3.2	-	-	13,159	13.9
3. Mainstreaming nutrition	53	0.1	-	-	35	0.0	-	-	273	0.3	-	-	-	-	-	-	362	0.4
C. Programme management and coordination		-		-		-		-		-		-		-		-		-
1. Knowledge Management, Planning and M&E	152	0.2	-	-	1,036	1.1	-	-	-	-	-	-	-	-	-	-	1,187	1.3
2. Programme coordination	464	0.5	7,210	7.6	252	0.3	-	-	201	0.2	-	-	-	-	-	-	8,127	8.6
ERAS Components		-		-		-		-		-		-		-		-		-
1. Multi-stakeholder institutional framework for integrated catchment area management	285	0.3	-	-	-	-	1,602	1.7	-	-	-	-	-	-	-	-	1,887	2.0
2. Scaling up catchment level, sustainable land management practices	1,118	1.2	-	-	-	-	4,387	4.6	-	-	-	-	-	-	1,837	1.9	7,343	7.8
3. Monitoring and assessment of ecosystem services, resilience and food security	123	0.1	-	-	-	-	684	0.7	-	-	-	-	-	-	-	-	807	0.9
4. Project coordination unit	83	0.1	-	-	-	-	477	0.5	-	-	-	-	-	-	-	-	560	0.6
Total ERAS+PRIDE COSTS	14,692	15.5	26,483	28.0	26,540	28.1	7,151	7.6	7,063	7.5	498	0.5	3,000	3.2	9,120	9.6	94,547	100.0

C. Summary benefits and economic analysis

145. The economic analysis is based on the estimation of benefits gained from the implementation of improved and climate resilient agricultural practices and catchment management. The costs and revenues estimated in the financial analysis provide the basis for an evaluation to determine the likely economic benefits and costs to the national economy as a whole. The main benefits of the Project would accrue to the Malawi economy in terms of the improved farming systems that will sustainably increase food crop yields, diversify crop production, improve soil fertility and structure, and increase overall food security (in terms of increased food availability, access and improved nutrition). Furthermore, reduced post-harvest losses will come from promoting the adoption of improved post-harvest management practices.

146. Since investments foreseen under the ERASP are linked to PRIDE investments, the same economic discount rate adopted in PRIDE economic analysis (i.e. 12%) has been adopted here. Incidentally, this rate is considered appropriate for the case of Malawi and perfectly in line with the social discount rate commonly used in several Development Banks[42]. Details of the Economic Analysis are presented in Appendix 12.

Project Economic Internal Rate of Return and Net Present Value

147. The overall Economic Internal Rate of Return (EIRR) of the Project is estimated at 27.5% (base case) which is above the opportunity cost of capital in Malawi estimated at 25% (see Table 2 above), indicating the economic convenience of the Project. The EIRR is estimated in a conservative way as it is based only on the assumption that only 80% of target farmers will adopt technology packages promoted by the Project. In case of higher % adoption, the EIRR will increase (see benefits increments in the sensitivity analysis below).

148. The Net Present Value (NPV) is USD 7 million over the 20-year period of analysis, with the benefit stream based on the quantifiable benefits that relate directly to the activities undertaken following implementation of the components. These figures are considered as reasonable given the fact that benefits are estimated in a very conservative way. The summary of the economic analysis is presented in Appendix 12.

149. **Sensitivity Analysis.** In order to test the robustness of the above results, a sensitivity analysis has been carried out. The EIRR and NPV were subject to sensitivity analysis in order to measure

[42] See: Zhuang, J., Liang, Z. Lin, T. and De Guzman, F. 2007, 'Theory and Practice in the Choice of Social Discount Rate for Cost–Benefit Analysis: A Survey', ERD Working Paper No. 94, Asia Development Bank, May. And also: Harrison, M. 2010, Valuing the Future: the social discount rate in cost-benefit analysis, Visiting Researcher Paper, Productivity Commission, Canberra.

variations due to unforeseen factors and account for risk. Criteria adopted in the sensitivity analysis are: 10, 20 and 50% cost over-run, 10 and 20% increase in benefits, and 10 to 50% benefits decrease. Results are presented in Table 8. Also, the minimum number of beneficiaries needed in order to obtain a positive NPV and therefore a profitable project has been computed. This indicator can turn in hand during the implementation of the project while monitoring project performances. As shown in Table 5 the minimum number of beneficiaries amounts to about 12,500 HHs (corresponding to an adoption rate of about 43%).

Table 8 Sensitivity analysis for informed decision-making

	Base case scenario	Cost increments			Benefits increments		Benefits decrease			Benefits delay		Minimum number of beneficiaries
		+10%	+20%	+50%	+10%	+20%	-10%	-20%	- 50%	1 year	2 year	12,506
EIRR	27.5%	24.6%	22.1%	16.6%	30.7%	33.9%	24.3%	21.0%	10.7%	21.6%	17.8%	12.0%
NPV ($)	7,032,283	6,222,151	5,412,019	2,981,623	8,545,643	10,059,004	5,518,923	4,005,562	- 534,519	5,154,200	3,477,341	-

D. Sustainability

150. Implementation of the project will be through government structures, in particular the District officers and extension network, which will be strengthened to augment the numbers on the ground as well as capacities and capabilities to support VNRMCs and farmer groups. This will ensure that there is institutional support for the project activities after the grant ends.

151. Sustainability of the project approach will be generated through a strong incentive framework. Three main benefits streams are expected, two of which raise the returns to SLM. The first is increased agricultural productivity including value addition (to be provided under PRIDE); the second is expanded livelihood options derived from non-timber forest products, and the third is the time and cash savings derived from easier access to firewood and water and time and cash savings from reduced medical expenses due to water borne diseases in flood events as well as the averted care burden. The equitable sharing of benefits will be ensured through effective implementation of the CAMPs and the VNRMC plans. The use of recognised local level structures (Traditional Authorities and the VNRM groups) in the implementation of village-based NRM plans, which provides a pathway for scaling up, is an integral part of the project strategy. Formalising the VRNMS into legal entities in order to boost their enforcement capacity will reinforce the benefits streams.

152. Sustainability in the adoption of SLM practices will be promoted through supporting a motivated and knowledgeable extension service through recruitment of facilitators to fill the gaps, greater technical support from the extension network and investing in work 'enablers' at the extension level to secure greater involvement in results monitoring and reporting. This is intended to improve the institutional support given to the farmer groups and *de facto* improve the quality of the demonstration plots. Sustainability of adoption rates will be promoted through working with women and men's groups separately. Participatory approaches used for the agricultural component will support farmer own priorities based on farmers' own knowledge of what works and challenges in order to ensure relevance. Sustainability will also be strengthened through agro-biodiverse farming strategies, which is intended to contribute to a stabilisation of production yields year to year, and associated means to continue sustainable livelihood strategies in future years, but with minimum levels being substantially higher than at present, due to improved varieties based on landraces. The project will implement a participatory approach based on indigenous knowledge and farmer to farmer knowledge sharing.

153. Advocacy and knowledge management are essential to scale up the ecosystem-based approach in food security strategies. There are political barriers to scaling up and moving away from reliance on input subsidies, with only weak support for sustainable land use methods. The project, through Component 1, will generate evidence on the state of the environment for the selected catchments. Through Component 2, extension officers will be trained and motivated to

report on results from the work on increasing agricultural productivity. The project, through Component 3, will put into place an environmental monitoring framework and knowledge management system to develop the evidence base. Resources will be dedicated to producing user-friendly fact sheets and audio-visual materials to disseminate the results and policy-relevant messages.

154. SAPP has agreed to support the establishment and strengthening of village saving groups to overcome cost barriers for access to farm inputs and for the additional equipment needs of the farmers. These credit facilities may also be drawn on to buy treadle pump packages which would further help communities to observe the buffer zones agreed in the catchment management plans developed in Outcome 1.The village and savings clubs will be a key tool in empowering groups to expand their livelihoods, during and post project grant. If run well, they have been shown to be self-sustaining. A key emphasis of this component will be financial literacy training and agreeing clear rules of engagement.

155. At the central government level, the project has a strategy to mainstream successful catchment management strategies into national policies, plans and budgets. For example, it will produce reader-friendly and eye-catching knowledge products including audio-visual material, based on the evidence generated by the project. The project will provide technical contributions through coordinating structures at the Centre, for example, the National Task Force on SLM and the GEF Projects Steering Committee. Two National workshops are planned for dissemination of project results to policy makers in order to advance policy development on land and resource use for poverty reduction.

Appendix 1: Country and rural context background

1. Malawi is a densely populated landlocked country of about 15 million [current estimate about 17 million] people in an area of 118,484 km^2, of which 24,000 km^2 is fresh water. Population growth is almost three per cent per annum and the country has one of the lowest per capita GDPs in the world. With a human development index of 0.445, Malawi is ranked 173rd out of 188 countries (2014), while for its gender development index it ranked 116th out of 208 countries (2013). The third Integrated Household Survey (IHS3, 2011) estimates that 51% of the population lives below poverty line with 25% being ultra-poor.

2. The socio-economic challenges remain formidable. The ability to maintain a level of economic growth to ensure poverty reduction remains limited by: (i) the narrow economic base; (ii) the small and low value domestic market; (iii) poor infrastructure and high transport costs; (iv) erratic power supply and heavy reliance on fuel imports; (v) poorly developed business sector; (vi) Government intervention in key market sectors; and (vii) weak institutional management capacity in the public and private sectors. Education levels and productivity are low. Because of the predominance of rain-fed agriculture the country is extremely vulnerable to climate shocks, particularly droughts and prolonged dry spells. Present climate change scenarios predict more erratic rain- and drought patterns. Inflation and high interest rates remain a disincentive to investors. Chronic food insecurity and malnutrition, combined with HIV/AIDS prevalence of 11.9% add to the challenges.

3. Malawi has a predominantly agricultural economy, with 80% of the population depending on subsistence farming and exports reliant on the key cash crops – tobacco, tea, sugar and cotton. Real GDP growth rates averaged less than four percent during the 1990s, and ranged from two percent to nearly seven percent since 2002. The current account deficit of nearly 13% of GDP is financed by donor grants and development credits. Malawi has limited access to alternative modes of external financing and has attracted little foreign direct investment. Most of the farmers are smallholders cultivating on less than one ha of land. Agricultural production is mainly under rain-fed and this makes it vulnerable to climate change and variability. In Malawi, evidence of climate change has been experienced including unpredictable rainfall patterns, early cessation of rains, late onset of planting rains, floods, droughts and increasing temperatures since the year 2000 (GOM, 2006).

4. **Rural Poverty**. Approximately 74% of the population live below the income poverty line of USD 1.25/day and 90% below the USD 2.0/day threshold (UNDP, 2009). The proportion of poor and ultra-poor is highest in rural areas of the southern and northern regions. Over 85% of the poor live in rural areas (NSO 2008). Rural areas have a higher proportion of both stunted and underweight children, 36% and 18% respectively compared to urban areas with 31% and 12% respectively. The 2014 MDG Report on Malawi indicates that poverty levels are still very high and that the first goal on eradicating extreme poverty and hunger is unlikely to be met. In addition, degradation of the natural resource base has increased, in particular rates of deforestation.

5. The rural poor further incur high levels of malnutrition due to:(i) inadequate dietary intake; (ii) low access to food in terms of quantity, quality and diversity due to inadequate food production or low income; (iii) poor child feeding and care practices; (iv) low education and lack of knowledge in food processing and utilisation; (v) poor access to quality health care services and sanitary amenities; (vi) diseases; (vii) cultural beliefs which deny women and children consumption of high nutritive value foods; and (viii) poor coordination by GOM of nutritional programmes within and between institutions. About 38 percent of households earn their livelihood only from farming or fishing. Around 25 percent combine work on their farm with other jobs, largely in agriculture. The recurrence of both economic and climatic shocks frustrates attempts to escape rural poverty.

6. Farming in the main source of livelihoods in rural areas. Any reduction in crop yields negatively affects food security and other household requirements. Other sources of livelihoods in the rural areas include selling labour and small scale business.

7. Rural poverty is characterised by:

- Gender of Household Head. About 25 percent of the households are headed by women and 63 percent are poor, whereas only 49 percent of male-headed households are poor;
- Household Composition. The average household size for the male and female headed households is 5.1 and 4.1 respectively. Poor households are larger (5.4 persons/household) than rich than the non-poor households (3.8). The dependency ratio is higher for female headed households (1.5) than male headed households (1.0).
- Access to safe drinking water: over 85percent of the people have access to clean drinking water. The main sources of safe drinking water are protected wells, boreholes and piped water.
- Source of fuel for cooking: Overall, firewood is the main source of fuel for cooking (84 percent) followed by charcoal (12 percent). In rural areas, 95 percent of the households use firewood as compared to 37 percent in urban areas. Even though charcoal is largely produced in rural areas, use of charcoal is more in urban areas (51 percent) than rural areas (4 percent).
- Education. Poverty is severe among people who live in households whose heads have no formal education; and those with more than a junior certificate are less likely to live in poverty;
- Land Holding Size. 70 percent of the land is under customary tenure system (Sahn and Arulpragasam, 1991). Average land per household is 0.8ha. Some 75 percent of the farmers cultivate less than 1.0ha, with 33 percent of male heads cultivating less than 0.5ha as compared to 50percent of female household heads;
- Access to Markets and Services. The poor live in remote areas with few roads and little means of transport, which limits their economic opportunities and access to financial services;
- Illness and Disability. Families affected by chronic debilitating diseases such as HIV/AIDS and tuberculosis, both of which are accentuated by poor nutrition are poor or ultra- poor.

8. **Constraints and opportunities for agricultural and rural development**. The Agricultural sector is important to economic growth and human welfare because it employs about 80percent of the total workforce (NSO, 2012) and accounts for an average of 30% to the GDP from 2005-2013[43]. The sector contributes significantly to national and household food security (GOM, 2011). The sector is dualistic, comprising smallholder and estate subsectors. More than 80percent of the rural population are smallholder farmers (SHF) with customary land tenure. They cultivate small and fragmented landholdings over approximately 2.4 million hectares, with low yields, and are subsistence-oriented. Average landholding size has fallen from 1.5 ha in 1968 to around 0.7 ha today. Broad challenges to increased crop productivity include degraded soils, unpredictable weather and markets, high cost of inorganic fertilisers, pests and diseases, inadequate number of extension staff (extension: farmer ratio) for dissemination of extension information, and limited labour for agriculture activities. There are a number of agricultural technologies that have been developed and are being promoted by the government and other non-governmental organizations to address some of these production constraints. Such technologies include integrated soil fertility management practices, improved varieties, conservation agriculture, use of ICT in delivery of extension information,

9. Farming systems are dominated by maize occupying >70percent of arable land. The two main farming systems are: maize mixed (covering 75 percent of cropland) and cereal-root crop mixed in the south (15 percent of cropland). The original niche of smallholders was in the provision of maize to feed estate and urban workers. In good rainfall years with favourable prices and access to inputs, Malawi is able to produce around 3.0 million tonnes of maize, which is above the self-sufficiency level. In poor seasons, many households are food insecurity and malnutrition particularly in the food deficit southern region.

10. In terms of agro biodiversity, there is diversity of crops grown by smallholder farmers. Overtime, there has a change in the crop varieties from landraces improved or hybrid types due to among other

[43] FAO 2015.

factors: short duration to cope with short rains, wide adaptation in different environment, and high yield potential.

11. Fishing employs around 250,000 people and accounts for 60 to 70 percent of the animal protein intake. Livestock ownership is low with an average of 0.53 tropical livestock units per household. Performance of the livestock sector is affected by low productivity of the cropping sector. As cropping extends into grazing areas, the number of ruminant livestock has decreased. Per capita meat consumption and animal protein intake is low, contributing to poor nutrition among children. The fisheries and livestock sub-sectors are opportunities for diversification of livelihoods and can enhance resilience to climate change.

12. Despite availability of improved technologies, the productivity of most crops has only shown modest improvement because of: a) declining soil fertility; b) poor access to financial services and markets; c) unfavourable weather; d) small landholdings; and e) nutrient-depleted soils and limited use of fertilisers prior to introduction of the Farm Input Subsidy Programme (FISP). Post-harvest losses are estimated at 30% of production for maize and higher for perishable commodities.

13. Land and land-based resources are threatened by the high demand for resources such as wood for fuel and agriculture. Deforestation rate is estimated to be 3.3 percent annually between 1972 and 1992, which is an accelerated rate compared to 2.3 percent per annum between 1972 and 1990. 2.5 million hectares of forest resources were lost between 1972 and 1992, which is over 40 percent of the Malawi's forest resource[44]. Table 1 summarises Malawi's land cover types by region and gives their estimated areas, with an indication of the changes in cover that have taken place since the last comprehensive assessment carried out in 1991. Significant land use change is apparent. Forested areas and grass lands have decreased by 45 percent and land under agricultural production has increased by 37 percent.

Table 7 Land use change in Malawi from 1991 to 2008

Land cover type	Area ('000 ha.)				Change (1991- 2008)
	North	Central	South	*National*	'000 ha. %
Forest, woodland, plantation	868	523	597	*1,989*	-669 -25%
Extensive agriculture in forests	1,337	771	486	*2,593*	+160 +7%
Extensive agriculture in grasslands	-	-	259	*259*	+23.3 +10%
Intensive agriculture	142	2,002	1,577	*3,721*	+630 +20%
Grasslands	365	227	23	*614*	-152 -20%
Built up areas, rocks/gravel, marsh	8	36	179	*223*	+7.7 +4%
	2,720	***3,560***	***3,120***	***9,399***	

Source: 2009 Malawi Biomass Energy Strategy

14. Forests are being cleared for housing and agriculture primarily driven by population growth. A confounding factor is that the public extension system faces multiple capacity and financing challenges that limit its impact in terms of delivery of forestry, agricultural and environmental education and training in Malawi. Furthermore, catchment area and land degradation is being driven by the harvesting of fuel wood and charcoal production. Although the estimated annual supply of all biomass is 42.4 million cubic meters of solid wood equivalent which is estimated to be 2.7 times the demand (15.8 million cubic meters), the spatial distribution is uneven: surpluses are found in the northern regions but shortages are reported in Central and Southern regions, and the costs of transportation are too high to fix this problem. The diminishing standing stock means that a diminishing amount of biomass can be sustainably harvested annually.

[44] USAID (2010) Community-based Natural Resource Management Stocktaking Assessment: Malawi profile.

15. Future projections for further increases in deforestation and land degradation are startling. With the population increases expected, if more is not done to increase agricultural productivity then an estimated 740,000 hectares of forest and woodland (representing 37 percent of the 2008 forested area) will need to be cleared to provide farmland to meet the expected food requirements. This loss of forests will further jeopardise the sustainability of wood fuel supply in central and Southern regions of the country, which are already short on wood fuel. The Malawi Biomass Energy Strategy indicates a heavily charcoal-dominated future due to population increases and increasing electricity prices. Wood fuel consumption is projected to increase substantially too. At current trends, 82 percent of the population is projected to remain reliant on biomass energy in 2020. One study estimates that demand and supply will exceed 100 million tonnes per year by 2030 while the sustainable supply of biomass should be no more than 10 million tonnes per year[45].

16. Soil loss because of land degradation was estimated by the World Bank in 1992 to average 20 tons/ha/year, which is estimated to contribute to crop yield reduction of between four to eleven per cent per year. The Department of Land Resources Conservation estimated that in 1991 average annual soil loss in Karonga was 34 tonnes per hectare per year, for Nkata Bay, the estimate is 43 tonnes per hectare per year and for areas around the Zomba mountain foot slopes, the erosion is estimated at 55 tonnes per hectare per year. Since then, there has been no comprehensive work on estimation of soil loss in Malawi over the years, though the expectation is that this has increased due to population pressure and agricultural intensification and extensification. Another economic study estimates that Malawi lost USD15 million in the agriculture sector in 2007 due soil losses.

17. An additional consideration to the wide-scale use of agro-chemicals is that, coupled with high rates of soil erosion, the chemicals are leaching into rivers and water bodies which promotes eutrophication, damages eco-system health, causes fish mortality and increases the threat to human health. The risk of infestation of invasive aquatic weeds was found to be medium to very high for most areas of Malawi. These weeds form dense mats of floating weeds, displacing indigenous aquatic flora and fauna. They can impede water flow in rivers and irrigation canals (witnessed during the project concept design mission), which increases the rate of siltation in rivers, lakes and reservoirs, they can increase eutrophication levels killing fish and other biota, they can increase evapotranspiration from a water surface by 40 to 50 percent and they are linked to increases in water borne diseases such as schistosomiasis and cholera.

18. Added growing complications, in shifting Malawi to a more productive, sustainable development pathway are climate shocks. Malawi is vulnerable to a number of hazards, the critical ones being floods, droughts, strong winds, hailstorms, earthquakes, pest infestations and disease epidemics. Nearly all droughts in Malawi have been associated with the El Nino Southern Oscillation (ENSO) phenomena, 2015 being no exception. All flood disasters in Malawi are caused by high intensity rainfall resulting from three key synoptic systems: the Inter Tropical Convergence Zone, the Zaire Air Boundary/Congo Air Mass, or tropical cyclones. The joint effect of these three systems exacerbates the severity of the flooding in the country. Flood-prone river basins in the Malawi include the Songwe, Lufira, Limphasa/Luweya, Likangala/Thondwe and the Shire/Ruo.

19. Failure to consider, plan for and minimise the impact of these shocks has been shown to derail development initiatives and economic growth plans. Climate change projections for Malawi indicate mean temperature increases of between 2 and 3 ^{o}C by 2050, with longer and more intense heatwaves. Mean annual decrease in rainfall may remain at current levels but the variability will change, with an expected increase in the intensity of rains during the wet season of November to April and drier periods during the dry season of May to October. Climate models predict a wetter regime for the northern regions while the south will be drier with shorter and more intense rainfall periods. More

[45] Kambewa, P. and Chiwaula, L. (2010)

rain is expected to fall as heavy storm events, increasing the risks of flooding, drought and environmental degradation. Rivers in Malawi are very sensitive to changes in rainfall. Anecdotal evidence also suggests that agricultural losses due to pests can reach as high as 30 to 40 percent, and pest incidence will also be affected by changing patterns of rainfall and increasing temperatures. The combination of increased temperatures and rainfall variability is likely to result in a considerable loss in agricultural productivity and a reduction in the areal extent of land suitable for rain-fed agriculture.

20. Less than 4 percent of cultivated land is under irrigation, and only half (47,531ha) of that is managed by smallholder farmers. Major problems revolve around distribution of water and access to irrigated land, canal repairs, and mobilisation of labour for maintenance, and rules for resolving disputes. These issues need to be addressed to expand the irrigation sub-sector.

21. The land access that smallholders enjoy is a granted right to a lineage, transferred through either patrilineal or matrilineal systems depending on location. The right allows its holder to use customary land. In addition smallholders may access land through sub-lease of the land of other right holders. Land access ranges between these two, but generally a smallholder's long-term access is uncertain. The right to customary land is rarely taken back, but it has to be shared between relatives – and is at times a source of conflict; while the practice of land leases is largely confined to seasonal leases; and gives preference to those who can afford to pay in advance. Women face disadvantages both in conflicts over land rights as well as in access to lease options. Land access under the customary title is nowadays less certain; and it does not create favourable conditions for investment in soil fertility, irrigation infrastructure and land levelling.

22. The private sector remains under-developed in rural areas and smallholder farmers are poorly integrated in the marketing system. This is compounded by limited market infrastructure, poor quality feeder roads, inadequate market information, a lack of skills and facilities in post-harvest storage and agro-processing.

Appendix 2: Poverty, targeting and gender

Human development and poverty

1. The population of Malawi grew from 9.9 million in 1998 to 13.1 million in 2008[46], representing an increase of 32 percent. Current estimates indicate the population is now around 17 million. There are more females (51 percent) than males (49 percent). The Southern Region has the highest population of 5.9 million (45 percent), followed by the Central Region, 5.5 million (42 percent) and the Northern Region has 1.7 million (13 percent). The youth profile in Malawi indicates that out of the total population more than 40 percent are aged 10 to 35 years[47]. Literacy rate within this age bracket is estimated at 81.8 percent with slightly more males (86.6 percent) than females (77 percent) being literate. About 85 percent (11.1 million) of people live in rural areas.

2. The 2014 UNDP Human Development Report ranked Malawi 174 out of 185 countries surveyed making the country one of the poorest in the world. The Southern region has a slightly larger poverty rate (63 percent) than the Northern region (60 percent). The incidence of poverty and ultra-poverty is higher in female-headed households. The proportion of poor and ultra-poor is 58 percent and 27 percent, respectively, in female-headed households. On average, female-headed households earned only 60 percent of the annual income of male-headed households.

3. The Government of Malawi (GoM) has over the years pursued various strategies to reduce poverty including: the Malawi Poverty Reduction Strategy (2002–2005); the MGDS I and the current MGDSII 2011 – 2016). Emphasis has been on economic growth, infrastructural development, and the provision of basic social services but as mentioned above poverty remains widespread in Malawi. One of the more successful but costly strategies was the FISP implemented from 2005 in response to low input use and severe food supply shortages. FISP aimed to provide low-cost maize and tobacco fertiliser and improved maize seeds to poor smallholders (a legume seed component was later added). Maize yields increased from 0.8 to 2.0 metric tons per hectare between 2004/05 and 2009/10 and tobacco expanded production at an average annual rate of 13 percent.

Rural livelihoods

4. About 85 percent of households in Malawi are engaged in agricultural activities. Of these households, about 84 percent are engaged in crop production whilst 44percent rear livestock, hence, 43 percent of households engaged in agricultural activities are engaged in both livestock rearing and crop cultivation. In terms of labour the IHS3 found that women worked in 94 percent of the cultivated plots relative to 82 percent of men. Regardless of the sex of the children, 25 percent of the cultivated plots used children and 23 percent reported to have hired child labour input. The agriculture sector contributes about 35 percent to GDP, covers 85percent of the labour force, and contributes 83 percent of foreign exchange earnings (MDPC, 2012). A study conducted by the World Bank (2010) looking at sectors and their importance for poverty reduction concludes that it is four times more effective to develop the agriculture sector than other sectors to bring people out of poverty in Malawi.[48]

5. Malawi's agricultural sector is characterised by a dual structure consisting of smallholder farms (SHF) and estates. The smallholder sub-sector contributes more than 70 percent to agricultural GDP. Malawi's economic performance is therefore dependant on how the smallholder farmers perform.

[46]The 2008 population and housing census

[47] According to the National Youth Policy (2013), youth in Malawi constitute all persons from age 10 to 35 years regardless of their sex, race, education, culture, religion, economic, marital and physical status.

[48]Referred to in Strategic Framework for Climate Smart Agriculture in Malawi, draft, FAO 2015A

SHF's yields are typically less than the national average; they have lower per capita expenditure and a higher incidence of poverty. According to the IHPS10/13[49] on average households in Malawi have 0.89 ha of land of which 0.88 ha are cultivated. In the case of SHF the landholdings are typically fragmented, under customary land tenure systems, and cultivated as low-input rain-fed land (80-90 percent). SHFs cultivate mainly food crops dominated by maize, but also other staple grain, cassava and sweet potatoes to meet subsistence requirements. Although smallholder agriculture is still mainly subsistence oriented, they are also increasingly contributing to cash crop and export production in burley tobacco, cotton, tea, bell pepper (paprika), groundnuts, chillies, beans, pigeon peas, vegetable and rice (several of these are both cash crops and subsistence crops, see table 1 and 2 below).

Table 8 Household reporting of crop cultivation and crops sales

Table 1: Households Reporting Cultivation of Crops (percent)

	2010	2013
Maize	97.03	94.62
Traditional	61.85	64.09
Hybrid/OPV	50.63	45.72
Groundnuts	32.53	37.00
Pigeon Peas	21.26	28.58
Beans	14.09	22.23
Rice	4.66	4.25
Tobacco	15.44	10.55

Table 2: Households Reporting Sales of Crops Cultivated (percent)

	2010	2013
Maize	14.69	15.72
Traditional	10.07	12.01
Hybrid/OPV	16.04	15.67
Groundnuts	33.16	38.34
Pigeon Peas	20.24	26.18
Beans	38.39	50.07
Rice	39.83	38.84
Tobacco	97.37	94.71

Source: IHPS10/13

6. In terms of gender, the man decides what to produce, at least when money is involved. Women mainly grow crops for the family's own consumption, while men grow cash crops. Women seem to have limited access to, and control over, production factors such as land, agricultural inputs, and technology. Women provide most of the labour in the smallholder subsector, while men dominate labour in the commercial subsector, creating imbalances in terms of access to agricultural income.

7. Looking at changes in inputs and crop management from 2010 to 2013 (rainy seasons) recorded by the IHPS10/13 it is noteworthy that the use of fertilizer and improved seeds have decreased while intercropping as a management practice have significantly increased from 29.5 percent (2010) to 45.8 percent (2013) (table 3 below). The data from IHS3 further shows that richer households are less likely to intercrop compared to the poorer households. The southern region has registered the highest proportion of plots that are intercropped (50 percent) compared to the north (20 percent) and the centre (10 percent).This could indicate that SHF are increasingly applying intercropping as a means to manage soil fertility and productivity and as a risk spreading strategy. A slight increase in crop diversification from 2010 to 2013 (table 1 above) could also be contributing to the risk management strategy. There has been a slight decrease in the maize and tobacco production and an increase in all other crops except rice. The increase in nitrogen fixing beans and pigeon peas is particular noteworthy in relation to benefits for soil fertility. Another interesting observation is that the use of improved varieties (hybrids and OPVs) has been decreasing, however still dominating, and the

[49] Integrated Household Panel Survey Report 2010-2013

use of traditional varieties (traditional and hybrid recycled seeds) has been increasing. This most likely reflects less access subsidized seeds and fertilizers for improved varieties.

Table 9 Input use, Crop Stand and Management (plot level, percentages reported)

2010		2013
Input Use		
Fertilizer Use	58.19	54.96
Improved Seed Use (for Maize Only)	45.02	40.15
Crop Pattern		
Pure Stand	70.47	54.2
Inter-Cropped	29.53	45.8

Source: IHPS10/13

8. About 95 percent of the population uses firewood or charcoal for cooking. Gathering firewood takes as much as three hours in a day and it is mainly the duty of women and in some cases supported by children. This limits time that could be spent more productively—tending gardens, raising cash crops, in family care and sending girls to school. The 2012 Global Burden of Disease assessment revealed that exposure to fine particulate matter (P.M. 2.5) and carbon monoxide in smoke from cooking over an open fire causes four million premature deaths per year–exceeding deaths attributable to malaria or tuberculosis and likely to exceed deaths from HIV AIDs by 2030. Typical smoke exposure levels for women cooking over open fires are equivalent to smoking two packs of cigarettes per day. According to reports, the use of improved cook stoves reduces exposure of women and small children to fine particulate matter (PM 2.5) and carbon monoxide resulting from partial combustion of wood and woody biomass from cooking over open fires whether indoors or outside.

Vulnerabilities and food insecurity

9. The IHPS10/13 shows that food insecurity is prevalent in Malawi and has not improved comparing 2010 with 2013. In 2013 41percent of households had very low food security[50]. Disaggregated very low food security is found in 38.1percent of urban household, 41.4 percent of rural household, 38.2 percent of men headed household, and 50.8 percent of women headed household. Households vulnerable to food insecurity employ a variety of coping and adaptive mechanisms intended to mitigate or scale down food hardships. Such coping strategies include: relying on less expensive or less preferred food, limiting portion size at meal times, reducing number of meals, restricting consumption by adults, borrowing food or relying on help from others. The food insecurity is strictly linked to the cropping calendar with high food insecurity during the period preceding the harvest (November-February). It reaches its highest point in February and gradually starts to decrease from March, right before actual harvest. After harvest (April-October) the incidence of food insecurity goes below 10 percent.

10. The development in food insecurity between the years also clearly reflects SHF's dependency on rain-fed agriculture. Droughts, erratic rains, floods and water logging was in the IHPS10/13

[50] Very low food security is in the IHPS10/13 defined as: households experience multiple indications of disrupted eating patterns and reduced food intake. They report reduction in food quality, variety, quantity and frequency of food consumed. Consumption by adults could have been restricted in order for small children to eat and could also depend on food assistance from relatives or friends

reported as cause of food insecurity by 24.1 percent of rural household in 2013. This makes it the second most important cause after lack of farm inputs (38.1 percent) and followed by high market food prices (21.7 percent). With the last decades increase in climate variability and shocks (see Appendix 14 SECAP note) the exposure of smallholders to droughts, erratic rains, floods and water logging has increased their vulnerabilities. At the same time wide spread soil erosion and degradation of vegetation cover is compromising the productivity and resilience of agro ecosystems.

Gender

11. The IHS3 notes that 72.7 percent of Malawi households are headed by males and 27.3 percent by females. Disaggregation by location shows that males headed 82 percent of the urban households and 71.1 percent of the rural households, while females headed only 18 percent of the urban households and 28.9 percent of the rural ones. The southern rural area has the highest proportion of female headed households (29 percent) and the northern rural areas have less (21 percent). The proportion of female headed households increases with increase in age. Malawi has a Gender Inequality Index (GII) value of 0.591, ranking it 131 out of 151 countries in the 2013 index.[51]

12. In the agriculture sector, studies show that about 70 percent of full time farmers are women. However, most women do not take full control over the use and ownership of agricultural land, access to credit is low (between 10 percent and 15 percent) and the control over the use of the credit rests with the men within the households. Similarly, extension and training services favour men. The 2010/11 bi-annual gender audit showed that seasonal average of women membership to NASFAM Associations was only 34.4 percent.[52] Women in Malawi are more vulnerable to climate change than men, mainly because they are poorer than men; they bear the primary responsibility for growing of food crops and collecting resources like water and firewood, which are becoming increasingly scarce. Frequent drought and erratic rainfall force women to work relatively long hours to secure food, water and energy for their homes.

13. Major poverty indicators disfavour women in Malawi and these aggravate the disadvantaged position of women see Box 1.

Box 1 Gender gaps at a glace[53]

Gender Gaps at a Glance

- GII – 0.573 (ranking 124 out of 148 countries)
- Literacy levels. Females 59percent; Males 69percent
- Population. Women 51percent; Men 49percent
- Access to extension services. Women 14percent; Men 18percent
- Average landholding size. Women 0.803 ha; Men 0.964 ha
- Participation in household decision making in male headed household. Women 36percent
- Composition of agricultural labour force. Women 70percent
- Poverty prevalence. Female household 59percent; male household 51percent
- Care-giving for the sick. Women: 80percent
- PLHIV. Women: 56-58percent
- Gender-based Violence victims. 90percent are women
- Domestic tasks: Women (82percent); men (18percent).

[51] The GII reflects gender-based inequalities in three dimensions: reproductive health; empowerment; and economic activity. The GII shows the loss in human development due to inequality between female and male achievements in the three GII dimensions.

[52] NASFAM is the largest independent, smallholder-owned membership organisation in Malawi with over 100,000 members

[53] Source: The Agriculture Sector Gender, HIV/AIDS Strategy (2012-2017); UNDP, 2013

14. In Malawi there are both matrilineal and patrilineal systems. There are four main tribes, two of which, the Chewa and Lomwe tribes, are matrilineal. Under the matrilineal system, land is handed down through the female line. Women are considered to be pillars of society, but are nonetheless restricted to the home and performing family care responsibilities. Paradoxically, such female-dominated societies prevent women from attending school and from having an economically active life. Women's role is to stay at home. Northern tribes, which are male-based, do allow women to go to school and do not marginalise them by forcing them to take care of the family. In many contexts, men are expected to dominate and women to be passive in taking decisions about sexual relationships. The 'subordinate' position in which Malawian culture places women and girls denies them the power equal to men and boys, to among other things inherit property or acquire property through purchase.
15. The cultural norms in Malawi exacerbate the gender gap. For example, traditional Malawian culture, regards, wife battering as normal. Domestic violence occurs across all socio-economic and cultural backgrounds. Women are the major victims of culturally and socially acceptable gender-based violence in the rural areas which has been treated as a private issue until recently. GOM in response to the international and regional instruments on women's rights, started to implement initiatives aimed at creating awareness of gender-based violence and changing the social order in which a woman is assumed to be of lesser status and with the men leading in all family aspects.
16. The National Gender Policy of Malawi was launched in March 2000 and evaluated after five years. The evaluation highlighted challenges and issues which included HIV and AIDS, gender-based violence (GBV), human trafficking, increased environmental degradation and high levels of poverty with gender dimensions. The policy was revised in 2008 to address these issues. The Gender Equality Bill, 2012 further provides legal response to the gender inequalities. MGDS II includes gender as a cross-cutting issue. The MOAIWD gender and HIV/AIDS strategy (2012-2017) recognises that women and the youth are responsible for a significant proportion of work in the rural sector. In promoting gender equality and women's empowerment, the AIP-GEF project will therefore be acting in accordance with and supporting the various policies and legal responses implemented by the government.
17. The analysis of the status of women and the gender gaps emphasises the importance of that development initiatives in Malawi address gender issues in order to achieve their objectives. Experience from IRLADP showed that female headed household responded better to project initiatives than male-headed among poor beneficiaries. IRLADP further noted that operating under similar circumstances, female farmers can respond better to development initiatives than male farmers, and hence their participation in the development can accelerate poverty reduction[54]. It was established that women earn nearly 50 percent of what their male counterparts involved in similar ventures in informal enterprise earn.

Youth

18. With regard to agriculture, the National Youth Policy seeks to ensure that: (i) modernisation of agriculture through the incorporation of ICT and other modern technologies and tools to make agriculture attractive to the youth is encouraged; (ii) access to productive agricultural land in adequate proportion and other factors of production for the youth who fail to access these resources due to culture, gender and/or other socio-economic factors is facilitated; (iii) the promotion, provision and dissemination of youth tailored information and provision of support for advanced training targeting out of school youth for increased agricultural production, agro-processing and marketing is facilitated; (iv) an enabling environment for Public Private Partnership for youth development including the provision of technical training to youth is created; and (v) support for the scale up of the national internship and mentorship programmes to facilitate youth to enter the labour market in rural and urban areas is promoted.

[54] IRLADP Independent Impact Study; 2013

Geographic coverage and targeting

19. The co-financing baseline for the project is the Programme for Rural Irrigation Development (PRIDE) which has 15 prioritized sites for investments in irrigation schemes in two clusters in the North and Southern regions of Malawi. In addition to the investments the PRIDE financing will also cover capacity development for land and water management in the command area and nearby rain-fed agricultural land in the catchment areas. With limited resources the GEF financing has been prioritized for investments in wider catchment area management increasing ecosystem service and protecting the PRIDE investments in 5 of the most vulnerable catchments[55] (see map page vi). During the project design these catchments were selected through a two-step process reflecting the project's targeting priorities. To identify the most vulnerable catchments in the first step the following criteria where used to compare all catchments with PRIDE investment sites:

i) Level of food insecurity, source: MVAC assessment 2012 and 2013
ii) District average maize production per ha the last 8 years, source: MoA
iii) Rainfall variability measured over the period 1985-2012, source: Strategic Framework for Climate Smart Agriculture in Malawi, FAO and MAIWD draft 2015
iv) Drought occurrence measured over the last 20 years, source: ICRAF
v) Flood risk, source: Vulnerability, Risk Reduction, and Adaptation to Climate Change in Malawi, GFDRR. 2011
vi) Soil erosion measured over the last 20 years, source: ICRAF

20. Applying these criteria it is clear that in general the catchments in the south are more vulnerable than the ones in the north, though they are all poor and experience periodic food insecurity. To be able to learn about barriers and enabling conditions for upscaling from comparing the differences in conditions between north and south it was decided to select at least some catchments from a district in the north. As a result 4 districts (Karonga, Machinga, Phalombe and Zomba) with 8 PRIDE investment sites covered by 7 Extension Planning Areas (EPAs) were selected for the second selection step consisting in a further situation diagnostic including a household survey where 323 randomly sampled respondents were interviewed. The sample included 161 men and 162 women including single women, women household leaders (18 percent), and women from men lead household. The household survey was complemented by gender separated as well as mixed focus group discussions (FGD) with farmers and with district officers. Even though the household sample is not statistically representative for the whole catchment areas, the situation analysis, complemented by the FGDs, has given good indications on ecosystem degradation issues and drivers linked to farming and livelihood systems and food security as well as adoption barriers for SLM practices and land and water governance systems at a catchment area level. The situation diagnostic also allowed to leave out Zomba that turned out to be more food secure than the population in the EPAs in the catchments in the other three districts (paragraph 22 and table 5 below). Therefore, the final geographical targeting of ERASP investments is two catchments with PRIDE investments in Koronga, two in Machinga and one in Phalombe covering an estimated 35,000 hectares and involving at least 7 Extension Planning Areas (EPAs).

Livelihoods profile of target population

21. **Income and livelihoods.** Key results from the household survey among the population in the target EPAs indicate that the average annual household income is very low (US$ 244, US$ 281 for men and US$ 213 for women) and below the poverty line and the national average from the IHS3. The main source of livelihood for over 65 percent of the households is agriculture followed by non-

[55] According to the Irrigation Master Plan of Malawi (2014) the country has 17 water resources areas (WRA) defined by natural hydrological boundaries of major catchment areas with a manageable size and representing homogeneous parameters within themselves. The WRA are subdivided in 78 water resource units (WRU) again following natural hydrological boundaries for this subdivision. The catchments selected for the ERASP are subareas under the WRUs defined to capture the catchment impact area of the PRIDE investments.

farm labour income (less than 12 percent) and business (less than 8 percent). The table 4 below illustrates the disaggregation of agricultural production assets, labour availability, production costs and incomes for the average household. Rain-fed agriculture is the main income generating activity. Even though land holdings are small only around 1/3 is cultivated. Firewood fetching is a time consuming activity but does bring in some additional income in times with food shortage.

Table 10 Average income and asset variables

Variable	Sample size	Average	Standard Deviation
Land holding size (ha)	323	0.97	0.75
Area planning to cultivate 2015/2016 season (ha)	323	0.31	0.43
Household size	323	5.15	1.79
Household labour availability	323	2.57	1.28
Total farm operation costs per season	323	4091	10411
Distance covered to fetch firewood (Km)	323	2.57	1.29
Annual Income from irrigation farming (MK)	323	6084	15115
Annual Income from Rain fed farming (MK)	323	45380	76740
Annual Income from firewood and charcoal (MK)	323	3463	15913
Annual income from Livestock	323	5739	23936
Total annual income (MK)	**323**	**129058**	**125374**

22. **Food security** vulnerability is widespread varying with the annual rainfall with women being more vulnerable than men. However, as shown in table 5 below Zomba EPAs have more households with either no food shortage or with food shortage between 2-3 months per year unlike the other district's EPAs with households typically experiencing food shortage for more than 4 months per year. The better food security status in Zomba may be attributed to the Shire River Basin Project and interventions from NGOs that have introduced many practices for catchment area management, SLM and climate change adaptation including irrigation farming. To further target the GEF investment it is therefore proposed to leave out the catchment areas/WRUs of the Zomba district PRIDE investment sites.

Table 11 Income, food security and key assets by district EPAs and gender

Variable	Karonga EPAs			Machinga EPAs			Phalombe EPAs			Zomba EPAs			Average all EPAs		
	F	M	A	F	M	A	F	M	A	F	M	A	F	M	A
Annual HH income (US$)	185	309	243	187	262	220	262	294	279	229	233	231	213	281	244
% of HH with food shortage 6-8 months per year	23	21	22	22	36	28	43	40	42	8	20	15	24	29	27
% of HH with food shortage 4-5 months per year	58	47	53	53	39	47	18	12	15	19	0	9	39	23	31
% of HH with food shortage 2-3 months per year	19	13	16	18	0	10	35	45	40	53	55	54	30	30	30
% of HH with food shortage less than 1 month	0	0	0	4	6	5	0	0	0	0	0	0	1	1	1
% of HH with no food shortage	0	18	9	0	19	8	3	2	3	19	25	22	5	16	11
Land holding size (ha)	0.86	1.42	1.12	0.58	0.84	0.69	0.80	1.11	0.97	1.20	1.00	1.09	0.84	1.09	0.97

F: Female respondent.

M: Male respondent.

A: Average for the households in the EPAs in the district.

23. **Nutrition.** Access to different food groups is a challenge to many households. The food groups that are eaten almost every day are grains, vegetable and fruits while legumes and fish are eaten a few times per week. The majority of the respondents from all the four districts (97percent) reported that they eat grains almost every day. Fish is available in Karonga, Zomba and Machinga because of the proximity to lakes. There is an increase in pigeon peas production due to high market demand in almost all the districts which also means availability of legumes at a household level. Some foods like eggs and oils, and meat are rarely eaten by most of the households because they are not affordable. In general, there are very few households who eat all the six food groups in a day. This is an indication that most households may be nutrition insecure especially during food shortages and it was confirmed during the focus group discussions.

24. **Gender.** The situation diagnostic of the target population confirmed the gender imbalances and inequalities described for the national level above. Women have a significant bigger workload than men, less say over land and water resources and decisions regarding income generating activities. They prefer crops that contribute to household nutritional security where men prefer crops for sale. Women also grow crops that are manageable/affordable in terms of inputs and labour requirements. Both men women prefer to grow maize and rice, while women differ in preferring pigeon peas while men differ in preferring cassava. The differences were also noted in the varieties of crops; in general men grow hybrid seed while most women recycle their seed. Men decide over the sale of cattle, goats and pigs, while women can decide over chickens. Women gather firewood for household consumption where men seem to only be involved in gathering firewood for sale and charcoal production. It was noted that due to increase in the demand for women's roles at the household, boys in all cultures have started to play certain roles that in the past were mainly for girls and women such as collecting water. Boys and girls also seem to have equal access to attend to school. Most of the women/girls roles are carried out on a daily basis and are routine activities while men's roles are mostly demanded when need arises. The FGDs revealed that women are engaged in one or more simultaneous roles throughout the day while men have some free time in which they engage in income generating activities or luxury such as beer drinking or watching or participating in sports.

25. **Crops cultivated.** Crops grown in the 2014/2015 cropping season (table 6 below) confirms the overall dominance of maize as the main stable crop grown by all households followed by pigeon pea, rice, groundnut and cassava. Most crops are for own consumption but cotton, pigeon pea and cassava as well as vegetables grown with small scale irrigation in the dry season are also for sale. Most farmers intercrop maize with pigeon pea and cassava planted at low density. Groundnut, rice and dwarf beans are planted in pure stands. Most farmers have adopted the improved varieties (hybrid and OPV maize) and landraces are only grown at a small scale (less than 10 percent of the cultivated land). The low diversity and dominance of a few crops may contribute to the food security vulnerability to rainfall variability and climate shocks.

Table 12 Crops grown in the EPAs of the four districts in the 2014/2015 cropping season

Crop	percent of households growing crop			
	Karonga	Machinga	Phalombe	Zomba
Maize	100	100	100	100
Rice	22.5	32.9	42.0	1.3
Sorghum	7.4	5.6	0	0
Pigeon pea	46.5	86.9	63.7	12.4
Groundnut	29.6	25.4	19.7	10.1
Common beans		1.2	20.9	
Soybean		-	1.2	6.5
Cowpea	1.2	1.2	-	27.7

Sweet potato	2.5	2.5	1.2	-
Cassava	11.9	13.6	14.8	1.2
Tobacco	-	-	1.3	6.3
Cotton	29.4	0	0	74.5
Agroforestry trees	2.4	0	0	7.5

26. **Livestock.** Number of livestock per household is really low (table 7 below) and only 52 percent of the households in the survey owns livestock. With the exemption of Karonga, where households also have cattle, the most common livestock are goats and chickens, but also pigs, sheep, ducks and rabbits are raised by some households. The livestock are mainly kept for food (meat and eggs), income and manure. In most cases, the income raised is used to buy farm inputs and food during food shortages.

Table 13 Livestock owned by household in the EPAs of the four districts

District	Livestock type	Current owned	Number owned in last 12 months	No. died in last 12 months	No. sold in the last 12 months
Karonga	Chickens	1	4	2	1
	Goats	1	1	0	0
Machinga	Chickens	2	3	2	1
	Goats	1	1	0	0
Phalombe	Chickens	2	3	1	1
	Goats	1	1	0	0
Zomba	Chickens	2	5	1	1
	Goats	2	3	0	1

Targeting strategy and gender mainstreaming

27. The ERASP-GEF project will be implemented blended with the PRIDE implementation and as such follow the same gender strategy which include providing sensitisation on gender issues through various ways, such as the Gender Action Learning System (GALS). The project will Train Trainers to use the GALS tools to roll-out the out the methodology to the communities. Manual and implementation guidelines developed for the PRIDE will be adjusted for the implementation of the GALS methodology in the ERASP-GEF. GALS has been implemented in the context of both IFAD-funded interventions and NGO-supported projects. It helps to address and overcome unequal gender and social relations. It is a versatile methodology that can be integrated with a variety of interventions (such as rural finance, natural resource management, value chain development). It can be used for household and groups. GALS will be incorporated in the capacity building of the sub-CMC and VNRMC. GALS uses a set of pictorial tools that can reach both literate and illiterate people. In addition, the support for reforestation and the plantation of wood lots as well as the increased water availability from improved catchment conservation will have direct impacts on women's life by reducing workload and save time for firewood gathering and water collection. The introduction of efficient stoves will also have health benefits.

28. Likewise, the ERASP-GEF project with follow PRIDE's strategy for youth involvement. While the National Youth Policy (2013) defines youth as all persons from age 10 to 35 years, PRIDE and the ERASP-GEF will work with young women and men of 20 to 35 years. This is the group that has potential to participate in the agricultural opportunities sited in the Youth Policy (para 11.)

29. The target group of the ERASP-GEF project is defined as smallholder farmers in the selected catchment areas/WRUs of the PRIDE investment sites. Within this group, a primary target group comprises households that are particular food insecure and produce mainly for subsistence willing to

seek increased land and water productivity through land and water landscape level governance and catchment area conservation and SLM practices.

30. The ERASP-GEF targeting mechanism will be closely aligned with the PRIDE and draw on IRLADP and SAPP lessons and ensure equitable participation at all levels including in involvement in catchment area land and water use governance and planning and in provision of services such as training and capacity development and eventual inputs for catchment area conservation and SLM. The main measures and activities are summarised in the Targeting Strategy Matrix and the Gender Checklist for project design and implementation below.

Table 14 Targeting strategy matrix

Measures	Activities
Geographical targeting	• GEF-ERASP has deploys a method for selection of the most vulnerable catchment areas/WRUs with PRIDE investments in terms of: i) food insecurity; ii) maize production per ha (proxy for food security and status of land and water resources); iii) rainfall variability; iv) drought occurrence; v) flood risk; and vi) soil erosion
Enabling measures – to create and sustain a policy and institutional environment favourable to gender equality and women's empowerment	• Gender awareness creation for Traditional Authority / Chiefs to enable gender sensitivity in their work with communities; • Sensitisation of programme implementers; • Sensitisation of local leaders in charge of land and water governance issues catchment areas/WRUs; • Gender Audit of five sub- Catchment Management Committees (sub-CMC) supported to become centres of excellence; • Communication, extension and knowledge packages used in ERASP-GEF and the PRIDE will be gender sensitive in terms of language, topics and literacy; • Facilitate women and youth participation in catchment management and SLM trainings and study tours by addressing barriers to their participation.
Empowering measures – to give target groups equal chances to access activities	• Set quotas for leadership positions for women in conservation groups and sub-CMCs; • Leadership training, particularly for men from poorer households, women and youth; • Promote equitable involvement in land and water governance and planning decisions
Direct targeting – when services or resources are to be channelled to specific individuals or households	• Identify most food insecure households to participate in experimental learning on SLM practices and as recipients of inputs • Identify innovative women all ages and young men as lead farmers for promotion of further upscaling of catchment conservation and SLM practices
Self-targeting measures – to ensure that goods and services respond to priority needs, resource endowments and livelihood strategies of target groups	• Strengthening of women and youth groups in various fronts including entrepreneurship; • Ensure that ERASP-GEF's interventions respond to the priorities, labour capacity and livelihood strategies of the smallholder farmers including land and water use planning in the catchment area/WRU
Operational measures – to ensure gender-equitable participation in, and benefit from, planned activities	• Ensure TORs for ERASP-GEF staff reflect contribution to gender equality and community empowerment including the Programme Coordinator; • Discussions in start-up workshop and other mobilisation activities to include gender and youth issues.
Monitoring targeting performance – to monitor outputs, outcomes and impacts as they relate to target group	• The WEAI to form main part of gender analysis in the baseline survey and RIMS data collection and reporting; • All data to be disaggregated by sex and age with due qualitative analysis.

Table 15 Gender targeting matrix

	Design
1. The project design report contains – and project implementation is based on - gender-disaggregated poverty data and an analysis of gender differences in the activities or sectors concerned, as well as an analysis of each project activity from the gender perspective to address any unintentional barriers to women's participation.	Yes (see text on gender and table 5 in this appendix). Further analysis and identification of unintentional barriers for women's participation in each project activity will be done during the final design mission.
2. The project design report articulates – or the project implements – actions with aim to: • Expand women's economic empowerment through access to and control over productive and household assets;	The project will be implementing the GALS including aspects of how to support women's economic empowerment. In project activities supporting crop diversification and improved production as well as livestock integration and NTFP emphasis will be on crops, livestock (chicken) and products with income generating opportunities for women.
• Strengthen women's decision-making role in the household and community, and their representation in membership and leadership of local institutions;	Yes (see para. 26 and the Targeting strategy matrix)
• Achieve a reduced workload and an equitable workload balance between women and men.	The project's focus at reducing the household need for firewood through improved stoves and assure the availability of firewood in woodlots will in particular contribute to a reduction of women's workload.
3. The project design report includes one paragraph in the targeting section that explains what the project will deliver from a gender perspective.	Yes, (see para. 49 in main text)
4. The project design report describes the key elements for operationalizing the gender strategy, with respect to the relevant project components.	Yes in the Targeting strategy matrix, but should be improved in the component description in the final PDR after the final project design mission.
5. The design document describes - and the project implements - operational measures to ensure gender-equitable participation in, and benefit from, project activities. These will generally include**:**	
5.1 Allocating adequate human and financial resources to implement the gender strategy	The project will be implemented blended with the PRIDE project and will as such benefit from the financial resources and capacity building allocated for the implementation of the PRIDE gender strategy
5.2 Ensuring and supporting women's active participation in project-related activities, decision-making bodies and committees, including setting specific targets for participation	Yes, see Targeting strategy matrix

5.3 Ensuring that project/programme management arrangements (composition of the project management unit/programme coordination unit, project terms of reference for staff and implementing partners, etc.) reflect attention to gender equality and women's empowerment concerns	As per PRIDE's gender strategy project staff will be trained in gender sensitivity and all TORs for ERASP-GEF staff will reflect contribution to gender equality and community empowerment including the TORs for the Programme Coordinator
5.4 Ensuring direct project/programme outreach to women (for example through appropriate numbers and qualification of field staff), especially where women's mobility is limited	This is included in the GALS methodology and the project's communication strategy
5.5 Identifying opportunities to support strategic partnerships with government and others development organizations for networking and policy dialogue	This identification should be further analyzed during the final project design and included in the PDR and followed up during project implementation
6. The project's logical framework, M&E, MIS and learning systems specify in design – and project M&E unit collects, analyses and interprets sex- and age-disaggregated performance and impact data, including specific indicators on gender equality and women's empowerment.	Indicators in the logical framework are gender disaggregated where relevant from which it will be possible to monitor gender equality in accessing project benefits. The baseline situation analysis described in this appendix will be complemented by the MPAT questionnaires and by a set of gender relevant survey indicators from the Women's Empowerment in Agriculture Index (WEAI)

Appendix 3: Country performance and lessons learned

1. Much experience has been gained in adapting and promoting SLM practices in Malawi (Conservation Agriculture, pit planting, manure and composting, mulching, water harvesting, etc.) and in most cases increases in harvest can already be achieved in the first year. Natural regeneration has also shown positive impact in some locations. However, the various projects being implemented do not seem to monitor adoption rates and barriers and incentives for adoption are rarely analysed and addressed in a systematic manner to allow for upscaling.

2. The recent FAO study (2015) on adoption of SLM practices (done as part of the development of an investment framework for climate smart agriculture for Malawi) identifies drought in water stressed areas and support from extension officers or NGOs as key drivers for farmer's adoption. Department of Land Resources and Conservation mentions from their experience the importance of: incentives in terms of increasing farm income from year one; keeping costs low for the implementation of SLM practices; provision of substantial capacity building to change the mind-set of farmers; and the organisation of farmers in groups facilitating their joint experimental learning and eventually access to markets. Several stakeholders both at national, district and village level have pointed out the need of a harmonisation in approaches promoted to farmers in order to avoid confusion and achieve more impacts.

3. Incorporation of small livestock in farming systems seems to receive little attention in the main objectives and activities of projects but is sometimes incorporated in the last years of project implementation because of farmers 'demands. Considering the role small livestock can play in provision of manure to improve soil fertility, in nutritional security and in a diversity strategy for small holder's resilience to rainfall variability and buffering against food insecurity, a subcomponent for small livestock could be included already in the project design.

4. The lessons learned from IFAD's involvement in Malawi, which are contained in the COSOP 2010-2015, and which are highly relevant to the project, are as follows:

(i) weak local government capacity creates a need for support from programme support units (PSUs), capacity-building of district assemblies, and the engagement of competent NGOs and the private sector for selected aspects of service delivery;
(ii) high management costs are difficult to avoid owing to the need for PSUs and the high market rates for competent staff;
(iii) sufficient resources and time need to be allocated to M&E, which needs to remain focused on a small number of indicators;
(iv) strong coordination with other donor funded activities needs to be maintained;
(v) "stop-go" implementation of macroeconomic policies and lack of coordination among different initiatives can significantly affect programme execution;
(vi) it is very challenging for commercialization initiatives to target the ultra-poor as they often lack the capacity to participate;
(vii) patience and a long-term perspective are needed to overcome the entrenched dependency and aversion to change, risk, entrepreneurial capacity and even project ownership among the poor;
(viii) delays in project start-ups indicate that early implementation support through a programme preparatory facility would be beneficial.

5. Other lessons learned can be gleaned from similar investments implemented in Malawi during the 2012-2015 COSOP programme cycle. The closest one is IRLADP. Lessons learned from this include which are directly relevant to this project are as follows:

- It is important to ensure that capacity is built at the national and district levels for implementation and ownership and after-project sustainability;

- Regular data collection and management is a challenge if there is no clear reporting system and a lack of properly articulated data collection tools and guidelines to harmonise the process;
- A two year project preparatory phase is recommended for complex projects. A capacity needs assessment is needed to identify gaps and a thorough elaboration of scheme designs and prior identification of project sites.
- There is huge variation in farmers' motivation and level of ownership of catchment conservation activities between district s and communities.
- IRLADP's demand-driven extension approach is the best way to motivate farmers and introduce new technologies but movement of staff and subsequent lack of follow-up makes it difficult to address the farmers' needs consistently.
- There is a high staff turnover because the local environment is often not conducive to stay. The Department tries to incentives the extension workers by providing them with motorbikes and better housing. IRLADP showed that farmer to farmer models can work best. Farmer Business schools are one such approach which the Ministry wants to promote in a formal policy.
- A number of cooperatives work well while others perform badly. Leadership skills and succession are important factors. Capacity development is needed to reduce dependency syndrome.

6. Previous projects on agro biodiversity implemented by the Gene Bank at Chitedze Agricultural Research Station-Department of Agricultural Research focussed on the promotion of drought tolerant indigenous crops such as sorghum, millet, cowpea and yams in selected districts within the low altitude agro-ecological zones including Lupembe Extension Planning Area in Karonga, one of the project areas under ERASP. Some of the lessons learnt include the following:

- Proper targeting of the crops for the selected project districts is important so that the communities can see the benefits of the new technologies.
- The selected crops should be locally adapted and address some of the constraints faced by farmers. For example, in this project, the selected crops are drought resistant and can also be grown without or with minimal inputs (inorganic fertilisers, pesticides).
- There is need for capacity building all levels (technical and farmers) on the appropriate technologies and agronomic practices.
- On-farm demonstrations on indigenous crops and other cropping technologies provide a learning platform to the communities on the potential productivity and associated agronomic practices.
- In the first year of project implementation, there is need to plan for starter pack seed multiplication program in the off season (under irrigation – May-September/October) to get enough seed for the on farm demonstrations in the rainy season (November-April).
- Seed availability is challenge in rural communities. In the design process, there is need to include appropriate and sustainable strategies for increasing farmer access to seed. One such example would be implementation of the community based-seed banks and pass-on systems. This initiative would require proper design in the implementation of the program from the field to post harvest management of seed; and capacity building of local communities.
- Some indigenous crops may be new for the current generation. To facilitate adoption, there is need for nutrition education on utilization of crop products as well as value addition at local level.

7. Other lessons learned from projects implemented in Malawi focussing on natural resource management and adaptation to climate change (CARLA), European Union funded project on "Improved forest management for sustainable livelihoods programme (IFMSLP)" and promotion of

energy efficient stoves under the Movement for Bio-energy Advocacy Utilization, Learning and Action (MBAULA) project include the following:

- There is need to actively involve the local communities and existing institutions in planning and implementation of interventions on natural resource management.
- It is important to build capacity of rural communities in catchment management and technical skills on forest based enterprises to ensure successful implementation of interventions and sustainability.
- There is need for development of training manuals on implementation processes of specific interventions related to catchment management. These manuals should be translated in local languages for use by the target communities. Similarly, knowledge products should be developed and distributed to all stakeholders in the project area.
- Communication products should be developed in different languages
- Interventions on non-timber forest products enterprises require analysis of market opportunities, training in processing, value addition and packaging.
- There are different types of cook stoves that have been promoted by institutions in some districts. The cook stoves vary in terms of raw materials used for the stoves, investment costs, efficiency and scale of utilization. The most widely adopted stoves are the chitetezo mobile cook stoves and these stoves are made locally used clay and are efficient in terms of amount of firewood required and this helps to save firewood and time spent on fetching for firewood. . Another benefit is that of compatibility with other energy sources such as crop residues and briquettes
- There is need for capacity building of technical staff on how to monitor the quality and efficiency of the cook stoves.
- Awareness campaigns should be conducted on the use of energy efficient stoves.

8. Experiences from projects on livestock interventions implemented by the Department of Animal Science at Lilongwe University of Agriculture and Natural Resources that included livestock pass-on activities indicate that the processes related to planning and implementation of the project as well as the actual the activities are critical for success of the project. Some of the specific lessons include the following:

- There is need for adequate planning and sensitization of communities on the planned interventions
- The selected beneficiaries for livestock interventions should be able to take care of the animals.
- Selection of livestock should be based on farmer preferences.
- Training of farmers in animal husbandry: For the specific types of livestock to be promoted, there is need for in animal husbandry (housing; feeding, feed production and conservation; animal health, breeding and management). The training should be done before distribution of animals. Animal housing, feed production and conservation and prevailing disease challenges should be assessed before distribution of animals.
- Use of drug boxes at the community level can help to address some of the animal health issues. Drug for the drug boxes should be those that are required depending on disease challenges and there is need to plan routine treatment all year round based on how flock interact in grazing areas.
- Animal and product marketing: farmers should be trained on the need to establish marketing structures like cooperatives so that they have a better bargaining power and have opportunity for bulk selling to companies or other players in the livestock value chain. The cooperative would offer a leverage in acquisition of inputs, supplies or services to members

- There is need for proper breeding and selection of better males on farm as sometimes better males are sold and poor ones left to breed with flocks in the communities.

9. A review of experiences with renewable energy in Malawi had the following lessons learned to say. Achieving sustainability of community-based renewable energy projects in challenging and requires a holistic approach. Partnerships, local institutions, small and medium enterprises, research institutions and training of local expertise are important elements for sustainable delivery of community owned renewable energy projects. Developers need to identify potential shocks, uncertainties and vulnerability of communities at early stages of projects, for example, for biogas projects, uncertainty in livestock population can reduce dung yield causing discontinuation of the operation of the biogas system. Community customs are also key to sustainability of projects as indicated by one biogas plant in Choma which is non-operational because the custom of the household allows only the head of the family to collect dung from the animal stall and so feeding of the plant was dependent on the family head. Ownership is important. Where communities contributed to project costs or where a technology was selected by the community there was a higher sense of ownership and commitment to finance the system's maintenance. Despite renewable energy projects improving people's income, communities lack knowledge of planning savings and business models for financing maintenance costs. In projects where beneficiaries made financial contributions towards maintenance, the fee was set without knowledge of prices and the indicative lifetime of components. Private-public sector partnerships were found to be crucial for sustainability of projects by providing the necessary long term support for renewable energy projects.

10. A report of the charcoal industry in Malawi among others indicates that small changes to production-end practices can have larger positive impacts on tree availability in the long term. In the past, however, efforts to address wood fuel supply tended to have limited success because they focused singularly on wood fuel provision while failing to address farmers' more complex livelihood needs in the context of local farming systems.

11. ERASP will mitigate risks highlighted above and take up the lessons learnt by:

- working through the PRIDE/ERASP PCO, which will be well staffed with technical specialists;
- an emphasis on developing planning capacities at all levels,
- awareness and dialogue around catchment management and identification of measures that address community challenges and is suitable for their situations;
- developing the evidential base for catchment management with District officials and communities and using that as the basis for planning processes to empower and enable continuation of the planning processes.
- The one to two year planning period in Component 1 will provide the preparatory phase for Component 2 outputs which should provide enough time to sensitise communities and build ownership in the process.
- Implementation arrangements have been structured to promote sustainability of the project activities. Implementation of this component will be through government structures, in particular through District officers and the network of extension officers. Sustainability will be promoted through supporting a motivated and knowledgeable extension service through recruitment of facilitators to fill the gaps, greater technical support to farmers from the extension network and investing in work 'enablers' at the extension level (such as simple computers and solar power) to secure greater involvement in results monitoring and reporting. This is intended to improve the institutional support given to the farmer groups and *de facto* the quality of the demonstration plots. Participatory approaches used for the agricultural component will support farmer own priorities based on farmers' own knowledge of what works and challenges in order to ensure relevance. Sustainability of adoption rates will be promoted through working with women and men's groups separately.

- Service providers will be contracted in where specific technical advice is needed in the implementation of specific outputs such as installation of biogas units and energy efficient cook stoves and provision of financial literacy training.
- For the energy efficiency and renewable energy activities, motivated people in the communities will be selected and trained to install and maintain the systems, based on proven models, in order to enable sustainability.

Appendix 4: Detailed project description

1. This appendix describes the ERASP three components in detail. Achieving sustained food security will requires increasing the returns from land management to a level that enables people to be lifted out of poverty, recognising that this can only be achieved through an agricultural and natural-resource-based development approach given the high population densities and small landholdings. The approach taken is a programmatic blending of complementary development strategies to achieve this objective. Broadly speaking, ERASP will address the agro-ecological dimensions of land management focusing on the upper catchments impacting on the PRIDE investments, while PRIDE will address the market dimensions (value-addition and marketing). SAPP will support credit provision through village savings and loan clubs.

2. The theory of change for this project is indicated in Figure 1 below. This is essentially how the outputs and outcomes are expected to interact in causal relationships to deliver the objective. The objective is food security that is sustained over time because the basis of it – natural capital – is protected and managed sustainably, together with market-oriented support provided under the baseline projects which together aim to increase returns to land to a level that enables people to be lifted out of poverty. The aim would be to reverse the downward spiral of environmental degradation and negative economic impact that is the result of open access natural resource use, by providing sustainable natural resource-based solutions that confer economic benefits such as increased agricultural productivity and enterprise development. These benefit streams would provide the main incentive mechanism to maintain these land management systems into the future.

3. There are two main areas of focus for the project. The first is improving agricultural productivity through sustainable land management approaches and agro-biodiversity, which directly aims to deliver the food security objective. The second, parallel area of action is on catchment management which aims to secure river flow and prevent soil erosion and siltation problems, and floods, thereby protecting the PRIDE irrigation investments and rain-fed areas, contributing to sustained food security over the longer term.

4. The project intends to raise incomes, expand livelihood options and improve food security through three benefit streams. Higher returns to land management are expected through the blended nature of ERASP with PRIDE. Higher agricultural productivity will be one benefit stream. Enterprise development based on natural resources will be another. An indication of the economic benefits stemming from the wood fuel industry have been estimated at 6.1 percent of GDP (2010)[56], the number of people deriving livelihoods from the commercial fuel production could be in the region of 200,000[57], which is significant compared to the numbers of people employed in the formal sector in Malawi, and forests contribute over 30 percent of rural income[58]. Another reported indicated that charcoal creates 200 to 350 job-days per Terajoule consumed, compared to 80 to 100 for electricity, 10 to 20 for LPG and 10 for kerosene, indicating the potential for a sustainable local industry and economy[59]. There is potential to expand this given the current gaps in natural resources management. Other positive social impacts with improved catchment management are reported regarding time and cash savings for women and children in collecting water and firewood and averted costs from a reduced incidence of flooding[60]. Spin-off benefits could include retention of children in school. These benefits will be tracked in the household surveys.

5. The ToC was validated by an extensive process of stakeholder consultations. Individual interviews among 323 respondents randomly selected in seven Extension Planning areas in four Districts where PRIDE investments are shortlisted to be implemented. In addition 12 single sex and mixed focus group discussion with on average 10 members each were conducted in villages that did

56 Malawi Biomass Energy Strategy (2009)
57 Ibid.
58 Kambewa, P. and Chiwaula, L. (2010)
59 Neufeldt et al (2015)
60 Byers, T.E. (2015)

not participate in the household interviews. This was supplemented by District level consultations, individual meetings in the capital with Central Government staff and a literature review. The main findings which underpin the ToC are summarised as follows:

Improvement in agricultural productivity

1. Factors that affect crop productivity are poor rainfall distribution, floods, dry spells, lack of money to buy inorganic fertilisers, low soil fertility, pests and seed constraints. Constraints depend on the location and the crop.
2. 61 percent considered soils to be of medium fertility and 30 percent indicated that soils are degraded. In Phalombe, 50 percent considered soils to be degraded. Almost all respondents indicated that soil quality has decreased over the years. Most said that the main cause of declining soil fertility was soil erosion. Other factors are over-dependence on chemical fertilisers and lack of organic matter.
3. Only 20 percent said that the solution lay in CA followed by crop rotation, use of organic and inorganic fertiliser and protection of natural resources. Currently, the main ways used by farmers to improve soil fertility is through the use of inorganic fertiliser. The use of organic fertilisers is low and has implications on long term build-up of soil organic matter and soil fertility.
4. However, nearly all farmers use conventional tillage methods. Most respondents have adopted inorganic fertiliser, crop residue and intercropping with legumes to increase soil and crop productivity.
5. Most farmers have adopted improved varieties. Landraces are grown at small scale. The proportion of cultivated land allocated to landraces ranges from 5percent in Karonga and Machinga and 9 percent in Phalombe.
6. Climate change has been noted in lower rainfall amounts, late onset of rains and hotter temperatures. Women and children are affected most because they are responsible for collecting water. Farmers are minimising risks through crop and variety diversification. Other practices due to CC are irrigation farming, pit planting and CA. Some of the challenges in implementing adaptation strategies are lack of farm inputs (seeds and fertilisers) and pest and diseases and water logging when pit planting is used with heavy rains.
7. In terms of agro biodiversity, farmers indicated that currently there are fewer crops grown than in the past, but that there are more varieties grown than in the past because farmers are diversifying due to climate variability. There are some crops and varieties that farmers would like to grow but are currently not grown such as early maturing cassava varieties, high yielding kayera beans and Irish potatoes for food and sale.
8. The decision on which crops and varieties to grow depends on many factors that include tolerance to droughts, disease resistant, high yields, soil type, market price and early maturing varieties, and climate factors. Hybrids are advantageous in maturing earlier and needing less rain and landraces are advantageous in withstanding dry spells, in resisting pests, in needing less fertiliser, in less labour costs (shelling, removing cobs) and in producing a better taste and in attracting a higher market demand and price.
9. Farmers face different challenges in raising livestock that include the lack of feed, diseases and pests. The main challenge is the destruction of crops by livestock because they do have alternative feed during the dry season. The benefits of livestock are the manure they provide and the fact that they are assets that can be sold to buy farm inputs.
10. It was noted that village savings and lending also plays an important role in increasing household income and improving livelihoods.

Deforestation

1. Between 10 to 20 percent of household income is spent on firewood. But significant percentages of household spend between 20 to 40 percent of their income on firewood. Distance walked for firewood: 4 km in Phalombe and less than 1 km for Machinga and Karonga. Woodlots are seen as the solution by the majority (70+percent).
2. There is an awareness of the effects of deforestation. Women in three Districts observed that wells are dying up and in Phalombe they observed that it had led to flooding. Men in Karonga

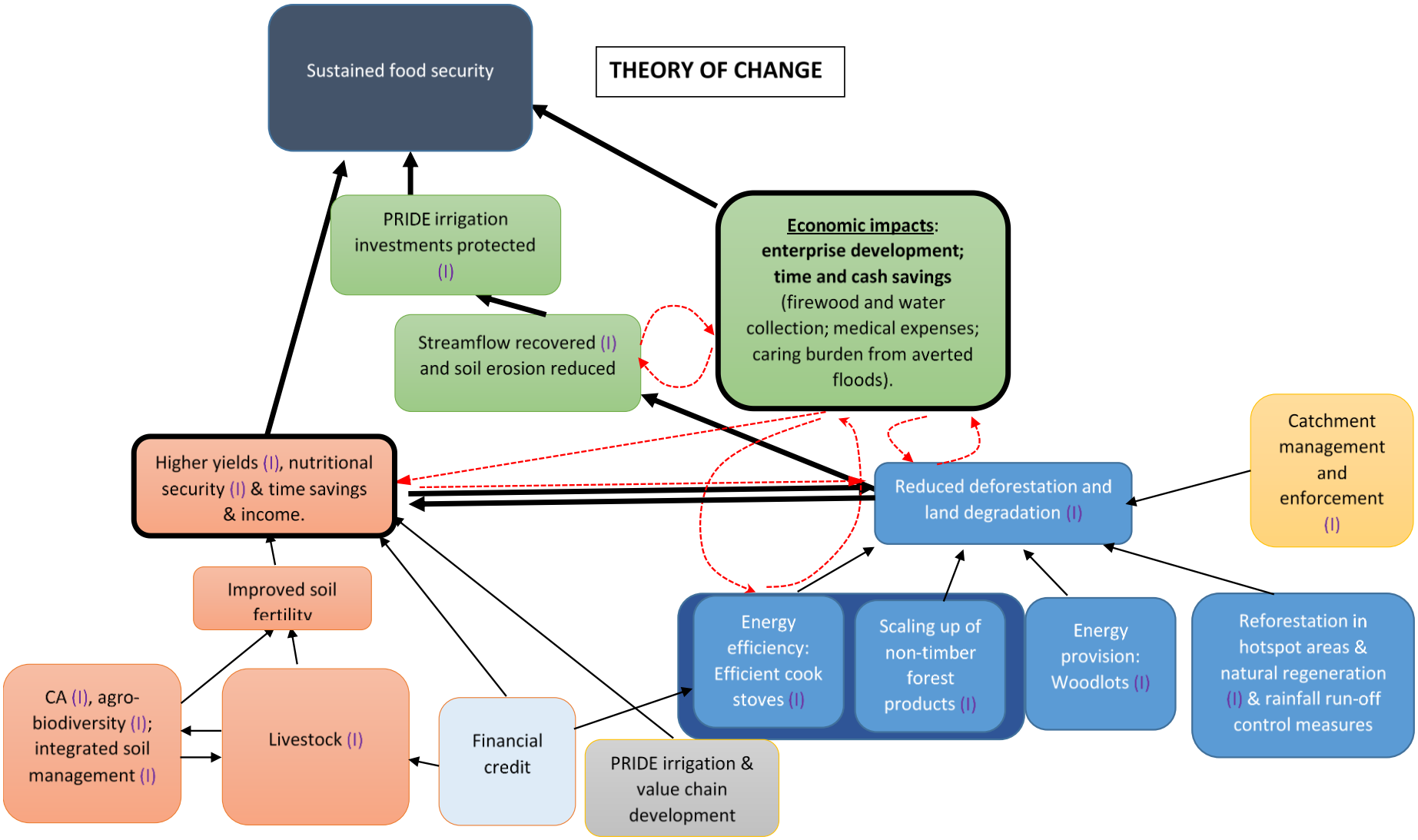
and Machinga observed that deforestation has led to soil erosion and in Phalombe: to a drying up of rivers.

3. Increased cases of diseases such as malaria and cholera due to unsafe water especially during floods. This increases the time burden of caring for the sick as well as increasing medical bills. Respondents confirmed that during the dry season most wells and rivers dry up and they queue for water in boreholes, increasing time spent on collecting water.
4. The main impact of deforestation was identified as being changes in the climate and long distances for firewood collection.
5. Catchment conservation done by between 48 percent (Phalombe) to 73 percent (Machinga) of household for firewood mainly (50 percent of household). Timber and non-timber forest products were other benefits of catchment conservation (fish, fruits, honey and mushrooms).
6. Catchment committees and provision of tree seedlings were popular solutions proposed for catchment rehabilitation.

6. The Project objectives will be achieved through three components: Component 1 Multi-stakeholder institutional framework for integrated catchment area management; Component 2 Scaling up catchment level, sustainable land management practices; and Component 3 Monitoring and assessment of ecosystem services, resilience and food security.

7. Component 1 is the planning foundation for the entire project. For Outcome 1, the National Water Resources Act (2013) establishes part of the institutional architecture which this project will implement in a few selected areas to achieve a catchment management planning process and the Village Natural Resource Management Committees (VNRMC) established in 2005 by the Department of Forestry for forest management at the village level, though community based natural resource management goes back to 1999. Outcome 2 provides the support to implement the plans and thereby generate economic benefits to the communities in return for sustainable management of their resource base. Component 3 adds environmental impact monitoring systems to the mix to enable continuation and development of the evidential base for further iterations of the catchment and village planning processes.

8. In the TOC (overleaf) the bold arrows depict the main outcome – objective connections. The red lines indicate the incentive framework which is expected to propel a virtuous cycle of catchment management into the future, Access to savings and loans is essential to enable the development of natural-resource based enterprises, including agricultural value chains (agro-dealers, equipment and other inputs) as well as relieving pressure on forestry resources to meet immediate needs. (I) indicates the indicators that have been included in the project logframe (see Appendix for the full logframe). The MPAT survey should in additional cash and time savings and livelihood connections.


THEORY OF CHANGE
Sustained food security
PRIDE irrigation investments protected (I)
Economic impacts: enterprise development; time and cash savings (firewood and water collection; medical expenses; caring burden from averted floods).
Streamflow recovered (I) and soil erosion reduced
Higher yields (I), nutritional security (I) & time savings & income.
Reduced deforestation and land degradation (I)
Catchment management and enforcement (I)
Improved soil fertility
Energy efficiency: Efficient cook stoves (I)
Scaling up of non-timber forest products (I)
Energy provision: Woodlots (I)
Reforestation in hotspot areas & natural regeneration (I) & rainfall run-off control measures
CA (I), agro-biodiversity (I); integrated soil management (I)
Livestock (I)
Financial credit
PRIDE irrigation & value chain development

Component 1: Multi-stakeholder institutional framework for integrated catchment area management.

9. Component 1 is the planning foundation for the entire project. This Component will develop five sub-catchment management plans. Component 1 aims to build capacity and joint ownership among different government and non-government stakeholders and community members (representing up-mid- and down-stream resources users) on the issue of catchment management following a shared vision of how communities wish to see their catchment developed. The planning process will include participatory land-use mapping of current use, users and degradation hotspots and drivers, negotiation and agreement on a land-use plan and development of by-laws for access and user rights for land and water resources, as well as a set of measures to rehabilitate the catchment. Component 3 on the monitoring and assessment frameworks will contribute to evidence base on land degradation, vegetation cover and biodiversity trends, which will inform on the effectiveness of the planning and management process through the sub-CMCs and CAMPs and future iterations of the catchment management plans.

Outcome	Outputs
1. At least 5 sub Catchment Management Committees (sub-CMC) in place as an effective NRM planning and coordination mechanism	1.1 1050 people (of which 50% are women and 15% are youth) trained in catchment area management and climate change risk reduction through community awareness campaign and training plan, and sub-CMCs established; 1.2 At least 5 Catchment area management plans (CAMP) developed and approved by sub-CMCs; 1.3 66 VNRMCs established/strengthened and implementing CAMP priority actions (>1050 participants of which 50% women, 15% youth, and 30% women in leadership positions).

10. The project will establish five sub-CMCs to protect five PRIDE irrigation sites, covering at least seven EPAs in three Districts. These sub-CMCs will be coordinated by the three Water Resources Officers belonging to the existing network of hydrometric Districts (which follow catchment boundaries). These District Water Officers will convene District officials in their regular coordination structures traditional authorities and selected community representatives to participate in the catchment diagnostic and planning process and discuss the implications at EPA level of the CAMPs approved by the sub-CMCs. In turn, land-use planning and resources management at the village level supporting the implementation of the CAMPs will take into account customary governance systems and traditional authorities and be coordinated by the District Water officials. These water officials are currently focusing on water and sanitation issues but are having their remit widened to cover water resources management in response to the 2013 Water Resources Act. The extension network already facilitates the action planning at the village level, supported in part through the Local Development Fund, a fiscal transfer mechanism from central government to the Districts and the project will strengthen this through a programme of trainings. Research assessments detailed in Activity 1.3 will be undertaken through experienced and qualified service providers.

11. A review of the existing village plans and priorities, as well as capacity and training needs assessment of these structures to deliver integrated catchment planning will be developed together with an implementation strategy regarding the data, information, training needs and the planning/facilitation needs to enable the development and implementation of the CAMPs. Gaps in the extension network will be filled through the recruitment of facilitators for the VNRMCs and extension work under Component 2. Coordination with neighbouring District officials through the sub-CMCs will be necessary in order to avoid displacing deforestation and land degradation outside the project boundaries. The project will include an engagement strategy to promote women in decision-making in the sub-CMC and the VNRMCs for effectiveness as well as an equity perspective. The engagement

strategy will also seek the involvement of youth. The planning process at the catchment and village level will follow the steps outlined below.

12. **Activity 1.1: Establish the sub-catchment management committees (sub-CMC)** and set the ToR for the work programme. The sub-CMCs should have representation of ministries, regional development authorities, local government; traditional authorities, NGOs, community groups and the business community within the upstream as well as midstream and downstream users. CMCs are new to Malawi and experience on how best to structure the meetings will need to be worked out. ERASP will develop a mobilisation strategy that will consider how best to structure the sub-CMC in order to provide a motivated and balanced representation that allows for equitable participation of all constituencies in catchment management, perhaps incorporating sub-committees for different constituency groups. The approach will be to ask who the key actors are, who should be involved in land and water governance and catchment management, what their goals and interests are and how to foster collaboration among them to support the planning process.

13. The sub-CMCs will be the mechanism with which to involve district officials in neighbouring areas and community leaders from upstream, midstream and downstream villages and resources users. These people are expected to be the messaging conduit for their villages and user groups to communicate the vision and approach of the sub-CMC and later the CAMPs project.

14. **Activity 1.2: Establishment of the catchment area management plan (CAMP) team**. The CAMP team will map out the catchment area, identify the State and non-State stakeholders and resources users and engage all stakeholders; draft the vision, aims and objectives and establish the sub-CMC and VNRMCs, which will support catchment management at the village level. The CAMP team should comprise a set of experts to support and follow up on the development of the CAMP including a soil conservation expert, a forestry/agro-forestry expert, an agronomist, a water management and harvesting expert and a food security expert.

15. **Activity 1.3: Diagnostic and assessment**: studies will be undertaken through engagement of service providers to investigate and understand the physical, tenure related and socio-economic causes and effects driving the forest, land, soil and water-related degradation and use problems in the catchment. The result would include inventories of natural resources and projections for their status based on a recognised set of drivers and climate change trends. The research findings would input to the CAMP and would be the basis for stimulating discussion and awareness among the VNRMCs and the sub-CMC about the causal relationships in catchment management, trends and projections with respect to influencing attitudes and motivations for catchment management and conservation. Component 3, which will establish monitoring and assessment mechanisms for land degradation, forest and vegetation cover, water availability and biodiversity, will inform future iterations of these diagnostic assessments.

16. **Activity 1.4: Catchment area management plans developed** and agreed by catchment management committees. These would be developed through visioning, scenario planning, setting the joint vision medium and long term target and the implementation pathway. This would encompass the different scenarios for development and management of the catchment, for example, wood fuel management plans. A process of recognising competing uses of land and water, trade-offs, prioritising activities and agreeing on the preferred pathway to be developed through the sub-CMC planning process. Milestones for implementation of the CAMPs and the supporting VNRMC plans and a tracking mechanism for implementation progress and effectiveness on an annual basis will be developed with the sub-CMCs and VNRMCs. The project should also use results from the landscape restoration assessment done by the Forestry Department.

17. **Activity 1.5: Village-level land-use and resources management plans developed**. The extension worker, supplemented by facilitators to be recruited by the project, will be the primary agent to facilitate the development of the village catchment plans, supported by a training plan developed under this project (see para 57). The approach will be to develop village land-use and resources management plans in line with the CAMPs and on the basis of self-recognised problems and challenges in land water, grassland and forest resource use, in order to develop a vision of the future and ownership of the approach. Conflicting land uses will be recognised and solutions found. In some

or all cases, village level visioning and planning may already have been done. Recognising this, the organisation, capacity and training needs assessments, a review of the existing village plans and priorities will be carried out to determine the extent to which they contribute to a catchment management approach; and supplementary planning will be undertaken to address the gaps, as required. The project will help the legal registration of the VNRMCs, under provision of the 1997 Forestry Act, and develop methodological guidelines, terms of reference and simplified models of contracts for management plans at village level, as well as developing a public information and training plan for the communities. Registering the groups as legal entities will enable communities to develop by-laws, which enforce the CAMPs and village land-use and resources management. Village catchment plans will be integrated into the District Development Planning process as per the usual channels.

18. **Activity 1.6 Public awareness materials produced** in the local language to further support the process of understanding catchment management objectives and benefits in project and non-project communities adjacent to the project to prevent unintended consequences for deforestation and land degradation in surrounding areas.

19. Water Resource Officers at the larger catchment level (hydrometric districts) will be supported in the CAMP planning process by service providers with a track record in facilitation of community planning processes and in developing social, environmental and economic assessments. It is envisaged that one contract would be issued per catchment to deliver the consultations, studies, maps and reports in order to make the process as efficient as possible, by enabling the catchment planning work to be undertaken simultaneously and in a timely manner.

20. Alternative source of income to help protect the catchment areas include forestry management for commercial purposes, production of non-timber forest products such as honey, mushrooms and medicinal plants, use of fuel efficient stoves and keeping small-stock to help with improving soil fertility. These issues are addressed in Component 2.

Component 2. Scaling up catchment level, sustainable land management practices

21. It is estimated that 1 million people in Malawi are participating in CBNRM[61]. There are numerous examples of community-based management of successful natural resources in Malawi that have led to the recovery of natural resources, wildlife and improved livelihoods. Box 1 presents a case study of one such initiative in Balaka District in Southern Malawi, which this project would seek to scale-up to the EPAs relevant to select PRIDE interventions. The value of this approach in protecting the irrigation investments will be monitored and measured and the results information will be published in user-friendly materials. In this way, the complementarity of ecosystem-based approaches to infrastructure-based approaches for improving livelihoods and food security will be tested; positive results will present as an important advocacy platform to secure political support for expanding ecosystem-based management.

[61] USAID (2010)

Box 2 Community natural resource management project restores the river and people's livelihoods in Balaka District

The Rivirivi River runs through Balaka District. Although the river was once perennial, it had become reduced to a few pools in the dry season. This was affecting local livelihoods as people were dependent on the river for watering livestock, washing and fishing. A NGO WESM (Wildlife and Environment Society Malawi) identified the clearance of forest vegetation from the river banks as a key factor affecting river flow and so began a project, funded by the Malawi Environmental Endowment Trust, to try to reverse this situation.

The project overs about 40 kms of river and 25 villages and is focused mainly on environmental management – reforestation, agro-forestry, water harvesting and the use of vertiver grass to control erosion. WESM works very closely with the government extension services from the departments of agriculture and forestry (about 20 extension agents), promoting skills transfer.

Five years later and as result of natural regeneration and enrichment planting, the woodland is now well established. One community keep beehives covering 25 hectares of land adjacent to the river. They also planted trees for medicine and in the longer term they hope to manage the area for fuel wood and charcoal production. In the last dry season, the river continued to flow.

Sustainable management of indigenous forests in Neno District

The project began in 1996 with the goal of sustainably managing these forests through tree planting, encouraging natural regeneration, fire protection and engaging communities in income generating activities such as bee-keeping, fruit juice production and guinea fowl rearing. 242,021 trees of various species were planted for soil amelioration, firewood, timber and nutritional purposes, translating to around 97 hectares – 0.5% of the project area.

Following an inventory conducted in indigenous forests in 1998, a second inventory was carried out to determine the impact of the project interventions on forest cover. Results revealed that the indigenous forest cover increased by over 30 percent from 1998 to 2006, with areas under strong leadership gaining 68 percent in forest cover. Forest cover in village forest areas increased by over 48 percent.

Source: Daulos, D.C., Mauambeta, Kafakoma, R.P.G. (2010)

22. The Component aims to implement the actions prioritised in the CAMPs and in village level plans developed under component 1 with emphasis on scaling-up the adoption of catchment conservation and SLM practices at the wider catchment level. The interventions will focus on landscape level catchment conservation and management to reduce GHG emissions, land degradation prevalence, and flood risk and increase the availability of surface water during dry periods as well as improving agronomic practices in farmers' fields that will result in sustainable intensification of agricultural production benefitting at least 16,600 farmers. Given the biophysical and farming system differences between the targeted catchments and in the importance of different drivers for catchment degradation, the catchment level CAMPs and village level plans will determine the shape of each of the intervention strategies and the degree of emphasis placed on the various activities. Given the limited budget, the CAMP and village level plans should be prioritised to fit the budget. The project will work on the assumption that bringing tangible economic benefits to communities will provide the incentive for the sustainable management of the natural resources in their surroundings – a key principle of community-based natural resource management.

23. Component 3 will support the continued monitoring and assessment of the outcomes of the component 2 interventions to provide evidence of, in particular, higher and more regulated river flows to support agricultural livelihoods. The project will aim to make the case to politicians and District and

Central Government about the nature, feasibility and effectiveness of community NRM as the foundation for productive agricultural practices, sustainable wood fuel supply (an essential plank of the country's energy mix), expanded livelihood options and the positive social and in particular the economic spin-offs for women and children.

24. Implementation of this component will be through government structures, in particular through District officers, the network of extension officers and the lead farmer model, supported where necessary by qualified facilitators to be recruited. The organisational capacity and training needs assessment undertaken in preparation for Component 1 will also address the knowledge, skills, motivational and coordination needs and challenges at the District and extension level with regards to wider adoption of SLM and agro-biodiversity practices as well as provide timely climate information for farmer's decision making. Service providers will be contracted in where specific technical advice is needed in the implementation of specific outputs such as installation of biogas units and energy efficient cook stoves. Developing of methodologies and 'how to' guidance manual will be produced in English and the local language for every output in this Component. Training curricula at the District and extension network level will be updated with material on policy and legal frameworks, catchment management and natural resources management, ecosystem, monitoring and assessment, conflict management and facilitation skills among others.

Outcome 2 Agro-biodiversity and SLM practices up-scaled for catchment conservation and increased sustainability of farming system productivity and improved resilience to droughts and floods Indicators:

- 16,600 Farmers experiencing having sufficient water for crop and small stock production needs
- Flood risk index reduced from high to medium
- Land degradation prevalence reduced from 46-60% to less than 40%
- 0.03 million tons CO2eq emission avoided and 1.74 million tons CO2eq sequestered
- Average stream flows feeding irrigation schemes maintained or increased
- Reduction in sedimentation affecting irrigation schemes

Outputs

2.1. Reforestation and natural regeneration of vegetation cover (with native species with honey, fodder and other production potentials) in 565 ha in woodlots and along river banks and in upper catchment areas;

2.2 11,320 households with efficient cook stoves introduced/scaled up to reduce wood demand and avoid deforestation;

2.3 5 Efficient charcoal kilns and sustainable supporting woodlots established in the 5 sub-catchments;

2.4 At least 5 alternative energy projects (biogas, solar energy, etc.) approved for funding by the challenge fund and made operational;

2.5 Honey and other NTFP small business established/expanded for 856 households as an incentive for forest conservation;

2.6 Improved soil and water management practices scaled up adopted by 16,600 farmers in 12,500 ha in sub-catchments terraces and contour ridges/bunds, (climate-smart agriculture and CA, integrated soil fertility management(ISFM); integrated pest management (IPM); integrated agroforestry and small stock systems securing nutrient recycling);

2.7 Drought tolerance, pest resistance and other beneficial characteristics from indigenous crop/ animal varieties incorporated in diverse crop and livestock systems in 2000 hectares to increase resilience to climate variability and increase availability of nutritious food in local food systems;

2.8 Meteorological forecasts reaching 10.600 farmers and integrated into farming planning and decision making (drought tolerant and short cycled varieties, crop diversification, planting date, land preparation, pest management).

The activities to support catchment level upscaling of SLM practices will include:

25. **Activity 2.1 Measures implemented in hotspot areas to recover river flows, prevent soil erosion and avoid flooding.** This would include reforestation and/or assisted regeneration of vegetation cover in hotspot areas such as river banks, gullies and the upper catchment and run-off control measures to prevent flooding increase infiltration and recharge of the aquifer and stop the loss of top soil, through terraces, ridges or bunds along the contours of the slope. A first activity in delivering this output will be the codification of current methods of delivering hotspot analysis (developed during an earlier IFAD and World Bank funded programme, IRLADP) and development of a shared understanding of these methods. Where appropriate and agreed between District Officers and communities, natural regeneration methods including enrichment planting will be implemented. Some of the recommended native species with multiple uses such as traditional medicine, fodder, dying, furniture, food, mulching include Terminalia sericea, T. stenostachya, Tamarindus indica and Adansonia digitata[62]. Communities will be trained and supported in the establishment of community nurseries and the development of sustainable forest management plans.The assumption made is that communities will be ready to exchange their labour in return for support for productive activities. This may not hold true; the shape of the village support plan and implementation arrangements will be scoped out at the village level.

26. **Activity 2.2 Cook stoves.** Biomass (defined as firewood, charcoal, crop residues and animal dung) accounts for about 90% of energy supply, mostly in the form of wood fuel for cooking in rural areas. This drives land degradation with impacts on soil erosion and weak flow regulation resulting in droughts and floods. Fuel wood consumption can be decreased by 34 to 61% by using efficient cook stoves depending on the model, emissions of carbon monoxide and particulate matter can be reduced with up to 75%[63], leading to, cost and time saving and health benefits to the household. Still, affordability of efficient cook stoves remains one adoption barrier according to the baseline study carried out for this project. Other case studies in Malawi have shown that the main adoption barrier is the lack of demonstration and knowledge of the benefit of the stoves.

27. Successful pilots of cook stoves that promoted high adoption rates have been reported[64]. A review of the experience on cook stove initiatives in Malawi will be carried out with a view to recommending a proven business model that has a good likelihood of success both for securing high uptake rates and promoting local enterprise development. Activities will fall into two main areas. The first will focus on promoting the manufacture, installation and maintenance of the cook stoves through an established and proven service provider and methodology (to be contracted). The aim will be to bring down the price of cook stoves to overcome the affordability barrier and insure local availability. The second will focus on generating demand for the efficient cook stoves, in order to create a self-sustaining market. ERASP will promote the uptake through the catchment management planning process outlined in Component 1 (which includes an extensive process of visioning, consultation, land-use planning and evidence-based assessments) and facilitated through the village savings and lending clubs supported through SAPP. This activity will be implemented with the cook stove activities under PRIDE.

28. GoM's target is for distribution of 2 million cook stoves[65], therefore ERASP represents a small fraction of the national ambition. Still the impact in the project areas could be significant. An estimate of the hectares that could be saved with the adoption of improved cook stoves for the target population is some 130 hectares annually, based on a 2 kilograms per household daily saving on fuel wood, a target population of 11 000 households, and taking a conversion rate based on research

[62] USAID (2010).
[63] 2015 Draft energy policy
[64] Zalengera et al (2014)
[65] 2015 Draft Energy Policy

carried out in a forest reserve in Malawi[66]. This benefit is larger than estimated current deforestation rates in the three catchments under consideration[67].

29. Linked to the efficient cook stove and agro-biodiversity (see activity 2.7) promoting activities, the project will implement a nutrition training targeting women, which will be developed under PRIDE. From a nutrition perspective, time saved in fuel collection and cooking provides an opportunity to invest time in the process of cooking itself. Also, the reduction in indoor smoke can result in improved nutrition through the environmental health impact pathway, not to mention reducing mortality rates from indoor air pollution and respiratory disease[68] benefitting in particular women and children. During the sessions that promote the efficient cook stoves and during subsequent sessions on maintenance; training will be imparted on nutrition and food preparation. Considering that women are the target group for this activity female extension workers are required, which could be an opportunity for young women to get involved in the awareness raising also on health benefits, promotion and sale of the stoves.

30. **Activity 2.3 Sustainable charcoal production:** The charcoal industry is one of the largest industries in Malawi. No official estimates are available but a 2007 report estimates that six million bags are produced annually amounting to 231 tonnes, produced by 46,500 mostly individual, small-scale producers[69]. These producers have little negotiating power and are regularly exploited by intermediaries and who capture just a small fraction of the final value of the product[70]. Charcoal is potentially a renewable, zero carbon forest product but its current method of production is unsustainable due to a mix of political, social and economic factors. There is a large domestic market, particularly in urban centres and future projections are for the consumption to grow. Fifty thousand hectares of indigenous forests are estimated to be cut down annually for charcoal production[71]. Under the 1997 Forest Act, charcoal can be produced only under licence. Supporting charcoal production regulations have been prepared and are expected to be under Parliamentary review in 2016. These include various minimum standards such as origination from sustainable wood sources.

31. Based on demand from the villages and in line with their catchment management plans, ERASP will support charcoal producers to organize in group and build high efficiency charcoal kiln together with establishment of sustainable woodlots that can eventually feed the charcoal kiln. Improving traditional earth kilns can increase the efficiency from 10 to 12 percent to 23 percent. Kilns fixed to location could even achieve efficiencies of up to 45 percent. Woodlots take about five years to reach a maturity level sufficient for sustainable harvesting, hence the project impact will be lower in the first few years, but even so, the benefits regarding improved efficiency will slow down deforestation and forest and land degradation while the woodlots are grown. The intention will be for sustainable charcoal groups to form and become licensed and so kick start a cleaner charcoal supply line to urban centres.

32. **Activity 2.4 Wood lots.** In spite of Malawi's high population densities, an enormous potential for woodlots is indicated in official reports. A total of 2,565 communally managed forest areas have been established throughout the country. The three targeted districts: Karonga, Machinga and Phalombe have 41, 21 and 112 village forest areas (VFAs) respectively. The project will support the VNRMCs in assessing their fire wood and wood for construction needs (considering savings from the introduction of efficient cooking stoves – activity 2.2), the status and capacities of the existing wood lots and formulate management plans for VFAs. The plans will include assisted reforestation with fast growing species and eventual expansion of woodlots in strategic areas for water conservation when possible and supported by adjustments in local bylaws for access and use of wood lots resources.

[66] Misanjo,E. & Kamanga-Thole, G. (2015)
[67] Deforestation rates in the target sub-catchments are estimated at 19 hectares annually in the District Officials consultation meeting held in the second design mission for ERASP.
[68] 2015 Draft energy policy
[69] Kambewa, P. et al (2007) Charcoal, the reality: A study of charcoal consumption, trade and production in Malawi.
[70] Neufeldt et al (2015)
[71] http://www.globalenvision.org/2009/02/24/malawis-charcoal-dependency

The project will support women's equal involvement in management, planning and decision making around the woodlots.

33. **Activity 2.5 Other NTFPs**. Together with the returns from woodlots and agro-forestry, this activity is intended to raise the returns from trees and forest to communities and thus can be seen as compensation for environmental services. Honey production is an option, which has the benefit that it can be done by men as well as women, it provides a good opportunity for income earning for young people as well as environmental co-benefits in terms of pollination services busting forest and vegetation recovery. Other NTFPs include mushrooms, fodder, fruits and traditional medicines. Small village producer groups will be trained in business management, processing and linkages to market. Establishment of local input supply of, for example, beehives will also be supported together with addressing other local barriers for expanding the production and its added value. The baseline study showed that NTFPs are already a livelihood activity for household and communities. The catchment planning process will be the channel through which needs, priorities and solutions can be found to scaling these up including connecting to PRIDE support for value addition and market links.

Box 3 The benefits of bees in Northern Malawi

After witnessing a lot of tree cutting and bush fires, a group of 10 villagers from Nkhata bay South decided to form a committee to promote afforestation and beekeeping. This was the birth of Kuwirwi-Utoto Village Natural Resources & Management CBO (KUTO). They acquired 6 beehives and began practising beekeeping, as an important sustainable and alternative source of income in Mtowole and Chavula villages, benefiting communities living in and around the forests. Following a successful application for funding, KUTO received US$25,000 grant courtesy of the Community Development and Knowledge Management for the *Satoyama* Initiative (COMDEKS) Project delivered through the UNDP GEF Small Grants Programme. With this, they bought another 150 beehives which were distributed amongst 15 groups of 300 men and women.

Each year harvests peak in the months of June, August, September and November. A good harvest yields 35 kilograms of honey per beehive. This honey is processed traditionally, packaged in recycled bottles then sold locally at Chintheche market. In 2014, a total of 150 Kilograms of honey was harvested.

The rewards of beekeeping extend beyond honey and pollination. Bees produce other products that can be harvested and put to good use, including beeswax, propolis, and royal jelly. Even the pollen they bring back to the hive can be harvested (it's rich in protein and makes a healthy food supplement in our own diets). Honey is also exploited for its diverse medicinal value. Beekeeping can also be a practical tool for raising the awareness of these communities of the importance of good management of their forests and for stimulating their conservation, thereby improving their biodiversity stock.

In a bid to protect the areas under forests land, 4 Area Development Committees (ADCs) and 40 Village Development Committees (VDCs) were trained on afforestation. Each village's forest area is protected by bylaws formulated at VDC level. Since 2014, 32,000 trees (including fruit trees) have been planted by the beekeepers. Tree cutting has reduced by a third and bush fires are now being controlled.

Source: UNDP < http://www.mw.undp.org/content/malawi/en/home/ourwork/environmentandenergy/successstories/promoting-natural-forest-conservation-through-beekeeping-in-tuko/>

34. **Activity 2.6 Alternative energy:** Biogas seems to be the most promising rural energy alternative to fuel wood for cooking in Malawi. Though the technology has been present in Malawi for many years, it has not been scaled up because of the cost of the biogas units, relative to fuel wood.

Community biogas units have been tested with some success, but experience on this is still nascent. With mass deployment and supporting enterprise development around its manufacture, the costs are expected to be reduced. The feedstock is reportedly not a problem as the units require small amounts of manure from goats and other small stock that are already present in the proposed project areas. ERASP will explore whether it could generate some more experience with biogas that could begin to develop an input market for its establishment and raise the demand. Economies of scale might be achieved with the PRIDE irrigation installations, thereby reducing the cost of building the unit.

35. Solar, non-traditional biomass (e.g. crop residues), hydro, wind and geothermal are potential energy resources that could enhance Malawi's energy security[72]. ERASP will establish a small innovation fund to support community initiatives on alternative energies, borrowing the concept from the World Bank-supported Shire River Basin Project, which has reportedly been successful in attracting energy innovative research and implementation projects through a similar fund.

36. **Activity 2.7 Improved soil and water conservation practices in farmers' fields**. Although credible SLM practices have been developed in Malawi, adoption rates are still low and dis-adoption after project support has ended are high. In a recent study, adoption barriers were shown to be due to a range of factors, the most important being weak access by women to extension services, the quality of the demonstration plot, the frequency of support by extension workers and lack of equipment and capital[73]. Experiences from SAPP show, that in years with dry spells fields where CA[74] and other SLM practices are applied have consistently higher yields compared to conventional fields. However, in years with floods farmers complain about water logging being a serious problem and high labor requirements for weeding. These barriers for adoption are also found in a recent FAO study listing as key adoption barriers and dis-adoption drivers moderate to high up-front learning costs due to higher management skills required, limited yield benefits in the short-term (but greater resilience in the medium term), high opportunity costs of labor (in particularly for weeding in the short-term), the lack of appropriate farm equipment to reduce labor inputs, and the opportunity cost of crop residues (animals, fuel, etc.). This shows the importance of continued qualified extension and research support to overcome the critical threshold of self-adoption and building farmer's experimental learning and adaptive management skills combined with short and medium term planning and decision support for farmer's technology choices taking into account the impacts of increased climate variability. The FAO study also showed that small farmers located in areas with higher climate variability (in particular the frequency of dry spells) and with greater household wealth (consumer durables, cropland, agricultural assets, and education) are more likely to adopt diversification strategies and CA and other SLM practices that reduce the negative yield impacts of climate change[75].

37. The aim of this sub-component is to promote autonomous decision-making by farmers regarding adoption of SLM practices that anticipate and accommodate climate variability. To address the key barriers for adoption and further upscaling the starting point at the District/EPA level will be to determine what the baseline of good practice is for that particular locality, to get a shared understanding of the challenges and to develop extension work streams that can be implemented through farmer field schools (FFS) and the lead farmer-follower farmers model also applied by SAPP. A District strategy for achieving high adoption rates will be developed by the consultant contracted to develop the organisational capacity and training needs assessment detailed in para 55. The strategy will address knowledge and skills as well as physical and financial access issues for the adoption of broad range of SLM practices and increased crop and animal diversification strategies and will include elements such as strengthening of equipment provision chains and sharing arrangements among farmers to facilitate local access. SAPP has agreed to support the establishment and strengthening of

[72] Zalengera et al (2014)
[73] Salephera consulting (2015) ASWAP-SP Technology Adoption Study Report
[74] CA in Malawi often includes only one or two of the three CA principals (minimum soil disturbance, soil coverage and mulching, and legume crop rotation/inter cropping) depending on climate challenges and farm suitability and does in its conceptualization also include pitch planting and addition of organic manure and is often combined with agroforestry integrating fertilizer nitrogen fixing trees with good yield results
[75] A strategic framework for climate smart agriculture in Malawi, draft, FAO 2015

village saving groups to overcome cost barriers for access to farm inputs in particular in the time gap for increased yield benefits and for the additional equipment needs of the farmers. Access to finance will also be facilitated through a new rural finance project currently under preparation by IFAD and the GOM.

38. There are various guidelines that have been written on SLM practices in Malawi including the Guidelines for Implementing Conservation Agriculture in Malawi produced by the National Conservation Agriculture Task Force (NCTFA 2015 guidelines), from which the district extension can pick up on some ideas and recommendations in the development of extension work streams, curricula for FFS, and training material for lead farmers. In this way, the project will contribute to the emerging body of experience and knowledge on SLM practices and climate-smart agriculture in Malawi.

39. Collaboration with the Shire River Basin Project to share training materials developed under both projects will be established. Collaboration will also be established with the SAPP adaptive research and extension support to take advantage of SLM practices already identified and tried out with farmers under SAPP. Likewise, the WOCAT database and information system for SLM practices will be an important source of information to draw from[76].FFS and the lead farmer- follower farmers model and demonstration sites, which is widely used in Malawi, will be implemented for experimental learning and dissemination among farmers in order to generate own experiences and innovative solutions. Input packages will be provided to the lead farmers. Sustainability will be promoted through supporting a motivated and knowledgeable extension service through recruitment of facilitators to fill the gaps, greater technical support to farmers from the extension network and investing in work 'enablers' at the extension level (such as simple computers and solar power) to secure greater involvement in results monitoring and reporting. This is intended to improve the institutional support given to the farmer groups and *de facto* the quality of the demonstration plots. Participatory approaches used will support farmer's own priorities based on their own knowledge of what works and challenges in order to ensure relevance. Gender balance in adoption rates will be promoted through working with women and men's groups separately. Sustainability will also be strengthened through agro-biodiverse farming strategies (see section below), which is intended to contribute to a stabilisation of farm production yields year to year, and associated means to continue livelihood strategies in future years, with minimum production levels being substantially higher than at present due to improvement in crop varieties.

40. **Agro-forestry** will be part of the menu of SLM technologies and practices to improve soil and water conservation. Improving woody biomass resource base using fertilizer nitrogen fixing, fodder and other multipurpose species on or near farms has been shown to increase agricultural productivity through the supply of residues. Tree planting options include mini-woodlots variable rotation; single or double-row hedging around fields and homesteads on a rotational basis for purposes of wind breaks, to slow down erosion, and as live hedges for animal control; and pollarding mature trees along boundaries and in fields for fodder, poles and fuel. Seedlings may be needed in some instances but many trees can be seeded directly, and some trees and shrubs can be propagated from cuttings and cloning. Multi-purpose crops can be integrated with multi-purpose trees.

41. Organic fertilizers and pesticides and rational minimum use of agro-chemicals will be promoted through **ISFM and IPM** including the use of compost and manure, mulching processes, crop rotation and intercropping, and **integrated crop livestock systems** using a diversity of drought tolerant and diseases resistant varieties (see activity 2.7). Regarding livestock, focus will be on small-stock, which has been shown to be effective in building resilience to changing patterns of climate variability. These will be promoted primarily as a source of nutritional security, especially important given very low levels of protein consumption taking advantage of nutrient recycling between trees, animal and crop production. The project will support pass-on schemes of goats and chickens building on indigenous varieties and support the cross-breeding in order to raise productivity levels and to capitalise on their resilience to diseases. The project will be using the pass-on package and scheme developed by the

[76] https://www.wocat.net/en/knowledge-base.html

Department of Animal Health and Livestock Development and implemented also in the SAPP project based on indigenous chickens.[77] The pass-on scheme will be accompanied with training in animal management and diseases control. Cattle will not be promoted by the project because of the problems in finding dry season feed, which competes with people for access to crops and with biomass for mulching.

42. **Activity 2.8 Agro-biodiversity:** Significant agro biodiversity has already been lost from small holder production systems in Malawi leaving them impoverished, vulnerable, dependent on external inputs and increasingly unsustainable and less nutritious. Indigenous plant and animal genetic resources with tolerance and resistance characteristics suited to local pressures are no longer available in local seed systems, which narrows climate change adaptation options for small holders and limit diversification resilience strategies. In addition, climate change may also in itself be a serious threat to agro-biodiversity due to changes in pest and diseases and because rates of evolution may not be able to keep up with climate changes. This may result in loss of microorganism and animal below ground diversity, insects and other pollinators, and other species important for agricultural production systems. The baseline study carried out during the project design indicated that indigenous crop varieties are cultivated on less than 10% of crop land in the targeted catchments. The farmers report that hybrid varieties are advantageous in maturing earlier and needing less rain and can therefore withstand dry spells while indigenous varieties are advantageous in resisting pests and diseases, needing fewer inputs, producing a better taste and in attracting a higher market demand and price.

43. The project will support crop diversification strategies for reasons of nutrition and food security and resilience to rainfall variability. Resilient farming strategies will require diversification at two levels. First at the level of crops and varieties so that losses in one crop can be offset by production from another. Integrated crop livestock systems will be part of this diversification process strengthening nutrient recycling. The second is at the level of genetic diversity. Local and indigenous varieties have a high degree of genetic diversity. These crops include sorghum, finger millet, pearl millet, yams and cowpeas. There are only few experiences in Malawi in terms of promoting agro biodiversity as a resilience and nutrition security strategy. However, the Malawi Plant Genetic Resources Center (MPGRC) has through a small grant project[78] and in collaboration with NGOs and district officers supported farmers in participatory research projects selecting indigenous and local varieties for (back) integration into cropping systems based on material from the national gene bank and tested in farmers' fields. Farmers, in particular women, have been very interested and a lesson learned is that, beyond the selection, it is just as important to provide the support to the farmers in getting the seeds back into the local seed systems from where they have totally disappeared. The ERASP project will build on these experiences. Women in particular tend to recycle seeds and show interest in indigenous varieties that were once important in local food systems; hence, this activity will be particularly beneficial to them. With the material conserved in the gene bank and collaboration between farmers and researchers, there is scope for farmers to improve indigenous and local varieties through cross-breeding in order to develop higher yield varieties, which are more suited to environmental conditions in different agro-ecological systems in Malawi.

44. This activity will be led by the MPGRC in direct collaboration with district officers and extension services and will scale up the include support to small action research and indigenous crop development involving farmers in selecting and testing indigenous varieties. The objective will be to improve the productivity and shortening the maturity and at the same time take advantage of these varieties' adaptation to local environmental conditions, in particular stresses from diseases and pests,

[77] A package of 4 female and 1 male goat is given to a subgroup of farmers within VNRMCs who will pass on the first offsprings in a similar package to other members of the group, who will then do the same and so on. In the case of the indigenous chicken the package is 9 hens and 1 rooster and a recipient should pass a similar package on to two other VNRMC members

[78] A grant provided from the Benefit Sharing Fund under the International **Treaty** on **Plant Genetic Resources** for Food and Agriculture (ITPGRFA)

and their nutrition values. To support further incorporation of the selected indigenous varieties in agro-diverse systems this subcomponent will also support training of farmers in seed multiplication and organisation of seed multiplication groups, linking up with local informal seed exchange and trading systems and establishment of community seed banks to insure local availability of seeds backed up by copies in the national gene bank. Community seed banks will be located on higher ground in areas of flood risk in order to promote resilience and maintain the capacity for food security following a disaster. Likewise community events for sharing recipes using indigenous crops and awareness on their dietary diversification and nutrition value will be supported. To support the sustainability of these activities and the conservation and research capacity of the gene bank extension staff will be trained and involved, junior researchers will be trained in participatory selection and research for sustainable use of plant genetic resources and samples of threatened indigenous crops.

45. **Activity 2.9 Agro-met forecasts.** Productive farming strategies should factor in the rainfall expected in the season, especially given climate change, which is forcing a departure from historical and expected weather patterns. The problem is that seasonal forecasts are issued for general drought conditions, rather than being tailored to the area of interest and in most cases the forecasts do not accurately predict the situation on the ground, rendering them untrustworthy and unreliable. And there is limited capacity and guidance on how to interpret these forecasts for agricultural planning. The five year strategic plan of the Department of Climate Change and Meteorological Services (2011-2016) indicates that the Department does not have sufficient monitoring and prediction systems for weather and climate and that the monitoring network is also not sufficient. Other challenges are the acute shortage of trained staff for the timely observing and forecasting of weather and climate variability.

46. The project will build on and extend/scale-up to the catchments covered by the project the methodology developed under the Global Framework for Climate Services (GFCS) Adaptation programme in Africa on 'training of agricultural research and extension to produce and disseminate agro-climatic advisories. The aim was to develop extension messages on the most appropriate crop and livelihood options in relation to the seasonal forecast for the area, in a participatory manner with farmers. This will be added to the training plan developed at the outset for the project, as indicated in paras 58 and 71.

Component 3. Monitoring and assessment of ecosystem services, resilience and food security.

47. The aim for this Component is three-fold: first to improve CMCs, District and national capacity to systematically measure, evaluate and document progress in improving ecosystem services and resilience and the linkages to increased food security for the target population in the catchments and as such the effectiveness of the implementation of the CAMPs (developed in component 1 and implemented in component 2). This will enable more informed decision-making on SLM, adaptation and enhanced food security in future iterations of the CAMPs. Second to create a standardised evidence base for catchment management to support national level upscaling of ecosystem approaches to increased resilience, local food security and global environmental benefits (GEB) including through policy adjustments and integration in the design of investment programmes. Third to serve as critical inputs to the GEF-IAP-FS monitoring by facilitating comparison and aggregation of overall results, highlighting common elements among different country projects approaches.

Outcome	Outputs
3. The evidence-base improved for SLM and NRM decision-making and upscaling at community, district level and central government levels.	3.1 90 District and 20 national level staff and 50 youth trained in biophysical assessment tools, and information systems developed in districts
- GEB monitoring and assessment tools (Exact, LDSF, DATAR) and protocols integrated in partner district governments and institutions and information	3.2 Land degradation surveillance framework (LDSF) network designed and implemented in 3 catchments
	3.3 10 stream flow monitoring stations

used for policy and programme design decision support - Model for participatory catchment land-use planning and management and application of SLM practices up-scaled in other catchments with PRIDE investment	upgraded/installed (financed by PRIDE) 3.4 Ex-Act, DATAR and MPAT monitoring tools applied in 6 sub-catchments; 3.5 6 knowledge management products produced to support upscaling and policy processes[79].

48. Monitoring of ecosystem services in Malawi is not systematic at district level and mostly based on visual perceptions. However, some capacities do exist at national level for example at the Land Resources Conservation Department (LRCD); the National Water Resource Authority; Forestry Department and the Spatial Data Centre in the Department of Surveys which hosts and manages in collaboration with the National Statistics Office and other technical ministries, the Malawi Spatial Data Portal (MASDAP)80 a web-based tool that has the potential to support GIS based monitoring systems. The LRCD has supported districts in applying the Revised Universal Soil Loss Equation to assess soil erosion and identify hotspots for intervention. Nevertheless data collection, analysis, storage and retrieval can be challenging because of: i) inadequate funding, ii) lack of training and instruments to measure key parameters and establish functional databases (for example in the use of remote sensing and GIS analysis, training on data capture and management), and iii) shortage of frontline staff. The District level structures for monitoring and reporting are present but require support to work effectively.

49. Building on the already existing capacities, the GEF-IAP-FS includes adding an assessment dimension to the conventional M&E with focus at documenting progress in improving ecosystem services and resilience and the linkages to increased food security for the target population. For this end the assessment tools offered under the GEF-IAP FS and supported by programme partners include the Land Degradation Surveillance Framework (LDSF) supported by ICRAF, the Ex-Ante Carbon Balance tool (Ex-Act) for calculating project carbon benefits developed by FAO and widely used by IFAD and partners, and the Diversity Assessment tool for Agro-Biodiversity and Resilience (DATAR) supported by Bioversity. These tools will be complimented by the IFAD developed Multi-dimensional Poverty Assessment Tool (MPAT), which includes a module on resilience and the Results and Impacts Monitoring System (RIMS) household survey tools which will also be applied by the PRIDE. For more information on the specific indicators the different tools will be monitoring see Appendix 7. The outputs listed above will be achieved through the following activities:

50. **Activity 3.1 Training of Staff and community youth**. District and national level staff and interested youth from the catchment areas will be trained to measure and continuously follow-up on ecosystem indicators by applying the LDSF, EX-Act and DATAR tools. Training will also include data analysis and database management and how to turn the data into useful knowledge and information products to support district level planning and, creation of evidence for awareness and upscaling. The monitoring and assessment tools will be integrated into the monitoring and planning procedures of District offices. Skills development in data management and reporting will be included in the capacity and training plan to be developed (see para 57). The connections between the data and information and the development of the District Development Plans will be strengthened.

51. **Activity 3.2 Application of the ecosystem assessment tools.** Most of the training under activity 3.1 will be provided as part of the actual application of the tools. In the first project year the baseline and targets for carbon and agro biodiversity monitoring will be adjusted and the project will support the design and establishment of the LDSF sampling sites as well as data collection and analysis. This will be supported by ICRAF (LDSF), Bioversity (DATAR) and eventual FAO (Ex-Act) as needed. 10 stream flow monitoring stations will be upgraded and installed, financed by PRIDE. Subsidies for transport an equipment to support the application of the tools will also be provided.

[79] Knowledge products can be fact sheets, learning notes, policy studies, thematic studies, videos, etc.

[80] http://www.masdap.mw/

52. **Activity 3.3 Application of socioeconomic and gender monitoring tools.** IFAD's MPAT will be integrated into the Project's M&A framework to assess and monitor rural livelihoods, household assets and access to quality NR, food and nutrition security and resilience in the targeted areas. MPAT will be accompanied by a set of gender-relevant survey indicators from the Women's Empowerment in Agriculture Index (WEAI) as well as the RIMS survey. The household surveys will include lines of enquiry on health issues related to floods and cooking practices as these form part of the incentive framework for catchment management among women especially. The baseline study results reveal the health impacts from floods leading to increased cases of malaria and cholera (creating a burden on women's time and creating financial cost burdens). It is assumed that if the project is successful in reducing flood risks through river bank and buffer zone conservation, increased rainwater infiltration and slowing down runoff this will avoid the conditions under which vector borne diseases can surface. The project monitoring framework will track this.

53. **Activity 3.4 Support for upscaling and policy processes.** The project results will generate broader lessons about how the catchment planning and governance and well as management and conservation practices are generating improved ecosystem services and food security through specific strategies for improving farmer's adoption rates and gender equality and involvement of youth. Ass such the project results will also contribute to the implementation of the national strategy on climate change and the 2010 National Agricultural Policy on sustainable land use and other supportive policies, and identify where harmonisations may be needed and where the remaining gaps may be. To support the maximum use of the project results emphasis will be placed on developing case studies, human interest stories as well as reporting on quantitative results. The underlying premise is that with better awareness of the agro-ecological connections and increased productivity and access to food, this should provide a motivation to upscale investments in ecosystem approaches. These findings will be lifted to the national level through a knowledge management strategy detailed in Section III.C. Support will also be given for consolidation of experiences for further advocacy through MEA processes such as convention reporting and strategies (NBSAP, NAP, NAPA) and in MEA fora such as UNREDD or Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services to promote wider application.

54. The main body of information for impact monitoring will be generated by the monitoring tools presented in Box 4.

Box 4 Impact assessment tools implemented through Component 3.

Land Degradation Surveillance Framework (LSDF)

The LSDF framework is built around a hierarchical field survey and sampling protocol using 13 sampling areas of 10 km^2 by 10 km^2 distributed across all 4 regions. The data collection at plot-level is based on a modification of the FAO Land Cover Classification System (LCCS), and includes information on slope and landform, vegetation cover types and strata, land use, land ownership and primary current use. Other information collected includes presence/absence of soil and water conservation structures.

In each sub-plot signs of visible erosion/degradation are recorded, together with rock/stone/gravel cover on the soil surface. Both woody and herbaceous cover ratings are made using counts, distribution and density, texture and depth recordings, and a vegetation rating scale is used from 0 (bare) to 5 (> 65% cover). High resolution satellite imagery will be acquired for sampling sites and used to develop predictive models using the data collected for the generation of high resolution maps of soil condition, vegetation cover and land degradation risk factors for these sites to assist with the national baseline assessments of land degradation/erosion, vegetative cover and soil carbon.

Ex-Ante Carbon-balance Tool (Ex-Act)

The (Ex-Act) is a land-based accounting system developed by FAO to estimate the impact of agriculture and forestry development projects on the carbon-balance. It estimates C stock changes. The tool helps project designers to estimate and prioritize project activities with high benefits in economic and climate change mitigation terms. It is mostly used at project level, but can be used for policy analysis and to advocate for more environmentally friendly approaches to food security. Ex-Act uses default values for mitigation options in the agriculture sector (IPCC, 2007) based on land-use. (e.g. forest cover, vegetation type, current agricultural management systems, degree of land degradation). It can be informed by the data generated by the LDSF monitoring exercise.

Diversity Assessment tool for Agro-biodiversity and Resilience (**DATAR**)

The DATAR was developed by Biodiversity International to quantify the traditional variety managed by small scale farmers. It combines individual household interviews with field observation, and entails focus group discussions where farmer's characterization of main crop varieties are identified on the basis of morphological, performance and quality traits (e.g. leaf colour, flowering time, yield, tolerance to water stress). The tool requires the involvement of key informant and staff operating in the communities to interpret the phenotypic features and descriptive traits, and ultimately compile a list of varieties grown in the target area. The results in the number and total area cultivated under each variety at farm and village levels provides an indication of the richness (number) and evenness (distribution - Simpson Index) of varieties for a specific crop.

Multidimensional Poverty Assessment Tool (**MPAT**)

Improvement in the farmers' livelihood, changes in household asset and climate-resilience will be assessed by MPAT ground survey and subsequent mapping exercise. It provides data that can inform all levels of decision making by providing a clearer understanding of rural poverty at the household and village level. It went through extensive field testing in several countries and independent validation and peer-review, and it is increasingly adopted within IFAD for local-level rural poverty assessment. The indicators provide an overview of eleven fundamental and interconnected dimensions, e.g. food and nutrition security, exposure and resilience to shocks, farm assets. The surveys are standardized, therefore the results can be compared across households, villages, projects and countries. Comparisons can also be made across different time points showcasing successes in poverty alleviation. It application of this tool will be partially financed by SLMP.

55. ERASP is an integral part of a 12 country regional program, the Integrated Approach Pilot on Sustainable and Resilient Food Security. Each country project will contribute to the collective impact of this program, which is intended to inform approaches to food security in the drylands of Sub-

Saharan Africa towards win-win solutions between food production and maintaining ecosystem health [or ‘’services’’] and in face of anticipated climate shocks. Each country project has committed to participating in the peer-peer applied management opportunities which are an integral part and distinct feature of this program, and which will be cost shared with the cross-cutting coordination and applied knowledge management and capacity building ‘’hub’’ project. Countries will both participate in and host site visits and in communities of practice on specific themes of interest and value to multiple ERASP countries and which will be defined during the project.

56. In turn ERASP will benefit from participation in this program by accessing through the activities delivered by the hub project good practice from the target geography and beyond through peer learning, current thinking on food security policy as well as access to technical expertise on a cost sharing basis where there is interest from multiple project countries. The program will generate knowledge management products and have an advocacy function which draws upon and creates visibility for the anticipated success stories from the country projects at the level of sub-regional and regional bodies within the context of food security debates and policy making. This program is multiple GEF Agencies but IFAD is the Lead Agency. The program will be coordinated via a substantive cross cutting project worth $10.4m and with a full time task manager.

Appendix 5: Programme for Rural Irrigation Development Programme Description

Programme area and target group

1. PRIDE is a national programme that supports smallholder farmer communities in and around medium-scale irrigation systems.

2. Twenty-four schemes have been pre-selected – of which 15 are prioritised – in two regional clusters in the Northern and Southern Malawi. The selection of irrigation schemes has been guided by the Irrigation Master Plan and Investment Framework (IMPIF).

Table 16 Irrigation schemes short-listed for PRIDE

Lot	Scheme	District	Irrigation Service Department (ISD)	Command Area (ha)	EIRR (%)	Study level
1	Marko	Chitipa	Karonga	727	15	Pre-feasibility
	Matoponi	Zomba	Machinga	73	16	Feasibility
	Mlooka	Zomba	Machinga	138	13	Feasibility
	Mpamba	Nkhata bay	Mzuzu	788	18	Pre-feasibility
	Nkhulambe / Wowo	Phalombe	Blantyre	310	21	Feasibility
	Kasimba	Karonga	Karonga	162	10	Pre-feasibility
2	Mwenilondo	Karonga	Karonga	524	23	Pre-feasibility
	Nazombe	Chiradzulu	Blantyre	470	11	Pre-feasibility
	Mafinga Hill	Chitipa	Karonga	43	15	Pre-feasibility
	Chanyungu Mposa	Machinga	Machinga	114	14	Feasibility
	Msenga	Nkhata bay	Mzuzu	836	23	Pre-feasibility
3	Chipofya	Nkhata Bay	Mzuzu	369	20	Pre-feasibility
	Lingoni	Machinga	Machinga	189	18	Feasibility
	Kadewere	Chiradzulu	Blantyre	300	10	Pre-feasibility
	Kasano	Karonga	Karonga	95	20	Pre-feasibility
Totals		**7 districts**	**4 ISDs**	**5138 ha**		

3. PRIDE's priority is to develop approximately 15 irrigation schemes, resulting in some 5,100 hectares newly under irrigation. Given an average irrigation scheme size of approximately 350 ha; each irrigation scheme will be associated with one or more villages, whose inhabitants cultivate the land to be brought under the scheme. An estimated 90% of the smallholder households in these villages will take part in the irrigated agriculture, while retaining lands for rain-fed farming, whereas the remainder 10% will continue to work only on their rain-fed land outside the irrigated area. Farmers in the latter category are not willing to make the transition into irrigated agriculture but will benefit from PRIDE support to good agricultural practices and market linkages for rain-fed crops. PRIDE supports both types of smallholder farms. The figures in the table are estimates only and will be further specified by the Programme's baseline survey.

Table 17 Estimated beneficiary population for PRIDE pre-selected scheme cluster areas

Population segments	#hh	ha		
		irrigated	rain-fed	total
# smallholder households targeted for irrigated and rain-fed agriculture	17.500	5.250	10.500	15.750
# smallholder households targeted for rain-fed agriculture only	2.000	0	1.800	1.800
	19.500	5.250	12.300	17.550

4. PRIDE will invest in irrigated and rain-fed agriculture on lands belonging to villages involved in the irrigation scheme development: the scheme cluster areas (see figure 1). Thus, the entire farming system, including its rain-fed and irrigated sub-system, is taken into consideration.

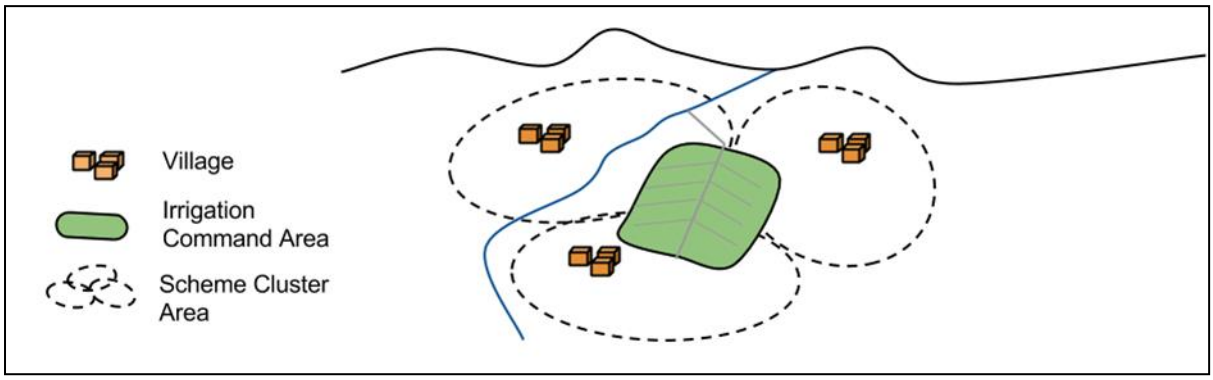


Figure 2: Schematic of PRIDE's targeting of scheme cluster areas

5. The **target group** is defined as smallholder farmers in the selected scheme cluster areas. Within this group, a primary target group comprises the households that are currently food insecure and produce mainly for subsistence. PRIDE's goal is to help enhance the resilience of rural communities to food insecurity, climate change effects and economic shocks. Its development objective is that smallholder farmer households increase income and nutritional intake from sustainable agricultural production.

Outcomes

6. PRIDE aims for two complementary outcomes:

- Outcome 1: Climate-resilient land and water management systems for smallholder households on both rain-fed and irrigated lands;
- Outcome 2: Environmentally and economically sustainable agricultural production systems adopted by smallholder households on both rain-fed and irrigated lands.

Component 1: Irrigation Development and Catchment Management
Sub-component 1.1 Land and Water Governance
Sub-component 1.2 Irrigation System Development
Sub-component 1.3 Soil and Water Conservation
Component 2: Agriculture and Market Linkages
Sub-component 2.1 Improved Agricultural Practices
Sub-component 2.2 Market Linkages
Sub-component 2.3 Mainstreaming nutrition

Component 1: Irrigation Development and Catchment Management

Outcome	Outputs
Climate-resilient land and water management systems for smallholder households on both rain-fed and irrigated lands	1.1 Communities effectively manage their medium-sized irrigation systems 1.2. Medium-sized irrigation systems (50 – 1000 ha) established 1.3. Erosion-affected and vulnerable land rain-fed land recovered

Sub-component 1.1: Land and Water Governance

7. This sub-component targets the preparation stage for all investments (including component 2) in the scheme cluster areas. This includes the management, operation and maintenance of irrigation schemes by WUAs, building on the approach used by IRLADP. The diagram provides an overview of the process and the entities involved.

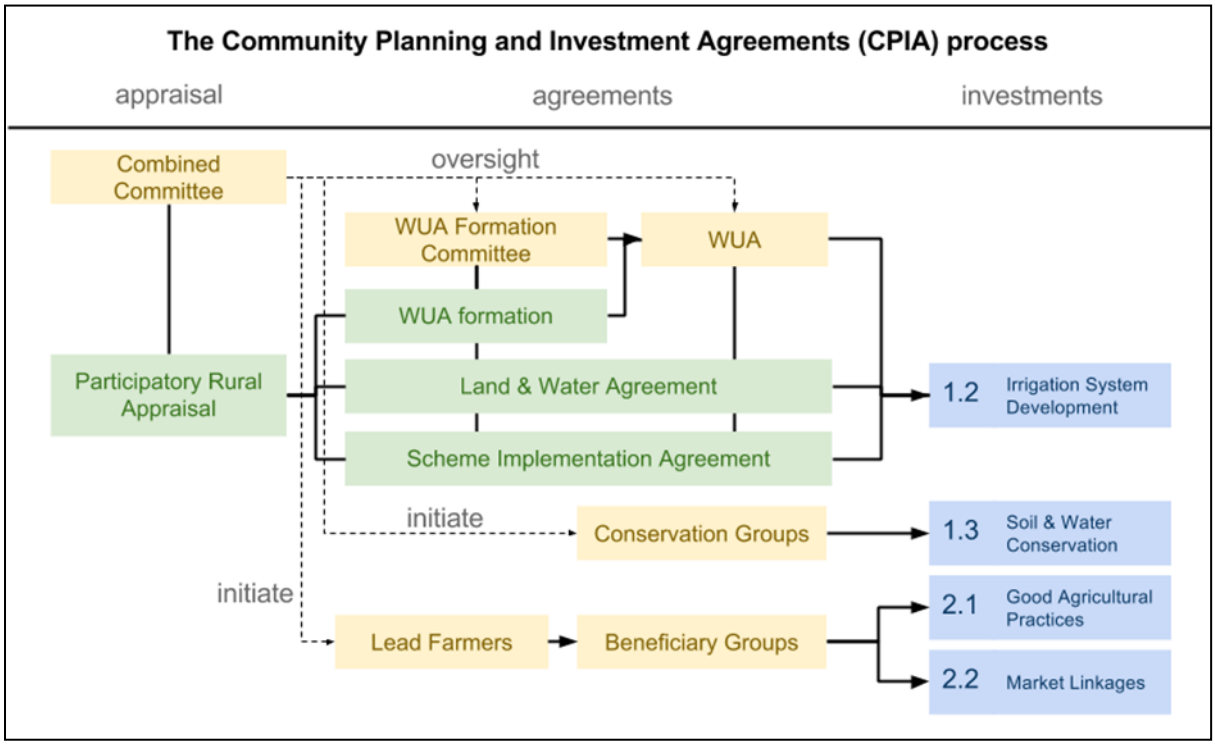


Figure 3: PRIDE: Community planning and investment agreements (CPIA) process

8. **Preparation activities and investment agreements**. A Community Planning and Investment Agreement (CPIA) process will be initiated in scheme cluster areas, which includes free prior and informed consent (FPIC) procedures and precedes any investment decision. PRIDE will set up a multi-disciplinary CPIA team in each district to guide the preparation activities, comprising of concerned government agencies at District level and specialized service providers where required. The communities will during initial consultations be represented by their leadership and their existing village development committees, who will be asked to convene a Combined Village Committee for the scheme cluster area. Following an appraisal process, increased knowledge on the proposed investments will enable the farmers to elect a WUA formation committee for the Water Users' Association. The formation committee will take a lead role in the establishment of land and water agreements, overseen by the Combined Village Committee. The other activities to be undertaken in the scheme cluster areas, such as soil & water conservation, good agricultural practices and market linkages, will be handed over to beneficiary groups and lead farmers who will liaise directly with agencies implementing the PRIDE programme. Facilitators from within the community will be trained

to enhance participation of women and youth in the meetings, and as such improve equality in the membership of committees.

9. The CPIA process comprises the following key elements:

- **Scheme area appraisal**
- **Social and environmental scoping**
- **Land and Water Agreements** – Consultations will be held to establish Land and Water Agreements between the WUA, landowners and, where applicable, Traditional Authorities. At this stage, the WUA formation acts on behalf of the interests of the to-be-formed WUA; but the agreement itself can only be concluded once the WUA is formally established. The consultations will address (i) access to land for farmers with less access at present; (ii) compensation for those affected by scheme construction activities; (iii) grievance mechanisms and (iv) confirmation of free, prior and informed consent. The Land and Water Agreements will include (i) the amount of land each WUA member will have access to, including procedures on land and water allocation in times of limited water availability; (ii) rules for changes in access to land in case of non-payment, non-performance or death; (iii) stipulations on sub-leasing; and (iv) procedures for conflict resolution.
- **Scheme Investment Agreements** – In parallel to the Land and Water Agreement and WUA establishment, the WUA formation committee will – in preparation to a WUA decision – negotiate the irrigation scheme lay-out and the beneficiary contribution to scheme development with the design consultant mobilised by PRIDE. In general, the WUA takes responsibility for land levelling, construction of tertiary and field canals, and for collection of local construction material. PRIDE aims to keep the beneficiary contribution within 20% of the total scheme value. The WUA will form a construction supervision committee of which the responsibilities need to be discussed; and which' role needs to be reflected in the construction contract. The conclusions of these negotiations will be documented in a Scheme Implementation Agreement, to which the WUA and the services mobilised by PRIDE will be held accountable.
- **WUA establishment**: As part of the actions identified during scheme appraisal, a WUA will be formed for each scheme as the legal entity holding lease of the irrigation command area and responsible for land and water management in this area. WUAs are private, non-profit, self-supporting, independent entities with four main functions: (i) management of WUA members' access to irrigated lands; (ii) operation and maintenance of the irrigation and drainage systems; (ii) collection of water charges and membership fees; and (iii) provision of law and order among the irrigators (including resolution of irrigation water related conflicts).
- **Soil & Water Conservation Planning**
- **Good Agricultural Practices and Market Linkages** – Crucial to the success of PRIDE's investments, farmers will be assisted in their farming practices and value chain linkages. The combined village committee will help enlist lead farmers for these activities, who will in turn form groups to take part in the activities carried out under component 2.

10. All plans developed in the CPIA process will be submitted through the Area Development Committee (ADC) to the District Executive Committee for approval and will provide the basis for preparing the annual work plan and budget.

11. As part of the WUA start-up phase, PRIDE will establish a WUA start-up facility. Using the experience from cross-learning visits and initial training, the WUAs will prepare investment proposals against a predefined maximum budget. Proposals will be assessed on their merits by a committee formed by PRIDE.

Sub-component 1.2: Irrigation System Development

12. The main focus of this sub-component is the development of 15 irrigation schemes, covering about 5100 ha. Investments in this sub-component are guided by the Irrigation Master Plan and Investment Framework (IMPIF). One of the key strategies that emerged is to invest in water storage. With increasingly erratic rainfall patterns as a result of climate change, and utilisation of dry season river flows reaching its maximum, water storage has become a necessity for further agricultural

development in Malawi. Water storage will have a positive effect on the regulation of water flows and as such, combined with improved catchment management, reduce the chance of river floods.

Component 1.3: Soil and Water Conservation

13. This sub-component addresses urgent environmental degradation risks in scheme cluster areas by funding soil and water conservation measures. This is part of PRIDE's sustainable land management strategy which also includes the promotion of good agricultural practices in sub-component 2.1. All activities in this sub-component are financed through ASAP.

14. Investments in this sub-category specifically aim at:

- Restoration of soil cover, targeting vulnerable grounds;
- Protection of river buffer zones through demarcation and possible fencing off;
- Erosion control investments such as vegetated contour bunds and gabions for tackling rill erosion and plugging of gullies, respectively;
- Reforestation of slopes through the provision of seedlings. Especially communities where improved cooking stoves (sub-component 2.4) are introduced will be supported in community forestry and agro-forestry using for instance fast-growing nitrogen-fixing species like Tephrosia, Senna, and Gliricidia; along with species that can be used as fuel wood.

Component 2: Agriculture and Market Linkages

15. The objectives and outputs of this component are as follows:

Objective	Outputs
Environmentally and economically sustainable agricultural production systems adopted by smallholder households on both rain-fed and irrigated lands	2.1 Smallholder farmers trained in good agricultural practices on rain-fed and irrigated land 2.2. Smallholder farmers linked to markets 2.3 Mainstreaming nutrition

Component 2.1: Good Agricultural Practices

16. The introduction of good agricultural practices by PRIDE builds on the experience gained in SAPP. PRIDE will focus on adaptation and dissemination of existing climate-smart Good Agricultural Practices. GAPs to promote include: utilisation of climate information services; conservation agriculture (CA), irrigation optimisation, use of improved inputs, application of integrated pest management and reduction of post-harvest losses.

17. **Climate-smart agriculture / good agricultural practices**: CSA is composed of three pillars: (i) sustainably increasing agricultural productivity and incomes; (ii) adapting and building resilience to climate change; and (iii) reducing and/or removing greenhouse gas emissions, where possible. PRIDE will focus its extension efforts on the dissemination of good agricultural practices, which fall within the definition of climate-smart agriculture. For the moment, the following categories of climate-smart good agricultural practices have been identified:

- Use of climate information services
- Optimisation of irrigated agriculture
- Conservation agriculture
- Access to and use of improved inputs
- Integrated pest management
- Post-harvest management

18. **Documentation of GAPs**. PRIDE aims to define standardised documentation on the GAPs that it promotes. The aim is to make available well-developed material – primarily to the extension cadre and lead farmers – for a limited number of GAPs. The GAP fact sheets contain highly visualised

information on the proposed practice and on its relevance and anticipated impact. For each GAP, information on productivity and profit will be complemented by information on the nutrition impact and on the importance of diversified sources of nutrition (see also component 2.3)

19. **Farmer to farmer extension work**: The use of lead farmers has already been proven under IRLADP and SAPP, and by NASFAM. Under PRIDE, lead farmers – female and male – will initially be identified in consultation with the leadership and community representatives in the scheme cluster areas. Lead farmers will benefit from the provision of demonstration packages and from training to build their knowledge of different GAPS and their skill in extension and communication. In return, the lead farmers will be asked to form Farmer Field Schools (FFS) comprising representatives from twenty households each. Members of the FFS can subsequently rotate in the role of lead farmer, so that different smallholder can specialise in different practices.

20. **Agricultural Extension**: The performance of the FFS will be guided by extension agents, who advise on the GAPs and monitor the group's composition and functioning. PRIDE will on preference make use of the MOAIWD, so that Agricultural Extension Development Officers (AEDOs), with support from Agriculture Extension Development Coordinators and District Officers, will train the lead farmers. Where the agricultural extension service is not sufficiently staffed[81] to provide full coverage; or where specialised knowledge (e.g. irrigated agriculture, cooking stoves) is lacking in the service, PRIDE will complement the extension services by engaging other service providers (NGOs, private sector).

21. **Training and extension materials and use of ICT**. PRIDE will finance the development and distribution of high quality training and extension materials including brochures, posters, and leaflets and the development and broadcasting of extension services by radio. Each GAP will be well-documented. PRIDE also invests in the use of ICT in extension services enabling quick and cheaper dissemination of information and giving agriculture a modern image, especially for youth.

22. **Inventory and adaptive research** – PRIDE relies on existing technology and does not invest in basic research into new Good Agricultural Practices. Transforming existing GAPs into practices with demonstrable benefits would in some cases still require two actions: the inventory of potential GAPs, based on experiences elsewhere in the region; and adaptive trials on farmer fields to confirm the potential of the new practice. PRIDE will outsource inventories and trials, in order to develop a sizeable portfolio of Good Agricultural Practices. Special areas of attention, in which to define GAPs, are integrated pest management and optimisation of planting times and irrigation turns in irrigated commands.

23. **Mechanisation**. The rental of agricultural machinery on a professional basis is new to Malawi. Mechanised traction would contribute to storage and availability of soil moisture. Traction helps break the hard soil layer that has developed just below the root zone by years of superficial soil tillage. Breaking this layer increases infiltration of rainfall runoff and enhances the depth of the root zone. PRIDE will purchase two tractors equipped with rippers, to primarily help develop the irrigated commands in the two regions where PRIDE is active. Component 2.2: Market linkages

24. PRIDE aims to link smallholder farmers to existing markets or market opportunities in order to increase the returns from irrigated crop land and render these large investments profitable. Prior information from the markets/dealers enables farmers to understand which products are in demand and how to produce these according to the desired quality and at the preferred time. Doing so enables them to get better prices and return to land and labour. Optimisation of the value chains for key products enable a better match between production and demand, which would benefit producers, markets and consumers. As MOAIWD has only few staff engaged in marketing, PRIDE will mobilise service providers for the implementation of this sub-component. Selection criteria include market experience and intelligence; staff capabilities; inclusiveness of the proposed approach (women and youth); and adequacy of the proposed work plan.

[81] Roughly one-third of the positions in the extension services are vacant, due to GOM's inability to fund all positions.

25. **Farmer Business Schools**. The Programme focuses on training groups of smallholder farmers, known as Farmer Business Schools (FBS, an approach established by RLEEP), on the basics of commercial crop production (farm budgets, cost price calculations, use of weights and measures, quality control, grading, storage and packaging, market intelligence).

26. **Producer Groups**. FBSs promote cooperation among smallholder farmers to increase their negotiating power towards input suppliers, traders and processors. Farmers that have received the basic training will be stimulated to form producer groups, to jointly market their produce and to benefit from a stronger negotiating position vis-à-vis traders and processors. **Commodity platforms**. A commodity platform represents all actors in a value chain. In a commodity platform, the value chain actors can collaborate to assess and carry through potential interventions in the value chain. Options to be reviewed by the platform include market access, product development, improving productivity, and efficient transactions along the value chain. PRIDE will facilitate commodity platforms for products or product groups that are relevant to smallholder farmers in the Programme.

27. **Value Chain Analyses and Market Studies**. PRIDE will commission studies to help enhance the market access and market benefits for smallholder farmers.

28. **Value Chain Start-up facility**. PRIDE includes a Value Chain start-up facility which can be accessed by the Commodity Platforms for specific investments that help improve the value chain and enhances especially the benefits it generates for smallholder farmers. Investments could include development of tracking and tracing systems; definition of new product standards, training on quality systems, etcetera.

29. **Irrigation technology window**. Finally, PRIDE will help pilot the introduction of in-field irrigation equipment, such as drip irrigation and sprinklers, by the private sector in Malawi. To this end, IFAD will fund an 'irrigation window', under the Malawi Innovation Challenge Fund (MICF). Component 2.3: Mainstreaming Nutrition

30. **Dietary diversity survey.** Child stunting and anaemia are endemic in Malawi and their reduction has so far – despite macro-economic progress – been sluggish. PRIDE intends to contribute to scaling-up nutrition (SUN) by a combination of actions. The aim of these efforts is to reduce child stunting by 80% at the end of the Programme period.

31. **Scaling Up Nutrition (SUN)**.The PRIDE approach to nutrition is aligned to the approach that is embraced by the GOM and by other development partners. GOM has established multi-sectoral coordination of nutrition programme implementation at national, district, village levels and is planning to deploy nutritionists in the local councils to improve coordination, monitoring and reporting. The national Nutrition Education and Communication Strategy (NECS) aims to strengthen and harmonize nutrition messages and practices from national to grassroots level. In the scheme cluster areas, PRIDE will engage Food and Nutrition Officers of the Department of Agricultural Extension Services. At national level, PRIDE will associate with the UN Malawi Nutrition Network and other key partners.

32. **Extension services**. In principle, extension and training on nutrition will be carried out by the agricultural extension system, though PRIDE may engage other service providers to complement the capacity of the government system. Services will be provided to the target group through lead farmers through established farmer groups, care groups and village associations. Lead farmers are trained by AEDOs who in turn are trained and supervised by agricultural extension development coordinators (AEDCs) at EPA level. These AEDCs are coached by Food and Nutrition officers and other relevant specialists at district level.

33. **Integrated homestead food production (IHFP)** is to facilitate adequate food consumption at household level. IHFP is an approach to improve diverse food access (primarily proteins, vitamins and minerals), and to share nutrition information. Nutrition education will encourage adequate consumption. Capacity will be developed by supporting training of trainers who can roll-out the toolkit on IHFP to the villages. PRIDE will collaborate with FAO on this activity.

34. **Improved cooking stoves**. PRIDE's promotion of improved cooking stoves aims to ensure that a private sector able to produce and market the materials and support services for improved cooking

stoves emerges. Service providers involved in the promotion of improved cooking stoves need to demonstrate how they intend to establish improved cooking stoves as a regular product in the market. The possible availability of carbon credits for improved cooking stoves – reflecting their impact on the reduced use of fuel wood – may be considered to improve the business case for local production and supply.

Appendix 6: Institutional aspects and implementation arrangements

1. This paper outlines the key institutions, weaknesses, strengths and their contributions in relation to ERASP project. The weaknesses and strengths of the institutions elaborated in the analysis have been utilised to strengthen the organisational set up of ERASP.

1.1 Ministry of Agriculture, Irrigation and Water Development

2. The Ministry of Agriculture, Irrigation and Water Development will the Implementing Partner, as it is for the PRIDE investment. The institution will be main accountable entity for the project results.

3. The MoAIWD will harmonise and mutually enforce natural resources legislations to protect land and water resources from degradation and pollution. This will complement with the responsibilities of the sub-Catchment Management Committees (sub-CMC) whose main responsibilities will be to ensure environmental and natural resources management.

4. The Ministry will oversee the implementation of the mandate “the overall management and development of the country’s water resources in terms of regulation, assessment, planning, conservation, development, allocation, coordination, protection and delivery for use by all sectors that depend on water”.

5. Within the MoAIWD, The Department of Irrigation (DoI) will play key roles of project implementation together with Environmental Affairs Department (EAD). However, staffing levels of DoI are currently below 50 percent of the established positions. DoI has staff at district level but relies on extension staff at local level. Its activities are implemented with the help of Agricultural Extension and Development Officers (AEDO) and Agricultural Extension and Development Officers (AEDC). Most extension officers (AEDO and AEDC) are not conversant enough with irrigation and natural resources aspects as such they require capacity building to efficiently undertake ERASP activities with a high degree of confidence.

6. Apart from capacity building, there are high vacancy rates in MoAIWD at Extension Planning Area (EPA) level and most AEDOs cover more than the mandated one section per AEDO, as such the need for mobility support should be considered in ERASP project as well as looking at ways to augment the extension capacity and capability to engage more effectively with the lead farmer model which has been implemented to good effect in Malawi.

1.2 Ministry Natural Resources, Energy and Mining

7. Given the environmental management strands of the project, the Ministry of Natural Resources, Energy and Mining has a keen interest in the project. It will provide management oversight of the project together with MOAIWD.

8. The Ministry of Natural Resources, Energy and Mining houses the Department of Environmental Affairs which has the broad mandate of handling all issues related to the environment. The Department is the principal instrument of Government in the implementation of all policies relating to the environment and natural resources. Essentially the Department provides environmental stewardship and enforces the environmental mandate through various approaches and strategies. It promotes conservation, sustainable use and protection of the Environment and Natural resources in line with the principles of sustainable development. The Ministry will therefore be instrumental for policy and legislative aspects which will be a significant input for implementation of the mandate of ERASP.

9. However, much as EAD is mandated to promote conservation, sustainable use, and protection of the Environment and Natural resources, it does not have frontline staff on the ground as such it cannot directly implement activities alone on the ground. However, at district level, EAD has Environmental District Officer (EDO) and implements its activities in collaborations with the Land Resources Conservation Department, DoI and Department of Forestry (DoF). Apart from the DoF, the other departments implement their activities using the AEDO and AEDC.

1.3 National Water Resources Authority

10. The Water Resources Act which was passed in 2013 calls for the establishment of the National Water Resources Authority (NWRA), which is mandated to assist the Ministry responsible for water affairs in administering the Water Act. The NWRA is mandated by the Act to have its own management and to operate as a corporate body with branches in regional centers. The Act further established

11. Catchment Management Committees (CMCs) under the NWRA, with authority to manage water resources in catchment areas designated as river basins or a group of river basins. CMCs are at the level of the Water Resource Unit. Sub-CMCs are envisaged to operate at smaller scales, such as the level that ERASP will operate. The Act gives the NWRA the power to establish or legitimize Associations of water users for the purpose of legitimizing group development and utilization of water resources. The Act gives mandates to each of these institutions to promote the investigation, conservation and proper use of water resources. As such collaborations between NWRA and ERASP will crucial for the mutual benefits of the two institutions and the catchments.

1.4 Catchment Management Committees

12. The Water Resources Act of 2012 provides for the formation of Catchment Management Committee (CMC) for a specific catchment area, after public consultation, on the proposal of the community and stakeholders concerned. The NWRA has also been mandated to establish catchment management committee's on its own initiative.

13. According the Water Resources Act, the members of a catchment management committee shall be chosen from among;

(a) Representatives of ministries, departments or other public bodies responsible for matters relating to water resources in the catchment area

(b) Representatives of any regional development authorities and local authorities whose areas of jurisdiction or any part thereof fall within the catchment area concerned

(c) Representatives of farmers within the catchment area concerned

(d) Representatives of the business community operating within the catchment area concerned

(e) Representatives of the non-governmental organizations engaged in water resources management programmes within the catchment area concerned and

(f) Other persons who have demonstrated competence in matters relating to the management of water resources.

14. As presented above, the CMC's will be composed of technical government officers with limited participation of traditional authorities. The technical government officers will be drawn from various ministries and departments within the catchments districts as provided by the Act. Functionality of the CMC may be affected by the large composition of representatives of government ministries and departments. Considering the limited human resources in government departments, allocation of the scarce human resources to the CMC may prove to be a limitation to the functionalities of the CMCs. ERASP will develop a mobilisation strategy that will consider how best to structure the sub-CMC in order to provide a motivated and balanced representation that allows for equitable participation of all constituencies in catchment management. The approach will be to ask who the key actors are, who should be involved in catchment management, what their goals and interests are and how to foster collaboration among them to support the planning process.

1.5 Village Natural Resources Management Committees (VNRMC)

15. Decentralization of natural resources management has taken many forms, resulting in different organizational structures. Village Natural Resources Management Committees (VNRMC) are formed at village and accountable to the communities tasked with the responsibility of managing natural resources. VNRMC's are a result of the decentralisation of natural resources management. Currently at community level, management of natural resources is left in the hands of VNRMC's. Apart from the

approval of the VNRMC's constitution and subsequent registration by the District Forestry Office, there is requirement for legal registration. However, VNRMCs already have the legal mandate inherent in their process of establishment under the 1997 Forestry Act. The focus of VNRMC is to develop natural resources management plans on customary land. VNRMCs can initiate the process of developing local management rules within the management plan, harvesting fees and sanctions.

1.6 Water User Associations (WUA) or Association of Water Users (AWU)

16. WUAs contribute significantly towards improvement of the efficiency and effectiveness of managing water supply systems in order to ensure long-term sustainability and enjoyment of water services by all Malawians. At sub-catchment, stream and village scale, Association of Water Users (AWU) can be established for water resources management. In some instances, Village Natural Resource Management Committees could register, in addition to being a VNRMC, as an AWU. In such instances their constitutions will be amended to include the requirements of the AWU. An AWU is not limited in membership to a VNRMC, it can be broader. This however does not mean that the other members of the AWU have any input in the functions and operations of the VNRMC (should they register in addition; however, if they combine their constitution they would). Once a VNRMC registers as an Association of Water Users (AWU), there is an additional requirement of legal registration.

17. Establishment of WUA is governed by a legal framework. Various policies entrust responsibilities to manage water and water related facilities in the hands of the WUA, as such WUA are registered legally and recognised as such in the statues of Malawi.

1.6 Department of Forestry

18. The Department of Forestry (DoF) provides guidance, plan, coordinate, facilitate and promote active participation of all stakeholders in the sustainable management, development and utilization of forest resources, goods and services for socio-economic development and poverty reduction. DoF plan, provide technical extension guidelines and facilitate forestry development on customary land and forest reserves, and participation of all stakeholders in the sustainable management of our natural resources.

19. DoF is one of the collaborating departments with EAD. It has front line staff on the ground responsible for departmental activities. Just like all government departments, staffing levels of DoF are below the required and most of the front line staff lack basic knowledge of forest and plantations management. There is an average of almost 30-40 percent vacancy rate across government establishments[82]. The department also lack equipment that can be used to control the spread of wild fires.

Organizational Framework for ERASP

20. The Ministry of Agriculture, Irrigation and Water Development will be the Executing Agency, as it is for the PRIDE investment. The Ministry will be the main accountable entity for the project results. The implementation will be by the PRIDE/ERASP Programme Coordination Office (PCO) comprised by dedicated and highly qualified personnel either from government or recruited from the labour market. The PCO, funded through PRIDE, will include a Programme Coordinator, and Specialists in the following areas: Procurement; Financial Management; Institutional, Environment; Gender and Targeting; Irrigation; Agriculture & Value Chains; Planning, Monitoring and Evaluation. The latter will be charged with Knowledge Management as well. Given the spread to the northern and southern regions, there will be two Programme facilitation offices, staffed by coordinators.

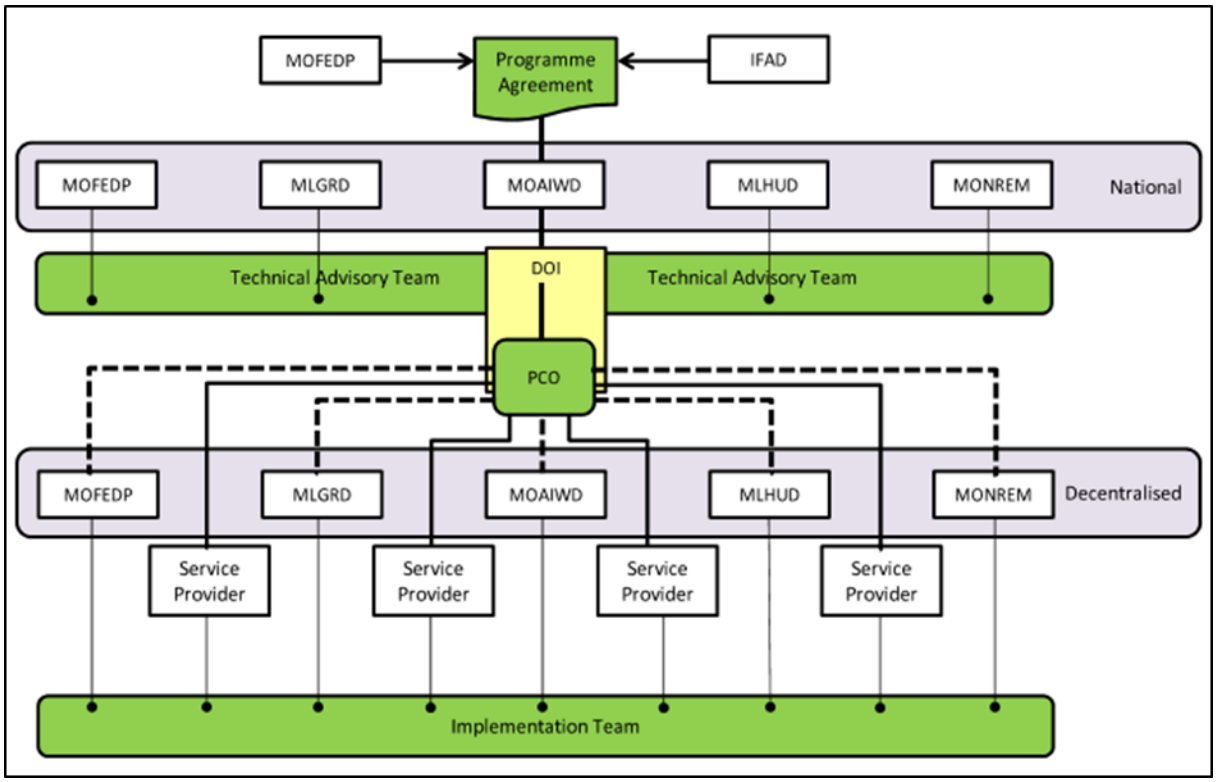
21. ERASP will be managed by the PRIDE/ERASP environmental specialist. ERASP will finance two additional positions which are two regional environmental experts, who will be located in the northern and southern programme facilitation offices. These experts will coordinate the catchment and

[82] Training Needs Assessment (TNA) for Climate Change Management Structures in Malawi-UNDP (2011).

environmental management activities in the regional clusters and provide support for monitoring and assessment. Environment Officer from EAD will be attached to the Environmental Specialist as part of capacity building for the Department.

22. Given the focus on environmental management, the PRIDE/ERASP Programme Coordinator will report directly to the Director of Environmental Affairs Department on ERASP as well as the Director of DOI. There shall be one holding account for both projects but two separate operating accounts for each of the projects. The Director of Environmental Affairs shall be the principal signatory to the independent ERASP operating account.

Figure 4 PRIDE-ERASP organisational framework



Source - PRIDE PDR

23. In addition to the project management arrangements detailed above, the project will be guided by the same Programme Steering Committee (PSC) as for PRIDE, comprising senior representatives of concerned Ministries and the Executive Director of the yet to be fully operationalized NWRA, under the chairmanship of the PS (Irrigation & Water Development) of the Ministry of Agriculture, Irrigation and Water Development. From IFAD-side half-yearly supervision missions will take place; and a provision will be made for a limited number of implementation support missions.

24. The project will also use the same proposed Technical Advisory Team for PRIDE which will be established representing departments concerned with the project implementation, including:

- Land Resources,
- Extension, Research (under MOAIWD), as well as the Department of Land (Ministry of Lands, Housing and Urban Development),
- the Environmental Affairs Department (Ministry of Natural Resources, Environment and Mining);
- the Debt and Aid Department of the Ministry of Finance, Economic Planning and Development; the Department of Forestry
- Department of Disaster Management Affairs (DoDMA).

25. The PCO will ensure that adequate services are mobilised for the day to day implementation of activities. A two pronged approach will be followed including enabling relevant District and Extension

planning area staff such as agriculture, land resources and environmental officers to enhance service delivery to the target communities and engaging service providers for capacity development where necessary. ERASP will seek partnership arrangements with different stakeholders for provision of goods and services, as necessary.

26. As detailed under PRIDE, the community level entry point for ERASP will be the authorities and with the Village natural resources management Committees (VNRMCs). The VNRMCs will play a key role during the planning and implementation phases. The VNRMC plans will be aligned to the catchment plans developed by the sub-CMCs.

2. Implementation arrangements for ERASP

27. The design of ERASP has involved extensive consultations with, amongst others, the intended beneficiaries of the PRIDE investments and communities residing in the catchments, Annex 4 has more details on this process. The project intends to work closely with rural communities to improve and sustain ecosystems services for food security outcomes. ERASP will strive to strengthen smaller-scale leadership/social mechanisms, platforms, structures and processes for sharing knowledge and networking to enhance collaboration among different users of natural resources through the catchment planning process.

28. The project will establish five sub-catchment management committees to protect five PRIDE irrigation sites, covering at four EPAs in three Districts, and 66 villages. These sub-catchment committees will be coordinated by the three Water Resources Officers belonging to the existing network of hydrometric Districts (which follow catchment boundaries). These District Water Officers will convene District officials in their regular coordination structures to discuss the findings from the body of planning work taken by the sub-CMC and what this implies for the challenges and trade-offs involved in land and resource use in the EPAs concerned. In turn, catchment planning at the village level will be coordinated by the District Water officials, who currently focus on water and sanitation issues but are having their remit widened to cover water resources in response to the 2013 Water Resources Act.

29. ERASP will support establishment or strengthening of VNRMC and build capacity of staff at the district and extension planning area levels. Establishment or revamping of existing structures will be key for implementing catchment management activities.

30. A review of the existing village plans and priorities, as well as capacity and training needs assessment of these structures to deliver integrated catchment planning will be developed together with an implementation strategy regarding the data, information, training needs and the planning/facilitation needs to enable production of the catchment plans. Gaps in the extension network will be filled through the recruitment of facilitators for the village natural resource management groups and extension work under Component 2.

31. Entry into the communities will be achieved through a well-established system at district level using the district executive committee (DEC) and government departments that will also be implementers of ERASP at grassroots level. Project beneficiaries will be selected with help of community leadership under the supervision of representatives of government departments (implementers).

Appendix 7: Planning, M&E and learning and knowledge management

1. ERASP's approach to planning, monitoring, evaluation and assessmnet (PM&EA) and knowledge management (KM) will follow the strategy, planning and M&E framework of the PRIDE in line with the framework of the MOAIWD as well as the GEF-IAP Food Security Programme and IFAD requirements based on emerging best practices of the IRLADP, SAPP and other IFAD initiatives.

2. The requirements of the GEF-IAP Food Security Programme includes adding an assessment dimension to the conventional M&E with focus at documenting progress in improving ecosystem services and resilience and the linkages to increased food security for the target population. For this end the assessment tools offered under the GEF-IAP Programme for Food Security and supported by programme partners include the Land Degradation Surveillance Framework (LDSF) supported by ICRAF, the Ex-Ante Carbon Balance tool (Ex-Act) for calculating project carbon benefits developed by FAO and widely used by IFAD and partners, and the Diversity Assessment tool for Agro-Biodiversity and Resilience (DATAR) supported by Bioversity. These tools will be complimented by the IFAD developed Multi-dimensional Poverty Assessment Tool (MPAT) and the Results and Impacts Monitoring System (RIMS) household survey tools which will also be applied by the PRIDE. The assessment dimension of the PM&EA framework will serve the creation of an evidence base across the programme to support upscaling of ecosystem approaches to increases resilience, local food security and global environmental benefits including through policy adjustments and integration in the design of investment programmes

3. Guiding principles that ERASP's approach will follow are:

- harmonise the framework with other M&E systems and key indicators of government;
- where possible align ERASP indicators with other IFAD programmes for a rationalised portfolio;
- adopt results-based management, based on output and outcome indicators to capture changes in ecosystem status and services and track food security enhancement and gender and youth related issues;
- use of objective-oriented Logical Framework and Annual Work Plan for planning and monitoring;
- Involvement of beneficiary communities in data collection, analysis and progress monitoring linking in particular the project monitoring and assessment to the monitoring of the progress in and effectiveness of the implementation of the CAMPs
- use standardised mechanisms for data collection supported by the MPAT, RIMS survey, EX-Act, DATAR and the LDSF where the district level is accountable for systematic data entry and the central CPO level is responsible for consolidation; and
- develop learning, innovation and KM mechanisms supporting in particular policy processes and wider upscaling.

4. A **project inception workshop** will be held within two months of project becoming effective with the full project team, district officers, relevant government counterparts and IFAD. It is crucial to build ownership of the project's goals and objectives and presents the modalities of implementation and execution, as well as providing inputs for the annual work plan and budget for the first project year. An inception workshop report will be prepared and shared with participants.

Key biophysical, poverty and food security indicators and monitorign and assessment tools

5. The Logical Framework is presented in summery in the executive summary of the project design report and included as an annex to this appendix in a more detailed version with more outcome and output indicators as a core framework for results based management of the project. At the goal and development objective level the framework includes indicators that track total project outreach and increase in overall resilience of the targeted population in terms of decrease in month with food shortage and child malnutrition and increase in agricultural production yields. These indicators are monitored through the RIMS and MPAT surveys covering ERASP/PRIDE target population. Resilience is further tracked at the outcome and output level in terms of reduction in flood

risk index, land degradation prevalence and hectares reforested or with recovered vegetation cover (all monitored and assessed through the LDSF) as well as hectares covered with agro-biodiverse resilient systems (monitored and assessed through DATAR) and water availability vis-à-vis production needs. Stream flows and sedimentation levels are also included to monitor ERASP's effectiveness in protecting the PRIDE irrigation investments. Finally, carbon sequestered and greenhouse gas emissions avoided, as a global environmental benefit, is monitored and assessed through the Ex-Act.

6. The logical framework includes indicators for which the collected data are disaggregated by gender, age and wealth class, to track the inclusiveness (or lack thereof) and the effectiveness of the gender and youth strategies.

7. One initial activity will be to adjust the logical framework, examining its consistency and the feasibility of targets. Local organisations should be fully consulted in this process and involved in the development of the M&EA plans at local level. Additional quantitative and qualitative indicators should be selected and endorsed on a participatory basis in particular for the output level. These will complement the main list of indicators currently presented in the Logical Framework. Furthermore, the review of the logical framework will include: i) the establishment of main M&EA activities and responsibilities among the project's different stakeholders; ii) commitment from stakeholders, the information they should provide and at what frequencies; and iii) format and content of the different reporting requirements.

8. As explained above the main indicators in the M&A Framework supported by the M&A tools (MPAT, LDSF, DATAR and Ex-Act) are aimed at measuring changes in food security, land degradation, agro-biodiversity, mitigation and resilience to climate change and will serve as inputs to the overall outcome and impact monitoring and assessment at the aggregated level for the GEF-IAP Food Security Programme including for the completion of the GEF-IAP tracking tool. The baselines have been estimated but will be adjusted within the first year of the project as part of PRIDE. The application of the RIMS survey at project start up, midterm and ending is a standard practice for IFAD, while MPAT is an innovation used in some IFAD projects to get a better understanding of how projects support changes in the multiple dimensions of poverty. In addition to the tools related to the global and local environmental benefits promoted through the GEF-IAP Food Security Programme these IFAD tools will provide a clear set of verifiable indicators to assess and report on project outreach and impacts on food security and nutrition and the access to production assets in the target population.

Planning and M&EA system

9. The **PM&EA Officer** in the PRIDE/ERASP PCO (financed by RPIDE) is responsible for planning, monitoring, reporting, evaluation and assessment, learning, knowledge management and communication, as well as ensuring appropriateness and efficiency of implementation related to targeting (food insecure, gender, youth, geographical). The PM&EA Officer will also take responsibility for: special studies and knowledge products, communications and knowledge management facilitating the implementation of the upscaling strategy, cross-component learning and organisation of policy seminars and workshops, stakeholder relations and other events. The sub-catchment management committees (sub-CMC) and strengthened community level institutions such as village NRM committees, WUA, conservation and seed multiplication and tree seedling nursery groups will play a key role in the participatory monitoring of ecosystem services, agroecological and climate change resilience measures.

10. Planning of project activities will be an on-going and participatory process coordinated by the PCO with support from the regional environmental experts with **Annual Work Plan and Budget (AWPBs)** forming the backbone of the planning. The AWPB, together with the Logical Framework's results-based indicators, will be the basis for monitoring project progress. Monitoring starts at the lowest level of the AWPB and the Logical Framework and will capture all four levels of results (activities, outputs, outcomes and impact at development objective and goal level) on a continuous basis. Findings from PM&EA will be enriched with feedback that comes from on-going generation of lessons learned, best practices, beneficiary and stakeholder stories also defined as learning and KM.

11. The AWPB will be the key instrument for implementation and operational control. The AWPB for the first year will be based on the ERASP Project Design Repost and its annexes and prepared by a small team of experienced staff. Training will be given to the PCO in the preparation of AWPBs. Subsequent plans shall include a brief description of the implementation of the project in the previous period and the possible challenges and opportunities for the upcoming year. The plan must also include: (i) the results obtained by component and the proposed plan for the next year including execution times and specific targets; (ii) the estimated budget by category of expenditure and sources of financing, (iii) foreseen procurement; and (iv) the M&EA plan for the year. The PCO Programme Coordinator will oversee the AWPB process and ensure that all stakeholders are fully involved. The PM&EA Officer supported by the regional environmental experts will be responsible for coordinating the preparation of AWPB, its consolidation, and presentation to the PSC, finalisation and submission to IFAD. The Financial Controller will provide costs, incorporation of the financing plan and disbursement arrangement. The Procurement Specialist will prepare the procurement plan. From year 2 onwards, a decentralised, inclusive and demand driven planning process will be undertaken ensuring that specific activities and timeframes are adjusted to local conditions. The approved AWPB by the PSC and IFAD will be the instrument granting the PCO the authority to conduct activities and incur expenditure.

12. ERASP's and PRIDE's annual planning and implementation cycle will be aligned with GOM's main planning cycle. The fiscal year goes from July to June while budget preparation extends from January to May. Budget ceilings are issued between February and May before the budget goes to Parliament for approval in late June. The DOI provides backstopping support to districts in the initial stages. An annual water sector review report is prepared by MOAIWD within 60 days of the end of the fiscal year. This report is based on the planning for the previous year and explains which targets have been met, which targets have not been met and why. This report forms the basis for an annual joint water sector review in December that makes a performance assessment of the Ministries and the sector during the previous year. The water sector review then feeds into the MGDS review mechanism.

13. The PM&EA officer of the PCO will in close collaboration with DOI and EAD establish a **management information system (MIS)**, using dedicated software to collect data from various levels. The MIS database will be aligned to the ERASP and PRIDE Logical Frameworks Indicators, which includes IFAD RIMS indicators. The MIS will also include MOAIWD, COSOP and National M&E master plan indicators and indicators from the EAD Environmental Monitoring System. Web-portals for easy viewing by service providers and beneficiaries can be considered, if deemed relevant. External support will be recruited for designing and establishing the databases and IT infrastructure.

14. The PM&EA officer supported by the regional environmental experts and district officers will ensure that stories are collected on a regular basis, providing factual information on changes and benefits achieved at local and catchment levels as well as documenting global environmental benefits and upscaling to other catchments. Such testimonies are especially relevant for documenting programme attribution to higher level impacts. Photo archives will be kept as part of structuring qualitative information. To ensure an effective flow of information, the PM&EA Officer will develop simple and user-friendly tools for data collection, data entry, data processing and analysis. Standard forms and formats will be made available to ensure consistency in the way data is recorded which will also be supported by the application of the LDSF, DATAR, Ex-Act and MPAT tools assessing local and global environmental and poverty reducing benefits. These tools are needed to systematically document progress at activities, outputs, outcomes, and impact level and will include:

- Standard formats for submission of financial returns on at least a monthly basis;
- A spreadsheet, database or accounting software to enter data and produce financial summary information (tables, graphs);
- Standard forms, based on the AWPB, to record progress and expenditure for each planned activity on a quarterly basis, and standard computer-based formats or templates to enter such data in a consistent manner, to facilitate consolidation;

- Standard forms to record results, in terms of activities completed and specific outputs produced, which will be the basis for physical progress summary information, and standard computer-based formats or templates to enter that data consistently; and
- Standard forms and computer-based formats or templates to enter data on ERASP resources, in particular registers of assets and contracts.

15. The main purposes of MIS supporting project M&EA are to provide early information on progress toward achieving intended outcomes and impacts of the project supported by the learning from the M&A tools (LDSF, DATAR, Ex-Act, MPAT). By tracking progress, monitoring support early identification of eventual implementation issues that needs to be addressed and facilitate decision making within the project context. In addition the M&EA system of each country project under the GEF IAP Food Security Programme will be part of a broader integrated information system at the programme level. This system is designed to inform and upscale investments in sustainable agriculture and SLM increasing ecosystem services and food security in all participating countries.

Reporting

16. Functional monitoring and MIS will provide the data needed to prepare progress reports. Results will be submitted in summary form in quarterly, half-yearly and annual reports to the PSC and IFAD. The AWPB is the starting point to monitor physical progress (actual implementation compared to planned activities) and financial progress (actual expenditure compared to budget).

Progress reports.

17. Progress reports present a full picture of programme resources, annual and cumulative physical and financial achievements as compared to targets set in the AWPB, analysis of successful approaches and outputs, failures and constraints, and whether progress is being made towards achieving objectives. Progress related to outcomes and overall goal cannot be expected until a reasonable period after interventions and delivery of outputs has passed, however it is necessary systematically collect data related to the outcomes and goal almost from the beginning. In the first Annual Progress Report, this may take the form of mentioning some of the key findings of baseline surveys that have been carried-out. From the second year onwards, the programme needs to start analysing whether outputs that are being produced are actually leading to outcomes and biophysical changes and changes benefits among the target group. The reports should highlight and justify the implementation strategy and indicate challenges encountered needed to be addressed as part of the adaptive management of the project. Specific reference should be made to recommendations by supervision missions.

18. **Project Implementation Review (PIR)**. In addition to IFAD progress report, the PCO will submit to IFAD a PIR on an annual basis. This report is a self-assessment of the GEF grant's implementation progress and likelihood of achieving project objectives which were set and endorsed by the GEF and approved by IFAD within the fiscal year[83]. The PIR will be submitted by IFAD to the GEF as part of the Annual Monitoring Review (AMR), the principle instrument for reporting to the GEF Secretariat on the IFAD GEF portfolio.

19. **Evaluation**. Evaluation by the PCO will ensure that activities being implemented are achieving the stipulated performance and resulting in the desired impact. A particular focus will be the assessment of the effectiveness of the programme on poverty alleviation and generation of sustainable global and local environmental benefits in terms of ecosystem services and its impact of each activity in terms of gender, and categories of households: male-headed, female-headed and youth.

20. **Baseline, mid-term and completion surveys**. These surveys are undertaken at start, middle and end of the programme implementation period and identify, verify and track outcomes and emerging impacts. A baseline survey will be undertaken to benchmark the existing situation in the

[83] A fiscal year for the GEF starts on July 1st, and ends on June 30th of the following year.

catchments as part of the final design of each irrigation scheme and stream flows and sedimentation levels will be established to be able to track and monitor ERASP's effectiveness in terms of protecting the PRIDE investment and improving its life span and utility. The baseline survey and follow-up surveys combine collection of basic demographic and socio-economic data with the application of MPAT, LDSF, DATAR and Ex-Act, in order to understand and gauge the linkage between increased ecosystem services and resilience and impacts on food security and poverty reduction. The Women Empowerment in Agriculture Index (WEAI) will also form part of the baseline and follow-up surveys in the catchment. The WEAI tracks changes in women's empowerment levels as a direct or indirect result of an intervention.

21. **The GEF-IAP Food Security Programme Tracking Tool (TT)** will likewise be completed at baseline, mid-term and completion allowing for the aggregation of indicators from the individual project level to the programme portfolio level and track overall portfolio performance in the GEF focal areas contributing with finance to the IAP Programme. The TT has been designed to monitoring several outcome indicators that contribute to the overall goals of the IAP Programme and demonstrate how each child country project contributes to the country and regional goals.

22. **Mid-Term Review (MTR)**. A MTR will be conducted halfway through implementation (towards end of year 3) to assess the performance and impact and its progress against the established objectives, the efficiency and effectiveness of ERASP/PRIDE management, and the validity of the ERASP/PRIDE designs. Recommendations for revisions to the activities and approach, the Logical framework targets, may be made if required.

23. **Programme Completion Report (PCR)**. At the end of the implementation period, a PCR will be compiled to provide an overview of the accomplishments of PRIDE. The PCR should inform the rationale for and orientation of a follow-on investment programme.

24. An **independent terminal evaluation (TE)** will also take place and look at impact and sustainability of results. It will be conducted by external consultants who will operate under the supervision of IFAD's Evaluation Office and IFAD staff. Technical staff working at the PCO, PM&EA Officer, and stakeholders will all be collaborating with the appointed persons for effective evaluation. The report will be submitted to IFAD and the GEF Evaluation Office no more than 12 months after project completion.

Table 18: Summary of main monitoring, evaluation, reporting requirements and responsibilities

M&E Activity	Responsible Parties	Timeline	Budget
Monitoring of project progress and performance	PCO (Project Manager and M&E Officer)	Continuous	
PIRs	PCO and IFAD	Annually	
Inception workshop	As above	During the first two months after the project is declared effective	Financed by PRIDE
Adjustment of biophysical and socio-economic baseline	PCO, IFAD, key Government partners and international institutions (ICRAF and Bioversity)	Baseline established in PY 1 (and in PY2 in the case of the LDSF for some catchments)	USD 125,000
Measurement of project outcome and impact indicators	As above	Mid and End of the project	USD 104,000
Measurement of project output indicators and	PCO, District Officers, Local support institutions	Annually	USD 40,000

progress and performance			
Perform and supervise data collection	As above	Continuous monitoring activity	
Six months and annual progress reports	Project Coordinator	Every 6 months and annually after project start up	USD 2,500
Participate to GEF IAP Regional implementation workshops	Project Coordinator and/or M&E Officer, Regional environmental experts	Every two years	~USD 40,000
Organize project supervision missions	PCO and IFAD	Every six months	Paid by GEF agency fee and the PRIDE project
Mid-term external evaluation	External consultants (oversight by IFAD)	Mid-term of project implementation	USD 30,000
Tracking Tool	PCO and international institutions (ICRAF and Bioversity International)	CEO Endorsement; at mid-term; and project completion	Part of baseline adjustment and outcome and impact indicator measurement
Final external evaluation	PCO External consultants (oversight by IFAD)	After project completion, but no more than 12 months later	USD 30,000
Project completion report	PCO External consultants (oversight by IFAD)	Before project closure	USD 10,000
Completion workshop	PCO and IFAD	At project completion	Financed by PRIDE

Learning and Knowledge management

25. Knowledge Management (KM) will be a process by which value is generated from project intellectual and knowledge-based assets. It will be performed in conjunction with PRIDE KM strategy, and include a detailed plan on how information will be obtained and disseminated using the MIS, project reports and reviews, development of knowledge products, policy workshops and the use of communication channels. A part time KM officer will be contracted in the PO to support KM activities and outputs. The table 6.2 below provide examples of KM objectives and the stakeholders who could be targeted, the kind of knowledge products which are appropriate, options for dissemination and sharing and potential partners for producing and disseminating of knowledge products. To share lessons learnt and promote upscaling, PCO is expected to use a range of different media and approaches, inter alia farmer field visits, website, radio, video, press releases and articles for local and international newspapers and the IFAD website. The project will benefit from and contribute to the GEF-IAP Food Security Programme knowledge network. The regional knowledge network, IFAD Africa, will provide opportunities to participate in regional thematic workshops, visit sites of similar projects, and guidance for the start-up of KM activities. Tools, such as case studies and stakeholder interviews, will complement the M&A tools described above to deepen the understanding of factors contributing to adoption of SLM practices and success or failure to show impacts on ecosystems services and food security. One of the main purposes of knowledge creation and sharing will be to support policy making by building a comprehensive body of evidence, lessons learned, and good practices. The M&A tools will provide a cost-effective way of building strong cases, and inform policy makers for further upscaling.

Table 19 Summary of key elements of KM and communication plan

Examples of KM Objectives	Stakeholders/Target Audience	Products	Dissemination Channels/Events
Influence policy to increase financing for scaling up adaptation activities	➢ Government bodies ➢ Key decision makers ➢ Donors/Dev. Partners	➢ Detailed studies (i.e. climate scenarios) ➢ Policy briefs ➢ Evidence-based lessons learned on successful approaches to adaptation ➢ Pictures and videos of climate impacts	➢ Seminars ➢ Roundtable discussions ➢ Policy working groups ➢ National newspapers, TV radio ➢ Social media
Strengthen project implementation	➢ Staff of implementing agency and of other similar projects ➢ Implementing partners and service providers	➢ Lessons learned ➢ How-to-do-notes ➢ Guidelines ➢ Local knowledge briefs	➢ Project website ➢ Hard copies in project office ➢ Mailing lists ➢ Workshops ➢ Training sessions
Contribute to body of knowledge on project themes (i.e. climate adaptation)	➢ Communities of practice ➢ Academics	➢ Studies ➢ Journal articles	➢ Thematic websites ➢ Academic journals
Share project knowledge with local community	➢ Local communities ➢ Target groups	➢ Newsletters/circulars ➢ Posters/leaflets/maps ➢ Video, animations, cartoons ➢ Facebook pages/project website ➢ Project briefs	➢ Start-up workshops ➢ Awareness sessions wit games and exercises ➢ Local media/social media ➢ Field visits ➢ Mailing lists

Logical Framework Malawi ERASP

M = Machinga; P = Phalombe; and K = Karonga
Baseline figures will be adjusted during the first project year when the MPAT, LDSF, RIMS survey and DATAR is applied

Results Hierarchy	Indicators				Means of Verification			Assumption
	Name	Baseline	Midterm	End Target	Source	Frequency	Responsibility	
Goal To improve food and nutrition security of rural communities in the targeted catchment areas	- months of food insecurity disaggregated by gender of household head - reduction in child malnutrition, measured by the incidence of wasting (RIMS level III – PRIDE indicator)	Average 4-5 months[84] Tbd		< 2 months for all households 20% reduction	MPAT survey RIMS survey	Project start, mid-term and completion	PCO/DOI	
Development Objective To enhance the provision of ecosystem services and improve the productivity and resilience of agricultural systems of vulnerable rural poor.	- farmers reporting yield increase (>20% above baseline) from improved rain-fed and livestock agricultural production disaggregated by gender of household head (RIMS 2.2.2 PRIDE indicator) **Total outreach:** - Smallholder farmer households receiving project services, differentiated by gender and wealth class (RIMS 1.8.1	0 farmers 0 HH	5,000 farmers 15,000 HH	25,680 farmers (at least 30% from women headed households) 9,600 farmers (M) 10,800 farmers (P) 5,280 farmers (K) 32,100 households (30% female headed) 12,000 HH (M) 13,500 HH (P) 6,600 HH (K)	RIMS survey Project progress reports (PPR)	Every two years Semi-annual	PCO/DOI	No major impacts of climate shocks, access to financial services, policies remain conducive to SLM practices, and 80% adoption rate of SLM practices among farmers trained

[84] 27% of households in EPAs in targeted catchments experience food insecurity >6 months per year, 31% experience 4-5 months, and 30% experience 2-3 months (baseline study conducted during project preparation).

	mandatory PRIDE indicator)							
Outcome component 1 Sub-catchment management committees (sub-CMC) in place as an effective NRM planning and coordination mechanism	- Sub-CMC operational after three years with active participation of upper, mid, and downstream communities (RIMS 2.1.4)	0 sub-CMCs operational in selected sub catchments	≥ 5 sub-CMCs operational	≥ 5 sub-CMCs operational	PPR	Semi-annual	PCO/DOI	Strengthening of the WRA and the hydrometric district offices will progress as planned by the government
Outputs component 1 1.1 Sub-catchment area management plans (CAMP) developed and approved by CMCs	- CAMPs developed and approved (RIMS 1.1.13)	0 CAMP for targeted WRUs	≥ 5 CAMPs	≥ 5 CAMPs 2 CAMP (M) 1 CAMP (P) 2-4 CAMP (K)	PPR	Semi-annual	PCO/DOI	
1.2 Village natural resources management committees (VNRMC) established/ strengthened and implementing CAMP priority actions.	- Groups established, men, women and youth participating, and percent of women in leadership positions (RIMS 1.1.10, 1.1.11, 1.1.12)	20 existing VNRMC 10 VNRMC (M) 1 VNRMC (P) 9 VNRMC (K)	40 VNRMC, > 636 participants	66 VNRMC, > 1050 participants (50% women, 15% youth, and 30% women in leadership positions) 20 VNRMC, > 400 participants (M) 13 VNRMC, > 150 participants (P) 33 VNRMC, > 500 participants (K)	PPR	Semi-annual	PCO/DOI	
Outcomes component 2 Agro-biodiversity and SLM practiced upscaled for catchment conservation and increased sustainability of farming system productivity and improved resilience to drought and floods.	- Farmers experiencing having sufficient water for crop and livestock production needs. (RIMS 2.2.4)	5,500 farmers 1,300 farmers(M) 2,400 farmers(P) 1,800 farmers (K)		16,600 farmers 6,000 farmers (M) 4,000 farmers (P) 6,600 farmers (K)	MPAT survey	Project start, mid-term and completion	PCO/DOI	Degradation hotspots are adequately identified and prioritized in the catchment management plans, and the project and the sub-CMCs successfully engage all stakeholders in catchment management and adoption of improved SLM practices
	- Reduction in flood risk index	High		Medium	LDSF	Project start, mid-term and completion		
	- Land degradation prevalence	46-56 % (M) 57-60 % (P) 46-51 % (K)		< 30% (M) < 40% (P) < 28% (K)	LDSF			
	- reduction in GHG emission and increase in sequestration (RIMS 2.1.8) **Protection of irrigation investments:**	0		0.03 million tons CO_2eq emission avoided 1.74 million tons CO_2eq sequestered	Ex-Act	Project start, mid-term and completion		

	- average stream flows feeding irrigation schemes maintained or increased	Estimated: 5 m^3/s No–April (M) 2 m^3/s May–Oct (M) 1 m^3/s No–April (P) 0.1 m^3/s May–Oct (P) 20≥ m^3/s Nov–April (K) 10≥ m^3/s May–Oct (K)		5≥ m^3/s Nov – April (M) 2≥ m^3/s May – Oct (M) 1≥ m^3/s Nov – April (P) 0.1≥ m^3/s May – Oct (P) 20≥ m^3/s Nov – April (K) 10≥ m^3/s May – Oct (K)	Data from stream flow monitoring stations	Semi-annual		
	- Reduction in sedimentation affecting irrigation schemes	Estimated 10-20t/years		40 % reduction (P)	Data from irrigation scheme monitoring	Annual		
Outputs component 2								
2.1 Reforestation and natural regeneration of vegetation cover (native species with honey, fodder and other production potentials) in woodlots and along river banks and in upper catchment areas	- Community forest management plans for woodlots and conservation forest developed and adopted	2-5 plans developed	15 plans adopted	20 plans adopted	PPR	Semi-annual	PCO/DOI	
	- Establishment/ strengthening of village tree nurseries	2-3 nurseries	15 nurseries	20 nurseries	PPR	Semi-annual	PCO/DOI	
	- Deforestation rate	10 ha/year (M) 5 ha/year (P) 4 ha/year (K)		4 ha/year (M) 2 ha/year (P) 2 ha/year (K)	LDSF	Project start, mid-term and completion	PCO/DOI	
	- Ha reforested and conserved	0 ha	100 ha	290 ha reforested 120 ha (M) 100 ha (P) 70 ha (K)	LDSF			
	- Ha with natural regeneration of vegetation cover	1,425 ha affected by forest degradation 1,000 ha (M) 300 ha (P) 125 ha (k)	100 ha	275 ha recovered 100 ha (M) 100 ha (P) 75 ha (K)	LDSF			
2.2 Efficient cook stoves	- Households adopting	300 households with	7,500	11,320 households with efficient cook stoves	Household survey	Every 2 years	PCO/DOI	

introduced/ scaled up to reduce wood demand	efficient cook stoves	efficient cook stoves 0 HH (M) 81 HH (P) 219 HH (K)	HH	6,000 HH (M) 2,000 HH (P) 3,320 HH (K)				
2.3 Efficient charcoal kilns linked to sustainable supporting woodlots established	- kilns established	0	3	5 kilns established, one in each catchment	PPR	Semi-annual	PCO/DOI	
2.4 Alternative energy projects (biogas, solar energy, etc.) approved for funding by the challenge fund and made operational.	- Alternative energy projects operational	0	2	5 alternative energy projects operational	PPR	Semi annual	PCO/DOI	
2.5 Honey and other NTFP small business established/ expanded as incentives for forest conservation.	- Households benefitting and annual income generated from NTFP	50 HH 3,572 USD/year 18 HH (M) 1,286 USD/year (M)[85] 0 HH (P) 0 USD/year (P) 32 HH (K) 2,286 USD/year (K)		856 HH 29,240 USD/year 350 HH (M) 9,000 USD (M) 146 HH (P) 13,140 USD (P) 360 HH (K) 7,100 USD (K)	PPR	Semi-annual	PCO/DOI	
2.6 Improved soil and water management practices scaled up in sub-catchments (terraces and contour ridges/bounds, Conservation Agriculture, ISFM, IPM, integrated agroforestry and livestock systems securing nutrient recycling).	- Training of lead farmers and follower farmers in SLM practices through FFS	0	300 sessions	400 training sessions	PPR	Semi-annual	PCO/DOI	
	- Farmers adopting improved soil and water management practices and ha where they are applied	<2,000 farmers <1,800 ha 1,200 farmers (M) 600 ha (M) 300 farmers (P) 700 ha (P) 340 farmers (K) 500 ha (K)	10,600 farmers 8000 ha	16,600 farmers (40 percent women, 25 percent youth, and 30 percent women lead farmers) 12,500 ha covered 6,000 farmers (M) 5,600 ha (M) 4,000 farmers (P) 2,400 ha (P) 6,600 farmers (K) 4,500 ha (K)	Household survey PPR	Every 2 years	PCO/DOI	
	- Households benefitting from improved chicken	0	750 HH	1,000 households	PPR	Semi-annual	PCO/DOI	

[85] Exchange rate 700K = 1 USD

	management and goats pass-on schemes	0						
2.7 Drought tolerance, pest resistance and other beneficial characteristics from indigenous crop/animal varieties incorporated in diverse crop and livestock systems to increase resilience to climate variability and increase availability of nutritious food in local food systems	- Training of farmer groups in nutrition and resilience benefits of indigenous crops, seed selection and multiplication and operation of community seed banks.		15 groups trained	20 groups trained	PPR	Semi-annual	PCO/DOI	
	- Village groups established and performing participatory variety selection	0	10 groups	10 groups	PPR	Semi-annual	PCO/DOI	
	- Community seed banks established and operating	0	5 banks	5 banks	PPR	Semi-annual	PCI/DOI	
	- ha covered and indigenous plant/crop/ animal varieties used per ha	700 ha covered by agro-biodiverse systems as defined in DATAR 4-6 plant/crop/ animal varieties used per ha		2,000 ha covered by agro-biodiverse systems as defined in DATAR 6-10 plant/crop/animal varieties used per ha	DATAR	Project start, mid-term and completion	PCO/DOI	
2.8 Meteorological forecasts integrated into farming planning and decision making (drought tolerant and short cycled varieties, crop diversification, planting date, land preparation, pest management)	- Farmers reach and using meteorological forecasts	0	10,600 farmers	16,600 farmers (40 percent women)	Household survey	Every 2 years	PCO/DOI	
Outcome component 3 Improved evidence-base for SLM and NRM decision-making and upscaling at community, district and central government levels	- GEB monitoring and assessment tools (Exact, LDSF, DATAR) and protocols integrated in partner district governments and institutions and information used for policy	0 district governments and partner institutions have integrated and use information from GEB monitoring tools	3 districts	At least 3 district government and 2 central level government institutions	PPR	Semi-annual	PCO/DOI	Policy makers and programme designers are interested in using improved evidence information for policy adjustments and programme

	and programme design decision support							design
	- Model for participatory catchment land-use planning and management and application of SLM practices upscaled in other catchments with PRIDE investment	0	1 other catchment	At least 5 other catchments	PRIDE PPR	Semi-annual	PCO/DOI	
Outputs component 3								
3.1 Staff and community youth trained in application of carbon balance assessment (Ex-Act), LDSF and biodiversity monitoring tool (DATAR) and use of information management system	- Number of district and government staff trained by the project	0	82 staff trained	90 district staff and 20 national level staff trained	PPR	Semi-annual	PCO/DOI	
	- Number of youth from communities trained	0	40	50 youth from communities trained (40% women)	PPR	Semi-annual	PCO/DOI	
3.2 Land degradation surveillance framework (LDSF) network designed and implemented	- LDSFs for sub-catchment areas completed	0 LDSFs installed	3 LDSF installed	LDSF completed for at least three catchment areas	PPR	Semi-annual	PCO/DOI	
3.3 Stream flow monitoring stations upgraded/installed (financed by PRIDE)	- monitoring stations upgraded/installed	0 stations	10 stations	10 stations 4 stations (M) 2 stations (P) 4 stations (K)	PPR	Semi-annual	PCO/DOI	
3.4 Ex-Act, DATAR and MPAT monitoring tools applied	- Sub-catchments where Ex-Act, DATAR and MPAT monitoring tools are applied	0 sub-catchments	5 sub-catchments	5 sub-catchments	PPR	Semi-annual	PCO/DOI	
3.5 Knowledge management products produced to support upscaling and policy processes[86]	- knowledge products	0 knowledge products	3 products	> 6 knowledge products	PPR	Semi-annual	PCO/DOI	

[86] Knowledge products can be fact sheets, learning notes, policy studies, thematic studies, videos, etc.

Appendix 8: Financial management and disbursement arrangements

Country Issues/ Overarching assessment of inherent risk

1. Transparency International's Global Corruption Perception Index score for 2014 was 34 (scale 0- high risk and 100 -low risk) as medium risk. The same index was 37 in previous two years. Malawi is now ranked 110 over 175 countries monitored. Risk has increased due to a large government corruption scandal towards end of 2013, which led donors to temporarily suspend aid disbursement to Malawi.

2. IFAD's Rural Sector Performance score provides a focused assessment of the potential risk in the rural sector. It is an indicator of accountability, transparency and corruption in the rural areas. The 2014 RSP E(ii) score for Malawi is 3.75.which is also a medium risk category.

3. In a bid to strengthen the public financial management framework and systems, the GOM has; (i) established independent audit committees for ministries departments and agencies; (ii) carried-out a forensic audit of the IFMS; (iii) engaged an IT security officer based at the Accountant Generals Department to monitor unlawful transactions on the IFMS; (iv) cleared a backlog of Government accounts reconciliations that were last carried-out in July 2013; and (v) speeded up the trial of cases for officers implicated in illegal transactions. However, the full impact of the Public Financial Management reforms is only expected to be achieved fully in one to two years' time at best.

A. Organizational framework

4. The Ministry of Finance Economic Planning and Development (MOFEDP) will represent GOM on all matters related to the Project. The Environmental Affairs Department (EAD) will ensure the overall oversight for the implementation of ERASP. This includes the provision of general policy directions for the implementation and coordination with other relevant agencies.

5. ERASP Financial management arrangements will foresee a joint implementation with the Program for Rural Irrigation Development (PRIDE) as per the agreement between the Department of Irrigation (DOI) and the Environmental Affairs Department (EAD) signed on August 28th, 2015. In the document, signed by the Directors of DOI and EAD, the parties agreed on the implementation arrangements for PRIDE and ERAS Project. Financial arrangements detailed here are in line with the above mentioned agreement.

6. The PRIDE institutional set-up shall remain as it appears in the final PRIDE Programme Design Report (PDR). Please refer to it for what is not specifically mentioned in this Appendix.

7. There will be one Program Coordination (PCO) Unit for the two projects, to be housed within Government offices to be identified by DoI. The Program Coordinator will also coordinate ERASP activities. The PRIDE Environmental specialist (in the PCO Unit) will be the main responsible for ERASP technical activities: s/he will report to the Director of EAD and to PRIDE Program Coordinator.

8. ERASP activities in the project districts will be performed under the guidance and technical advice of the two Regional Environmental Specialists in the PCO Unit (but based in the two PRIDE regional clusters). They will directly oversee activities in the three districts (one linked to the regional cluster in the North and two linked to the regional cluster in the south). The two Regional Environmental Specialists will report to the PRIDE Environmental specialist (in the PCO Unit).

9. The PRIDE PCO Unit is staffed with a financial controller recruited under performance contract to be supported with two assistant accountants under similar terms. There will be an Accountant seconded by EAD to ERASP and fully dedicated to ERASP financial management. S/he will operate under the direct supervision of the PRIDE Financial Controller.

10. Program Coordinator, PRIDE Financial Controller and PRIDE Environmental specialist (in the PCO Unit) positions are already budgeted under PRIDE. The positions of the two ERASP Regional Environmental Specialists in the PCO Unit will be budgeted under ERASP. The ERASP Accountant position will be paid by GOM (EAD).

B. Project Level Financial Management Arrangements and Control Organisation Structure

11. In accordance with IFAD's Guidelines for financial Management assessment at design, a financial management assessment was carried-out for PRIDE. The view is that results derived for PRIDE shall be considered valid for ERASP as well. The financial management arrangements for ERASP will therefore be in line with those included in PRIDE. Key financial management issues are summarized here.

12. There will be a separate ERASP Designated Account in USD and a separate ERASP Operating Account in Malawian Kwacha. Both accounts should be housed in a Commercial Bank acceptable by IFAD. Each district that will participate in the project will be required to open a local ERASP account in a Commercial Bank acceptable by IFAD as well. ERASP Operating Account and local ERASP Accounts will be used for day-to-day transactions.

13. The Director of Environmental Affairs shall be a principal signatory in the independent ERASP Designated Account.

14. ERASP financial management (accounting, reporting and auditing) will be performed by the PRIDE financial controller who will be supported by the Accountant seconded by EAD to ERASP and fully dedicated to ERASP financial management. This will include management of the ERASP operating account.

15. In each of the three Project Districts, the District Commission will second one Accountant to ERASP. Local ERASP accounts in the three project districts will be managed by the Accountants seconded to ERASP by the District Commissions, under the supervision of PRIDE financial controller.

16. The accounting software/ project accounting hub will be at the PCO level. The PCO Unit will use its own discrete accounting software and control system as specified in PRIDE PDR. As for follow-up of expenditure justifications/reporting and monitoring from districts, internal controls, accounting systems as well as internal and external audits: please refer to the final PRIDE PDR for detailed information.

17. PRIDE Environmental specialist (in the PCO Unit) will be the main responsible for ERASP activities. S/he will report to Program Coordinator (PRIDE) and EAD Director about the activities performed and planned. S/he will also recommend for approval by the EAD Director and for Disbursement by the Program Coordinator.

18. Disbursement of funds from the ERASP Operating Account shall be managed by the Program Coordinator. Disbursement of funds from the ERASP operating account to the local ERASP accounts will be performed through activity-tagged cash advances to be retired before subsequent releases (at least 50% of the money in the local ERASP accounts should be spent before a new release from the ERASP operating account shall be authorised). Private service providers will receive advances in accordance to contract stipulations. Detailed rules for authorizing cash advances shall be defined by the PCO Unit at the beginning of the Project - in line with what will be established under PRIDE - and will be specified in the Project Implementation Manual (PIM).

19. GOM tax contributions/ exemptions should be included in the ERASP bill to make it easy for Malawian Revenue authority (MRA) to provide the required tax exemptions. GOM contribution of tax

exemptions will be done in two different ways: (i) VAT (16.5%) will be reimbursed by the GOM through MRA upon request by the PCO; and (ii) forgone duties for duty-free purchases.

20. Transparency, governance, anti-corruption. In collaboration with IFAD and GOM, a Governance and Anti-Corruption Framework will be elaborated during the first year of implementation to mitigate the risk of corruption and promote effective utilisation of project resources. The Framework will include: (i) the programme operations and financial manual articulating the type of internal controls and administrative systems to be established to guarantee transparency and accountability; (ii) the computerised accounting system that will substantially reduce the scope for human error; (iii) the risk-based implementation reviews of programme financial management and staff; and (iv) the back-up procedures kept on the PCO's computer server to avoid the loss or damage of financial data.

C. Proposed Funds Flow and Disbursement Arrangements

21. The proposed funds flows arrangements will be in line with the PRIDE one. Please refer to the final PRIDE PDR for detailed information. A separate Designated Account (DA-ERASP) will be handling the funding source for ERASP, i.e. GEF funds.

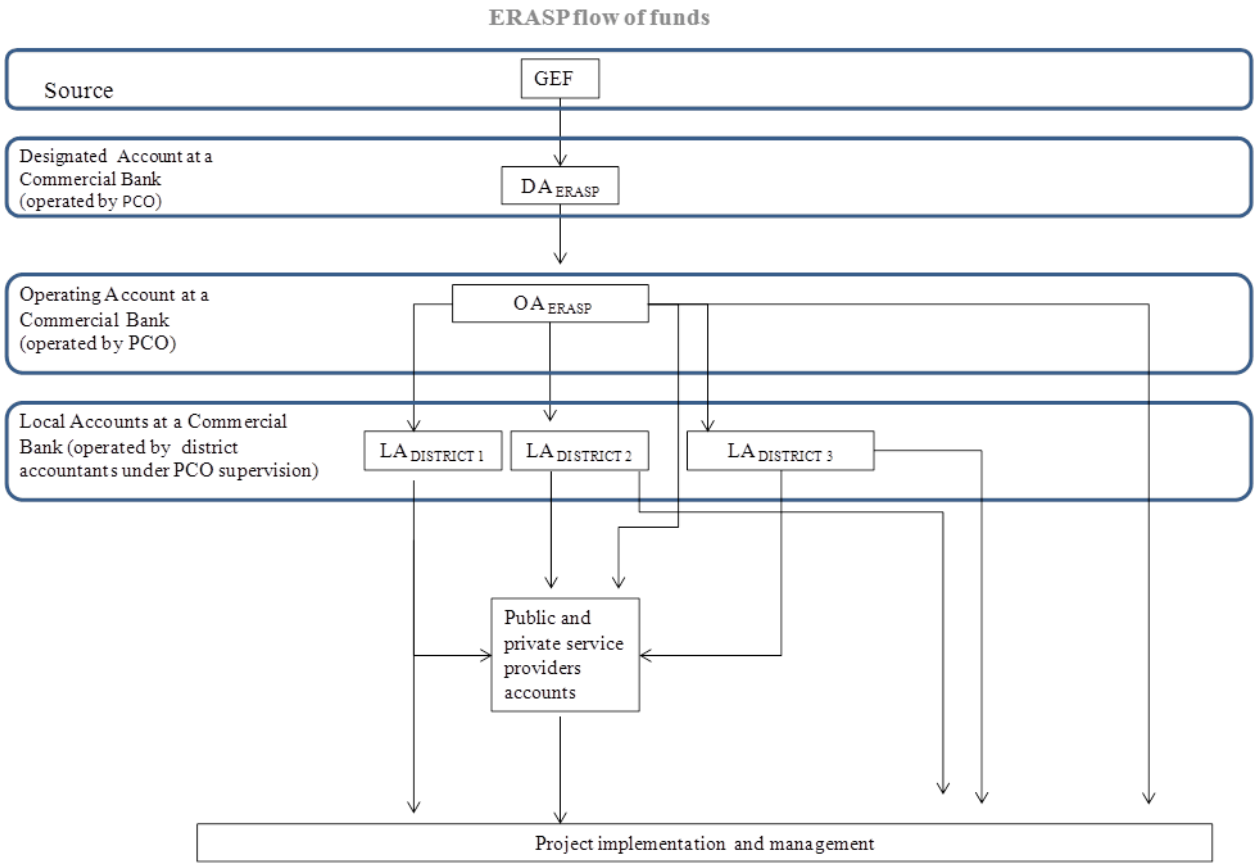
22. ERASP and PRIDE will submit two separate withdrawal applications (WA), to be defined in schedule 2 to the financing agreement with clear instructions of where to charge.

23. Project expenditures shall be eligible for financing if they are incurred during the Implementation Period.

24. No withdrawal shall be made from the Designated Account until the first AWPB has been approved by the Fund and the Fund has determined that all other conditions specified in the Financing Agreement as additional general conditions precedent to withdrawal have been fulfilled. The Financing Agreement may also establish additional specific conditions precedent to withdrawal applicable to particular categories or activities.

25. Withdrawals to meet the costs of starting up the Project may be made from the date of entry into force of the Agreement, subject to any limits established in the Financing Agreement. This is what would apply in the case of pre-financing by GOM. Treasury will advance the payments based on all accounted expenses. After first withdrawal from the DA the Project will reimburse pre-financed amounts.

Figure 5 ERASP Funds Flow Chart



Appendix 9: Procurement

Overarching country assessment

1. In relation to procurement, IFAD's General Conditions places emphasis on using the Borrower/Recipient's procurement regulations, provided they are deemed to be consistent with IFAD's guidelines. This is in line with the various commitments of the international donor community to work towards increasing the use of national systems where they can be shown to be compatible with the requirement of donors. The IFAD procurement guidelines and handbook require an assessment of national procurement systems as part of project design. The assessment has been done in two stages: (i) overarching country assessment and (ii) project specific assessment.
2. The Malawi legislative and regulatory framework is robust enough. The applicable law and regulations are contained in: (i) the Public Procurement Act; (ii) the Procurement Regulations; and (iii) Desk Instructions for Public Procurement.
3. The Public Procurement Act introduced a new legal framework governing public procurement in Malawi. The framework provided for the establishment of the Office of Directorate of Public Procurement (ODPP), which, since becoming operational, has taken the lead on public procurement reform. Among the changes to the procurement system introduced by ODPP was the complete decentralisation of the procurement process to the level of each public entity. There was also a concerted effort to raise awareness of the newly established framework among public sector officials, the private sector, civil society and the general population.
4. The legal and regulatory framework is sound for efficient public procurement. The Public Procurement Act and Regulations adequately establish the institutional framework required to support public procurement, the stages of the procurement process, the main methods of procurement and their conditions for use, and the conditions for review and auditing. Moreover, the Desk Instructions serve as a manual for procuring entities providing easy and simplified explanations and guidance. Finally, a comprehensive set of Standard Bidding Documents (SBDs) for a wide range of goods, works, and services has been issued to assist the procuring entities in the procurement process. The legal and regulatory framework in place thus represents a key asset in the development of sound and efficient procurement.
5. Despite these overall encouraging trends, country procurement assessment by ODPP with UNDP support found issues that still need to be addressed to ensure that procurement processes in practice are fully compliant with the legislative and regulatory framework. These include: (i) few procuring entities use the SBDs; (ii) many procuring entities do not have a copy of the Regulations and Desk Instructions; (iii) the quality of technical specifications is often poor; (iv) evaluation criteria are often poorly specified; (v) awareness of procedures for review is limited; and (vi) some procuring entities have experienced political interference in the procurement process.

- **Procurement is not integrated in the budget formulation process**. At present there is no linkage between the budget planning and the procurement planning. Thus, so-called procurement plans are made after budget allocation and approval – if made at all. ODPP is however making procurement planning compulsory.
- **Procurement plans are not followed.** For those procuring entities that have developed consolidated procurement plans, carrying out procurements in accordance with the plan remains a major challenge. Poor planning skills, time constraints, and to some extent external interferences and unplanned procurements constitute major obstacles.
- **No completion report mechanism exists.** There is no feedback mechanism providing completion reports on the execution of major contracts. The procedures related to the preparation of completion reports appear to differ between procuring entities. Some entities report that: (i) completion reports are prepared; (ii) the process of preparing completion reports is often delayed; and (iii) they do not prepare completion reports for major contracts.
- Most procuring entities have inadequate procurement competence levels and record keeping in procuring entities remains poor.
- The assessment by ODPP encountered a number of weaknesses related to the compliance and performance of the established control mechanisms. The following key issues were noted: (i)

auditors lack procurement proficiency; (ii) weak enforcement of audit recommendations; (iii) internal audit committees are not yet established; and (iv) compliant decisions are currently not being published.

6. The procurement assessment carried-out in accordance with the IFAD procurement guidelines and handbook during the design of PRIDE was partially satisfactory and identified some gaps regarding threshold levels for shopping and International Competitive Bidding. As the ERASP will be implemented by the same PCO as PRIDE, the GOM thresholds will be followed which currently are as follows:

Table 20 PRIDE Procurement thresholds

	Threshold	
	MWK million	**Procurement Method**
Goods	Up to 5	Request for Quotation (RFQ) using Govt approved list
	>5-80	National Competitive Bidding (NCB)
	>80	International Competitive Bidding (ICB)
Services	Up to 5	Least Cost Selection (LCS) - Other methods such as Fixed Budget and Quality-based Selection (QBS) may be used depending on the assignment.
	>5-15	Quality cost and based selection (QCBS)
	>15-40	QCBS- Expression of Interest/ Prior review by ODPP
	>40	QCBS- Expression of Interest/ Prior review by ODPP+ international advert
Works	Up to 10	RFQ
	10-800	NCB
	>800	ICB

Procurement arrangements

7. The main objective of the procurement guidelines is to provide and lay down procedures for undertaking the procurement of planned goods, works and services under the project in a fair, transparent, and efficient manner so as to achieve the objectives of the project in accordance with the public procurement principles. As recommended for PRIDE, the ERASP will use the GOM procurement systems. Thus the procurement planning should be according to the GOM planning calendar. Due to the medium inherent risk ranking of the GOM procurement systems obtained at various assessments; the IFAD prior review thresholds for the ERASP would be USD 50,000 for goods and services and for works over USD 100,000 to start with.

8. **Procurement organisation structure:** A specific procurement unit managed by procurement specialist will set up under PRIDE. This unit will also undertake the procurement activities for the ERASP. For each contract, ad hoc evaluation committee members will be appointed by the Programme Director in consultation with the procurement specialist and the concerned technical specialists. The committee members will be formally appointed by the MOAIWD PS or designate and will be required to sign a confidentiality code and professional declaration.

9. Internal Procurement Committee (IPC): The MOAIWD IPC will be the overall approval authority. The IPC will approve; (i) all procurement plans; (ii) draft advertisements and other bidding documents; (iii) specific terms and conditions relating to contract amounts, completion periods, stages and conditions of part payments; and (iv) applications for contract variations above thresholds as set and issued by the ODPP.

10. All NCB and ICB procurements will be carried-out and managed centrally at the PCO. Local shopping may be carried-out at the district level in case bulking opportunities may not be feasible at the PCO. In this regard, districts will have to submit their procurement plans for inclusion in the

consolidated project procurement plan. Efforts should be made by the procurement specialist to ensure that the best contract packaging possible, including consideration of what lots can be put together in a package for which it is possible to find a supplier or bulking opportunities.

11. **Procurement planning:** Implementation of approved actions will be based on a detailed specified procurement plan which will be part of the annual AWPB. Upon "entry into force" of the loan, an 18 month Procurement Plan will have been included in the AWPB for the first year of implementation. The plan will include all the key milestone dates and timelines including those for preparation of specifications and bidding documents, advertisements, opening of the bids, and receipt of IFAD No Objection where applicable, evaluations, contracts award and delivery of the relevant goods or services.

12. The Procurement Plan should be submitted to the procurement unit at MOAIWD. The Procurement Unit will refine the consolidated Procurement Plan and submit it to ODPP for information and later to IFAD for a no objection as part of the AWPB. It is important to note that if the procurement specialist does not carefully work through the procurement planning so that optimal contract packaging or bulking opportunities are missed; this will affect disbursement as there may be many small packages and payments that would make it impossible to optimally deploy the available disbursement methods.

13. The Procurement Plan will need to be constantly updated by the procurement officer, reflecting any procurement actions taken, revised milestone dates to cope with new situation, and new items to procure. However, No Objection from IFAD will need to be obtained when a revised PP is issued for a new budget year, or when a new item is included in an already approved PP.

14. **Bidding Documents**: The evaluation criteria and the final selection procedure of all procurements are required to be clearly stipulated on the bidding documents. Thus if the bidding documents are poorly prepared, miss-procurements and or corruption may occur. For the ERASP as applied to the PRIDE, the GOM standard bid documents will be used and adapted to suit the each specific procurement item. On job training should be carried-out for project management by MOAIWD and or IFAD in the preparation of these documents. The TOR's for the external auditors should include a requirement to review and advice on the suitability of prepared bid documents; a procurement auditor should always be part of the team. The approval of the IPC should always be sought for each prepared bid documents as per the approval thresholds in the Public Procurement Act. For those procurements above the IFAD prior review thresholds, an IFAD no objection should also be sought for by the Project management team.

15. **IFAD No Objection:** No Objection in terms of procurement needs to be obtained from IFAD on the following:

- Procurement Plan (original version as well as revised one when a new procurement is included)
- All the procurement that require IFAD prior review in terms of:
    - (i) Expression of Interest (if any)
    - (ii) Bidding documents (with a list of invitees if any),
    - (iii) Evaluation report (or technical and financial evaluation reports separately if the procurement is undertaken under 2-envelope bidding)
    - (iv) Full contractual documents including annexes as well as any amendment thereof.
- Any Direct Contracting, regardless of the value
- Situations that are outside of normal tendering procedures, such as application of different procurement method (e.g. NCB, instead of ICB), reducing the floatation periods, extension of bid validity, a bidding result with only one acceptable bid, etc. Proper justifications need to accompany those cases.

16. All the cases that receive "No Objection" including those under Direct Contracting shall be systematically registered by the PCO with the concerned documents submitted.

Appendix 10: Key Terms of Reference

ToR 1: Regional Environmental Experts

Background

1. The Integrated Approach Pilot (ERASP) program on Fostering Sustainability and Resilience for Food Security in Sub-Saharan Africa targets agro-ecological systems where linkages between the need to enhance food security and the opportunities for generating global environmental benefits are evident. The program aims to promote the resilience and sustainable management of ecosystems services and to climate-proof food production systems. At the same time, it will safeguard the long-term productive potential of critical food systems in response to changing human needs. ERASP is funded from the Land Degradation, Biodiversity and Climate Change Mitigation focal areas of Malawi's allocation from the Global Environment Facility.
2. The concept for the Enhancing the Resilience of Agro-ecological Systems Project (ERASP) was endorsed by the Government of Malawi (GoM) and approved as one of 12 country projects in Africa under the Food Security ERASP by the GEF Council in June 2015. Each country project will contribute to the collective impact of the ERASP program, which is intended to inform approaches to food towards win-win solutions between food production and maintaining ecosystem services, in the face of anticipated climate shocks. The regional program will generate knowledge exchange, deliver training; develop knowledge management products and have an advocacy function which draws upon and creates visibility for the anticipated success stories from the country projects at the level of sub-regional and regional bodies within the context of food security debates and policy making. IFAD is the Lead Agency for the Food Security ERASP.

3. The Goal of ERASP is to enhance the provision of ecosystem services to improve food and nutrition security of rural community in the targeted catchment areas. The Project Development Objective (PDO) is to improve the productivity and resilience of agricultural systems. This objective encompasses three sub-objectives of addressing land degradation, maintaining agro-biodiversity and climate change adaptation and mitigation. The project aims to reduce food insecurity from an average of four to five months in the three Districts to less than two months and a 20 percent reduction in child malnutrition, reaching 25,680 farmers, 30 percent of which should women heading households, through ecosystems management, supported by market and credit support from the baseline investments.

4. The solution to be supported by this project is an integrated strategy in three Outcomes areas. 16 outputs will be delivered across three Outcome areas. ERASP has prioritized for investments in catchment area management, increasing ecosystem services and benefits from the PRIDE investments in three of the most vulnerable water resource units (WRU) covering 42,000 hectares. Three districts (Karonga, Machinga and Phalombe) with five PRIDE investment sites covered by at least seven Extension Planning Areas (EPAs) were selected for the ERASP interventions.
5. The project components are as follows:

6. **Component 1** is the planning foundation for the entire project. This Component will develop five sub-catchment management plans. Component 1 aims to build capacity and ownership among different government and non-government stakeholders and community members on the issue of catchment management-essentially an agreed land use plan and set of measures to rehabilitate the catchment together with a shared vision of how communities wish to see their catchment developed.

7. **Component 2** aims to scale-up the adoption of catchment area conservation and sustainable land management (SLM) practices at the wider catchment area focusing on two outcomes; one on landscape level catchment conservation and management and one on improving agronomic practices in farmers field that will result in sustainable intensification of agricultural production. The aim is to improve Outcomes for 13,000 farmers.

8. **Component 3** aims first to improve District and national capacity to systematically measure progress and evaluate the impact of project interventions, thereby enabling more informed decision-

making on SLM, adaptation and enhanced food security; second to standardise monitoring protocols and national coordination on environmental surveys; third to demonstrate achievements within each Focal Areas. Furthermore, it will serve as critical inputs to the regional project by facilitating comparison and aggregation of overall results, highlighting common elements among different child country projects approaches.

9. Implementation of the three Components will be through government structures, in particular through District officers and the network of extension officers. For Component 1, the sub-catchment committees will be coordinated by the three Water Resources Officers belonging to the existing network of hydrometric Districts (which follow catchment boundaries). These District Water Officers will convene District officials in their regular coordination structures to discuss the findings from the body of planning work taken by the sub-CMC and what this implies for the challenges and trade-offs involved in land and resource use in the EPAs concerned. In turn, catchment planning at the village level will be coordinated by the District Water officials, who currently focus on water and sanitation issues but are having their remit widened to cover water resources in response to the 2013 Water Resources Act. The extension network already facilitates the action planning at the village level supported in part through the Local Development Fund, a fiscal transfer mechanism from central government to the Districts and the project will strengthen this through a programme of trainings.

10. Implementation of Component 2 will be through government structures, in particular through District officers, the network of extension officers and the lead farmer model. Service providers will be contracted in where specific technical advice is needed in the implementation of specific outputs such as installation of biogas units and energy efficient cook stoves; or in the preparation of assessments, such as in Component 1.

11. The Ministry of Agriculture, Irrigation and Water Development will be the Executing Agency, as it is for the PRIDE investment. The Ministry will be the main accountable entity for the project results. The implementation will be by the PRIDE/ERASP Programme Coordination Office (PCO) comprised by dedicated and highly qualified personnel either from government or recruited from the labour market. The PCO, funded through PRIDE, will include a Programme Coordinator, and Specialists in the following areas: Procurement; Financial Management; Institutional, Environment; Gender and Targeting; Irrigation; Agriculture & Value Chains; Planning, Monitoring and Evaluation. The latter will be charged with Knowledge Management as well. Given the spread to the northern and southern regions, there will be two Programme facilitation offices, staffed by coordinators.

12. ERASP will be managed by the PRIDE/ERASP environmental specialist. ERASP will finance two additional positions which are two regional environmental experts, who will be located in the northern and southern programme facilitation offices. These experts will coordinate the catchment and environmental management activities in the regional clusters and provide support for monitoring and assessment. Environment Officer from EAD will be attached to the Environmental Specialist as part of capacity building for the Department.

Responsibilities of the Regional Environmental Experts

The Regional Environmental Experts will be responsible for the following tasks:

- Work with the Environmental Specialist to develop Annual Work plans and budgets, consulting fully with Government staff responsible for the implementation of Components 1 to 3 or ERASP;
- Develop quarterly work plans and progress reports in line with indicators and targets specified in the logical framework endorsed by the management; organise quarterly progress meetings with regional District staff;
- Support PCO meetings on implementation progress, work planning and trouble-shooting;

- Supporting the coordination and leadership of the District Water Officials with technical advice and partnership mobilisation in the implementation of Component 1, including the implementation of the work plan strategy determined by the Organisational, capacity and training assessment;
- Supporting the District officials coordination meetings;
- Develop ToRs for service providers for key strategic pieces of work to support the implementation of Components 1 to 3, and supervise the work of consultants for production of focused and high quality outputs that will guide implementation progress in ERASP;
- Coordinating project activities across Components 1 and 3 to ensure cost efficiencies and cross–learning
- Coordinate project activities with related and parallel activities with other government and NGO projects/programmes.
- Managing relationships with project stakeholders including donors, NGOs, government agencies, and others as required.
- Take stock of progress and regular intervals and feed in case study materials to the ERASP knowledge management strategy.
- Collaborate with supervision and evaluation missions regarding regional implementation progress in ERASP;
- Input in the agenda and organisation of the two National Conferences

ToR 2: Organisational, capacity and training needs assessment

Background

13. The Integrated Approach Pilot (ERASP) program on Fostering Sustainability and Resilience for Food Security in Sub-Saharan Africa targets agro-ecological systems where linkages between the need to enhance food security and the opportunities for generating global environmental benefits are evident. The program aims to promote the resilience and sustainable management of ecosystems services and to climate-proof food production systems. At the same time, it will safeguard the long-term productive potential of critical food systems in response to changing human needs. ERASP is funded from the Land Degradation, Biodiversity and Climate Change Mitigation focal areas of Malawi's allocation from the Global Environment Facility.
14. The concept for the Enhancing the Resilience of Agro-ecological Systems Project (ERASP) was endorsed by the Government of Malawi (GoM) and approved as one of 12 country projects in Africa under the Food Security ERASP by the GEF Council in June 2015. Each country project will contribute to the collective impact of the ERASP program, which is intended to inform approaches to food towards win-win solutions between food production and maintaining ecosystem services, in the face of anticipated climate shocks. The regional program will generate knowledge exchange, deliver training; develop knowledge management products and have an advocacy function which draws upon and creates visibility for the anticipated success stories from the country projects at the level of sub-regional and regional bodies within the context of food security debates and policy making. IFAD is the Lead Agency for the Food Security ERASP.

15. The Goal of ERASP is to enhance the provision of ecosystem services to improve food and nutrition security of rural community in the targeted catchment areas. The Project Development Objective (PDO) is to improve the productivity and resilience of agricultural systems. This objective encompasses three sub-objectives of addressing land degradation, maintaining agro-biodiversity and climate change adaptation and mitigation. The project aims to reduce food insecurity from an average of four to five months in the three Districts to less than two months and a 20 percent reduction in child malnutrition, reaching 25,680 farmers, 30 percent of which should women heading households, through ecosystems management, supported by market and credit support from the baseline investments.

16. The solution to be supported by this project is an integrated strategy in three Outcomes areas. 16 outputs will be delivered across three Outcome areas. ERASP has prioritized for investments in catchment area management, increasing ecosystem services and benefits from the PRIDE investments in three of the most vulnerable water resource units (WRU) covering 42,000 hectares. Three districts (Karonga, Machinga and Phalombe) with five PRIDE investment sites covered by at least seven Extension Planning Areas (EPAs) were selected for the ERASP interventions.
17. The project components are as follows:

18. **Component 1** is the planning foundation for the entire project. This Component will develop five sub-catchment management plans. Component 1 aims to build capacity and ownership among different government and non-government stakeholders and community members on the issue of catchment management-essentially an agreed land use plan and set of measures to rehabilitate the catchment together with a shared vision of how communities wish to see their catchment developed.

19. **Component 2** aims to scale-up the adoption of catchment area conservation and sustainable land management (SLM) practices at the wider catchment area focusing on two outcomes; one on landscape level catchment conservation and management and one on improving agronomic practices in farmers field that will result in sustainable intensification of agricultural production. The aim is to improve Outcomes for 13,000 farmers.

20. **Component 3** aims first to improve District and national capacity to systematically measure progress and evaluate the impact of project interventions, thereby enabling more informed decision-making on SLM, adaptation and enhanced food security; second to standardise monitoring protocols

and national coordination on environmental surveys; third to demonstrate achievements within each Focal Areas. Furthermore, it will serve as critical inputs to the regional project by facilitating comparison and aggregation of overall results, highlighting common elements among different child country projects approaches. Under this Component, sound state-of-the-art methods, tools and measurement protocols will be developed to investigate progress towards climate-resilient livelihoods and improved management of ecosystem services such as LDSF for land degradation, DATAR tool to quantify the traditional variety managed by small scale farmers land degradation, Ex-Act - a land-based accounting system developed by FAO to estimate the impact of agriculture and forestry development projects on the carbon-balance and MPAT to measure improvement in the farmers' livelihood, changes in household asset and climate-resilience.

21. The sub-catchment committees will be coordinated by the three Water Resources Officers belonging to the existing network of hydrometric Districts (which follow catchment boundaries). These District Water Officers will convene District officials in their regular coordination structures to discuss the findings from the body of planning work taken by the sub-CMC and what this implies for the challenges and trade-offs involved in land and resource use in the EPAs concerned. In turn, catchment planning at the village level will be coordinated by the District Water officials, who currently focus on water and sanitation issues but are having their remit widened to cover water resources in response to the 2013 Water Resources Act. The extension network already facilitates the action planning at the village level supported in part through the Local Development Fund, a fiscal transfer mechanism from central government to the Districts and the project will strengthen this through a programme of trainings.

Objective of the ToR

22. To carry out an organisational, capacity and training needs assessment and to develop an implementation strategy to address these needs.

Tasks

23. These tasks follow closely the Outcome-output list in the PDR, supplemented with more detailed information in Appendix 4 of the PDR. In implementing this consultancy, reference should be made to this detailed information. The tasks are as follows.

Training needs

1. Review the existing village plans and priorities to determine whether they are up to date, their internal coherence regarding each of the five catchment management (i.e. the extent to which there are trade-offs) and their comprehensive coverage of the sub-catchment in question. This should feed into the training needs assessments for District officials and extension officers (tasks 3 and 4.
2. Develop a capacity assessment tool to apply to the District Water officials to be able to lead the process of development of the five the Catchment Area Management Plans. The capacity assessment tool should incorporate competency requirements in two areas.
    - The first area is the ability to convene and coordinate a multi-stakeholder process regarding the catchment management committee (CMC) process. The CMCs should have representation of ministries, regional development authorities, local government; traditional authorities, NGOs, community groups and the business community within the upstream as well as midstream and downstream users. CMCs are new to Malawi and so experience on how best to structure the meetings will need to be worked out.
    - The second is to coordinate and supervise studies that will be undertaken through service providers to investigate and understand the physical, tenure related and socio-economic causes and effects driving the land, soil and water-related problems in the catchment.

3. Develop a capacity assessment tool to apply to District officers, considering the range of activities that could be implemented under Component 2 and Component 3 of the project, especially under the environmental and livelihoods impact assessment (see background

section above). The consultant should draw on existing capacity assessments as they exist in developing this tool.

4. Develop a capacity assessment tool to apply to the extension officers' network in order to deliver integrated catchment planning and implementation (Components 1 and 2 of ERASP).
5. Apply the capacity assessment tool to the District Water Officials, District officials and extension workers in the five sub-catchments. A scoring and/or ranking methodology should be used in order to clearly communicate the extent of capacity and training needs.
6. Determine substantive catchment management informational and training needs among village groups based on the village plans (task 1), interviews with District officials and focus group discussions with village groups (see Component 2 for details of what the substantive agenda could include). The training needs should be differentiated according to women's and men's needs and youth needs.

Organisational needs

1. Together with the District Water official, develop a mobilisation strategy that will consider how best to structure the sub-CMC in order to provide a motivated and balanced representation that allows for equitable participation of all constituencies in catchment management, perhaps incorporating sub-committees for different constituency groups. The approach will be to ask who the key actors are, who should be involved in catchment management, what their goals and interests are and how to foster collaboration among them to support the planning process.
2. Determine the institutional support that District Water officials will require in order to coordinate and lead the planning process of the CMC development of the CAMPS.
3. Determine a human resources strategy for the extension services including i) the human resource gaps in the extension network are, considering the national standard of 1 extension officer for 750 farmers and ii) the incentives necessary to motivate and enhance productivity of extension officers.
4. Determine what the decision-making processes among District officers is and how coordination around catchment management in the sub-catchment in question could be facilitated. District officers should be brought together to discuss and agree the strategy. Individual interviews with key informants to supplement the strategy may be advisable.
5. District level coordination should also include the possibility to convene District officials across the five sub-catchments at least annually for knowledge sharing and peer learning on the ERASP methodology and results;
6. Determine the extent to which village natural resource management groups are working effectively in an inclusive manner for women, men and youth, the representativeness of the membership, decision-making authority, conflicts, extent of formalisation into legal entities; the need for coordination and the training needs around group management, leadership and coordination;
7. Determine partnership possibilities with NASFAM in order to scale up the project approach with a proven, market-led approach;
8. Determine recommendations for i) a CMC stakeholder mobilisation strategy together with costs ii) institutional support for District Water Officials to coordinate and lead the CMC planning process iii) coordination process for District officials for decision –making and implementation of Components 1 and 2 of ERASP iv) human resource recruitments for the extension service in the five sub-catchments together with a motivational enhancement strategy v) recommendations for an organisational strengthening of village natural resource groups.

Timing and outputs

This consultancy should take place over 3 months. The timings and outputs are as follows:

- An inception report should be produced within two weeks which should include the draft capacity assessment tools.
- The research and analysis should take 6 weeks.
- Production of a draft report should be produced two weeks later. The report should include:
    - the results of the capacity needs assessments, the review of the village plans and the District organisational needs reviews;
    - recommendations for
        - i) a training plan for District officials, District Water officials, extension officers and village natural resource management groups including timings and cost; gender equity in access to the training plan should be ensured at all levels;
        - ii) a stakeholder mobilisation strategy for the CMC process over the 1-2 years of implementation of Component 1 of ERASP;
        - iii) institutional support for District Water Officials to coordinate and lead the CMC planning process;
        - iv) coordination process for District officials for decision –making and implementation of Components 1 and 2 of ERASP;
        - v) human resource recruitments for the extension service in the five sub-catchments together with a motivational enhancement strategy;
        - vi) an organisational strategy for coordination of District officials in the 5 sub-catchments, including the scope and strategy for regular knowledge sharing and peer learning events and
        - vii) Recommendations for an organisational strengthening of village natural resource groups including an implementation plan for their formalisation into legal entities.
    - A meeting with the PRIDE/ERASP Environmental Specialist will be arranged to discuss the findings.
- A review time of two weeks of the draft report by the Environmental Specialist will be provided.
- The final report should be produced one week later.

Profile of the consultant

National consultant with 8 years of experience in development programming and environmental technical work, with experience in:

- Environmental management;
- Watershed management highly desirable;
- Capacity assessments and development of capacity development strategies;
- Organisational development highly desirable.
- Ability to work under tight deadlines and produce work of a high standard;
- A good standard of written English.

Appendix 11 Project cost and financing

Main Assumptions

1. This appendix provides the analysis of Project costs and financing for the Enhancing the Resilience of Agro-ecological Systems Project (ERASP). It describes the assumptions made in estimating the project costs which in turn support the detailed cost tables and financing plan. The analyst has used the COSTAB software to capture the financial data and has prepared a detailed cost table for each component. These cost tables have been consolidated into summary cost tables that present the project cost by component, expenditure account and financiers. The full set of detailed and summary tables is presented in the Attachments to this Appendix. Since the ERASP is primarily built on the Programme for Rural Irrigation (PRIDE), which is the co-financing baseline investment, this Appendix will also highlight the complementarities among the two Projects and the additionality of ERASP funding to PRIDE investments.

2. ERASP is to be financed over a seven-year period (2017-2023) while PRIDE Program will be financed over the seven-year period 2016-2022. Whenever possible, basic COSTAB information has been kept as per the PRIDE original budget. The information collected during the design mission provided the key parameters for the Project costs. Data collected have been checked for consistency with average costs of goods and services in Malawi. ERASP costs have been estimated on the basis of prices prevailing at the time of design in February 2016 whilst SMLP costs remain prevailing prices as of March 2015.

Economic growth, Inflation, Exchange Rates and Contingencies

3. **Economic growth**. Malawi is a low-income country with a very small-sized economy. Malawi recorded strong average growth (real gross domestic product - GDP) of 7.1% from 2006 to 2010, supported by sound macroeconomic management and improvement in smallholder agricultural productivity. However, real GDP growth slowed down to 4.3% in 2011 on account of shortages in foreign exchange, fuel and power. This in turn weakened performance in import-dependent sectors, notably manufacturing, construction, mining, transport, retail and wholesale trade and services. The deceleration in growth occurred against a backdrop of growing external and internal imbalances, resulting from macroeconomic policy slippages and the suspension of donor budget support. Real GDP growth in 2012 fell further to 1.8%. According to the IMF, GDP growth is estimated to have rebounded to 4.97% in 2013, reaching USD 3.81 billion, mainly thanks to a good tobacco season and strong recovery of growth in manufacturing, construction, and the wholesale and retail trade sectors. The World Bank expects real GDP growth to average 4.6% in 2015 and 4.7% in 2016. This growth is mainly driven by tobacco exports and continued growth in the key sectors of agriculture, manufacturing and services. The unemployment rate has been decreasing in the past few years: it was 15% in 2011, 7.6% in 2012, and about 3% in the first half of 2014. It is forecasted to remain stable at 3% in 2014 and 2015 and to increase up to 5% in 2020.

4. **Inflation rates and contingencies.** Local inflation rate, as reported by the Reserve Bank of Malawi, averaged 14.9% from 2001 until 2016, reaching an all-time high of 37.9% percent in February 2013and a record low of 6.3% in December 2010. Inflation rate was recorded at 23.5% in January 2016. Given the two digit local inflation rate, most of the cost items have been set in USD to mitigate cost overruns.

5. However, price contingencies have been applied on all costs. A local inflation rate of 10% is set as a base for the analysis for the Project period 2017-2023. Foreign inflation rate (2%) has been based on the Unit Value Index (in USD) of manufactures (MUV), which is commonly used as a deflator in the commodity-price literature. Both local and foreign inflation rates are compounded at mid-year. Inflation figures used in the calculation of the Project costs are shown in Table 1.

6. Physical contingencies have been considered in case of shocks that may emerge during implementation. A physical contingency of 10% has been applied to items for which the required amounts could not be reasonably estimated.

Table 21: Inflation Rates

Inflation Rates (%)	2017	2018	2019	2020	2021	2022	2023
Annual							
Local	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Foreign	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Compound							
Local	5.0	15.5	27.1	39.8	53.7	69.1	86.0
Foreign	1.0	3.0	5.1	7.2	9.3	11.5	13.7

7. **Exchange Rate.** The shift to a floating exchange-rate regime in May 2012, coupled with a weak current-account position and low levels of foreign reserves, caused Malawian Kwacha (MK) to depreciate to an average of MK356 to USD 1 in 2013, from MK166 to USD1 prior to the introduction of a flexible exchange rate. Depreciation continued during 2014 and 2015. The exchange rate was MK 684 to USD 1 at final design (January 2016). Despite higher tobacco exports, it is expected the MK will continue to depreciate in 2016, owing to the large current-account deficit and weak investment inflows. It is also expected the MK will continue to weaken thereafter, albeit more gradually, as the current-account deficit remains wide and foreign direct investment inflows stay fairly weak.

8. For the purpose of this analysis and in consideration of the above, most of the unit cost costs have been calculated in USD in order to deal with the forecast turbulence in the foreign exchange market. The exchange rate has been set to MK 684 to USD 1 (at data collection). The Project costs are presented in both MK and USD. Conversions from current USD values into MK use the constant purchasing power parity (CPPP) exchange rates reported in Table 2.

Table 22: CPPP Rates

Exchange Rate	Up to negotiation	Up to Project start-up	2017	2018	2019	2020	2021	2022	2023
MK to US$	684	684	711	767	827	892	962	1,037	1,119

9. **Taxes and Duties.** Taxes and duties have been estimated using information provided by the Malawi Revenue Authority and the Ministry of Finance. Import duties and value added tax (VAT) are applied to costs of all transactions where appropriate. A value added tax of 16.5% is levied on all imported and locally procured goods and services. Taxes on imported vehicles also include import duties and excises, and may range between 41.5% and 96.5%. The vehicles imported under the Project (four wheel drive exceeding 3000 cc) would fall in the highest tax category, i.e. 96.5% (import duty 25%, import excise 55%, VAT 16.5%). International technical assistance does not carry any taxes while training activities are taxed at 5%. For directly recruited local staff the Project will cover the social insurance charges of 15%. All items to be imported for the Project attract custom duties of different proportions, between 0 and 30%. A flat rate of 13.5% is imposed on all equipment and materials.

10. The Government will waive the duties, excises and taxes or will finance the cost of all taxes on goods procured under the Project. Taxes and duties applied in Project costing – displayed by expenditure category – are summarized in Table 3.

Table 23: Taxes, duties and foreign exchange by expenditure category

Expenditure category	% Taxes	% Duty/Taxes	% foreign exchange
Civil works	16.5	0	50
Vehicles (3000 cc and above)	96.5	17	60
Other Equipment and Materials	30	55	20
Studies and consultancies	16.5	0	50
Training	5	0	20
Co-funding	0	0	0
Operations and maintenance	16.5	0	10
Salaries and allowances	15	0	0

Project Costs

11. **ERASP Costs.** Total ERASP costs including price and physical contingencies, duties and taxes are estimated at USD 10.6 million over the seven-year Project implementation period. Of this amount about USD 1.4 million (13% of total project costs) represents the foreign exchange content, USD 1.6 million (15%) are duties and taxes. Total base costs amount to USD 9.7 million, while physical and price contingencies are estimated to add to this amount another USD 0.3 and 0.5 million (corresponding to 3 and 5% of the base costs) respectively. Investment costs account for 90% of the base costs (and recurrent costs for remaining 10%). Project investments are organized into four components: (i) Multi-stakeholder institutional framework for integrated catchment area management; (ii) Scaling up catchment level, sustainable land management practices; (iii) Monitoring and assessment of ecosystem services, resilience and food security; and (iv) Project coordination. Funds allocated to Project management and coordination amount to about USD 0.5 million or 3% of the baseline Project costs.

12. A summary breakdown of the Project costs by component is shown in Table 4. Project summary and detailed costs are provided in Annexes 1 and 2.

Table 24: ERASP Costs Summary, by Year and by Component (including contingencies, 000 USD)

	2017	2018	2019	2020	2021	2022	2023	Total
1. Multi-stakeholder institutional framew ork for integrated catchment area management	202	735	582	240	60	55	13	1,887
2. Scaling up catchment level, sustainable land management practices	1,305	1,655	1,726	1,510	722	378	46	7,343
3. Monitoring and assessment of ecosystem services, resilience and food security	163	137	58	160	60	68	163	807
4. Project coordination unit	180	68	64	65	66	67	50	560
Total PROJECT COSTS	1,850	2,595	2,430	1,975	908	568	271	10,598

13. **PRIDE Programme Costs.** Total PRIDE Programme costs including price and physical contingencies, duties and taxes are estimated at USD 84 million over the seven-year Programme implementation (2016-2022). Of this amount about USD 23 million (27% of total project costs) represents the foreign exchange component, USD 13 million (15.9%) are duties and taxes. Total base costs amount to USD 77.1 million, while physical and price contingencies are estimated to add another USD 6.8 million (8.8% of the base costs) to this amount. Investment costs account for 86% of the base costs (and recurrent costs for remaining 14%).seven-year period (2017-2023).

14. A summary breakdown of PRIDE Programme costs by component is shown in Table 5. ERASP will be complementary to PRIDE. ERASP activities will be conducted in upper-catchment areas linked to downstream PRIDE irrigation schemes, and will therefore be integrated into PRIDE interventions related to irrigation development, catchment management and improved farming. Complementarities among the two Projects will also happen as far as Project management is concerned: there will be one Program Coordination (PCO) Unit for the two projects and the PRIDE Program Coordinator will also coordinate ERASP activities. It is noted that project management costs are largely borne by the parent loan (PRIDE): costs for Project coordination unit under ERASP have been kept to a minimum (3% of the baseline Project costs).

Table 25: PRIDE Programme Costs Summary, by Year and by Component (including contingencies, 000 USD)

	Totals Including Contingencies							
	2016	2017	2018	2019	2020	2021	2022	Total
A. Irrigation development and catchment management								
1. Land and water governance	767	316	778	317	689	339	105	3.311
2. Irrigation system development	2.241	9.929	12.463	10.766	6.268	5.471	1.021	48.159
3. Soil and water conservation	184	395	345	411	359	427	128	2.248
Subtotal	3.192	10.639	13.586	11.493	7.316	6.237	1.254	53.718
B. Agriculture for irrigation and rain-fed systems								
1. Improved agricultural practices	927	1.327	1.292	1.242	1.179	1.089	341	7.397
2. Market linkages	1.931	4.380	4.510	1.083	534	451	268	13.159
3. Mainstreaming nutrition	14	120	112	113	1	1	-	362
Subtotal	2.872	5.827	5.914	2.438	1.715	1.541	609	20.918
C. Programme management and coordination								
1. Knowledge Management, Planning and M&E	193	120	120	223	125	129	278	1.187
2. Programme coordination	1.464	1.087	1.109	1.122	1.551	1.132	663	8.127
Subtotal	1.657	1.206	1.228	1.345	1.676	1.261	941	9.314
Total PROJECT COSTS	7.721	17.673	20.729	15.277	10.706	9.040	2.805	83.950

Expenditure Categories

15. The expenditure accounts are based on the standardisation that IFAD is adopting after phasing its Loan and Grants System. The expenditure and disbursement account structure for ERASP follows the structure used for PRIDE (see Table 6).

Table 26: ERASP/PRIDE Expenditure and disbursement accounts

	Expenditure Accounts	Disbursement Accounts
Investment costs		
A	Studies and consultancies	Studies and consultancies
B	Equipment and Materials	Equipment and Materials
C	Co-funding	Co-funding
D	Training	Training
E	Vehicles	Vehicles
F	Works	Works
Recurrent costs		
A	Operation and maintenance	Operation and maintenance
B	Salaries and Allowances	Salaries and Allowances

16. A summary breakdown of the ERASP costs by expenditure category is shown in Table 7.

Table 27: ERASP Costs by Expenditure Categories

				Foreign	Base
	Local	Foreign	Total	Exchange	Costs
	(US$ '000)			%	% Total
I. Investment Costs					
A. Works	459	81	540	15	6
B. Vehicles	82	83	165	50	2
C. Equipment and Materials	2,021	359	2,380	15	24
D. Studies and consultancies	548	98	645	15	7
E. Trainings	3,778	667	4,444	15	45
F. Co-funding	43	8	50	15	1
Total Investment Costs	6,929	1,295	8,224	16	84
II. Recurrent Costs					
A. Operations and maintenance	136	-	136	-	1
B. Salaries and allowances	1,417	-	1,417	-	14
Total Recurrent Costs	1,553	-	1,553	-	16
Total BASELINE COSTS	8,482	1,295	9,777	13	100
Physical Contingencies	285	23	308	7	3
Price Contingencies	453	60	513	12	5
Total PROJECT COSTS	9,220	1,377	10,598	13	108

Project Financing

17. **ERASP Financing.** The following financiers will be contributing to the ERASP: IFAD (through a grant), GOM and beneficiaries. The IFAD grant will be made of USD 4 million from the System for Transparent Allocation of Resources (STAR) and a set-aside of USD 4 million for the IAP. As far as the STAR funds are concerned, the breakdown is USD 1.5 million from the Land degradation focal area USD 1 million from the biodiversity focal area and USD 1.5 million from the climate change focal area. This amount includes agency fees and the project preparation grant.

18. Overall the grant from IFAD (including STAR and IAP funds) will finance 67.5% of the Project costs (USD 7.15 million). The government will finance the taxes and duties (USD 1.6 million, representing 15.1% of total costs). The estimate of taxes and duties was based on the rates in effect prevailing at the time of the design. In conformity with the principle that no taxes or duties would be financed out of the proceeds of the IFAD Loan/Grant, any future changes in the rates and/or structures of taxes and duties would have to be met by GOM. Beneficiaries will contribute USD 1.8 million representing about 17.3% of Project costs: it will consist mainly of unskilled labour in kind for the establishment and maintenance of terraces, contour ridges/bounds, and small water harvesting infrastructures on hillsides; on-farm tree planting and adoption of sustainable farming practices. The proposed financing plan for ERASP is summarised in Table 8.

Table 28: ERASP Financing Plan (000 USD)

	GoM		IFAD GRANT		Beneficiaries		Total	
	Amount	%	Amount	%	Amount	%	Amount	%
1. Multi-stakeholder institutional framew ork for integrated catchment area management	285	15.1	1,602	84.9	-	-	1,887	17.8
2. Scaling up catchment level, sustainable land management practices	1,118	15.2	4,387	59.7	1,837	25.0	7,343	69.3
3. Monitoring and assessment of ecosystem services, resilience and food security	123	15.2	684	84.8	-	-	807	7.6
4. Project coordination unit	83	14.8	477	85.2	-	-	560	5.3
Total PROJECT COSTS	1,610	15.2	7,151	67.5	1,837	17.3	10,598	100.0

19. **PRIDE Programme Financing**. PRIDE is to be financed by the GOM, IFAD (loan and grant), ASAP grant through IFAD, DFID, private sector and beneficiaries. IFAD will finance 31.5% (USD 26.5 million) of the programme costs of USD 84 million as a loan to the GOM; and 31.6% (USD 26.5 million) will be an IFAD grant. ASAP will finance 8.4% (USD 7 million). The loan is on highly concessionary terms including a 40-years maturity period, a 10-years grace period; and a 0.75% annual service charge. The other 50% of the IFAD funds form a grant under the Debt Sustainability Framework (DSF). The ASAP grant is provided by IFAD outside the usual funding framework. The government will finance the taxes and duties (USD 13.2 million, representing 15.7% of total costs). The estimate of taxes and duties was based on the rates in effect prevailing at the time of the design. In conformity with the principle that no taxes or duties would be financed out of the proceeds of an IFAD Loan or Grant, any future changes in the rates and/or structures of taxes and duties would have to be met by GOM. Beneficiaries will contribute USD 7.2 million (mainly in kind) representing about 8.7% of Programme costs. The proposed financing plan for PRIDE Programme is summarised in Table 9.

Table 29: ERASP Financing Plan (000 USD)

	GoM		IFAD LOAN		IFAD GRANT		ASAP		DFID		Private sector		Beneficiaries		Total	
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
A. Irrigation development and catchment management																
1. Land and w ater governance	504	15,2	1.035	31,3	1.368	41,3	232	7,0	-	-	-	-	172	5,2	3.311	3,9
2. Irrigation system development	9.597	19,9	15.241	31,6	16.368	34,0	-	-	-	-	-	-	6.953	14,4	48.159	57,4
3. Soil and w ater conservation	426	18,9	19	0,8	-	-	1.646	73,2	-	-	-	-	157	7,0	2.248	2,7
Subtotal	10.527	19,6	16.294	30,3	17.736	33,0	1.878	3,5	-	-	-	-	7.283	13,6	53.718	64,0
B. Agriculture for irrigation and rain-fed systems																
1. Improved agricultural practices	806	10,9	1.280	17,3	600	8,1	4.711	63,7	-	-	-	-	-	-	7.397	8,8
2. Market linkages	1.081	8,2	1.699	12,9	6.881	52,3	-	-	498	3,8	3.000	22,8	-	-	13.159	15,7
3. Mainstreaming nutrition	53	14,8	-	-	35	9,7	273	75,5	-	-	-	-	-	-	362	0,4
Subtotal	1.940	9,3	2.979	14,2	7.516	35,9	4.984	23,8	498	2,4	3.000	14,3	-	-	20.918	24,9
C. Programme management and coordination																
1. Know ledge Management, Planning and M&E	152	12,8	-	-	1.036	87,2	-	-	-	-	-	-	-	-	1.187	1,4
2. Programme coordination	464	5,7	7.210	88,7	252	3,1	201	2,5	-	-	-	-	-	-	8.127	9,7
Subtotal	616	6,6	7.210	77,4	1.288	13,8	201	2,2	-	-	-	-	-	-	9.314	11,1
Total PROJECT COSTS	13.083	15,6	26.483	31,5	26.540	31,6	7.063	8,4	498	0,6	3.000	3,6	7.283	8,7	83.950	100,0

20. **PRIDE/ERASP overall financing**. Looking at the larger picture of the combined PRIDE/ERASP, overall financing amounts to 94.5 million USD. The USD million 7.1 funded by IFAD-

GEF amounts to 7.6% of the overall project cost. In addition to this, IFAD will also fund 56% of the costs (half through a highly concessionary loan and half through a grant) and 7.5% through the ASAP grant. Remaining costs will be financed by: private sector contribution (3.2%) and DFID (0.5%). The beneficiaries' contribution is estimated at 9.6%. Government funding amounts to 15.5% of the overall costs. PRIDE/ERASP financing plan is shown in Table 10.

21. GEF funding for ERASP adds volume and value to PRIDE. ERASP increases the area interested in soil and water conservation activities, upper catchment management and improved agriculture practices. Consequently, the number of targeted households has increased from 17,500 (under PRIDE) to 49,000 (under overall ERASP/PRIDE Project). GEF resources add USD 1.6 million to the development of multi-stakeholder institutional framework for integrated catchment area management, USD 4.4 million to scaling up catchment level sustainable land management practices and USD 0.7 million to support Monitoring and assessment of ecosystem services, resilience and food security. The emphasis of this GEF contribution is on resilient agro-ecological systems, and the additional resources will fund activities complementary to PRIDE interventions. The lion share of GEF funds, about USD 4.6 million, has been allocated to investments in infrastructure for soil and water conservation and to scale-up catchment level sustainable land management practices.

Table 30: PRIDE/ERASP Financing Plan (000 USD)

	GoM		IFAD LOAN		IFAD GRANT		IFAD GRANT (GEF)		ASAP		DFID		Private sector		Beneficiaries		Total	
	Amount	%	Amount	%	Amount	%		%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
PRIDE Components																		
A. Irrigation development and catchment management																		
1. Land and water governance	504	0.5	1,035	1.1	1,368	1.4	-	-	232	0.2	-	-	-	-	172	0.2	3,311	3.5
2. Irrigation system development	9,597	10.2	15,241	16.1	16,368	17.3	-	-	-	-	-	-	-	-	6,953	7.4	48,159	50.9
3. Soil and water conservation	426	0.5	19	0.0	-	-	-	-	1,646	1.7	-	-	-	-	157	0.2	2,248	2.4
B. Agriculture for irrigation and rain-fed systems		-		-		-		-		-		-		-		-		-
1. Improved agricultural practices	806	0.9	1,280	1.4	600	0.6	-	-	4,711	5.0	-	-	-	-	-	-	7,397	7.8
2. Market linkages	1,081	1.1	1,699	1.8	6,881	7.3	-	-	-	-	498	0.5	3,000	3.2	-	-	13,159	13.9
3. Mainstreaming nutrition	53	0.1	-	-	35	0.0	-	-	273	0.3	-	-	-	-	-	-	362	0.4
C. Programme management and coordination		-		-		-		-		-		-		-		-		-
1. Knowledge Management, Planning and M&E	152	0.2	-	-	1,036	1.1	-	-	-	-	-	-	-	-	-	-	1,187	1.3
2. Programme coordination	464	0.5	7,210	7.6	252	0.3	-	-	201	0.2	-	-	-	-	-	-	8,127	8.6
ERAS Components		-		-		-		-		-		-		-		-		-
1. Multi-stakeholder institutional framework for integrated catchment area management	285	0.3	-	-	-	-	1,602	1.7	-	-	-	-	-	-	-	-	1,887	2.0
2. Scaling up catchment level, sustainable land management practices	1,118	1.2	-	-	-	-	4,387	4.6	-	-	-	-	-	-	1,837	1.9	7,343	7.8
3. Monitoring and assessment of ecosystem services, resilience and food security	123	0.1	-	-	-	-	684	0.7	-	-	-	-	-	-	-	-	807	0.9
4. Project coordination unit	83	0.1	-	-	-	-	477	0.5	-	-	-	-	-	-	-	-	560	0.6
Total ERAS+PRIDE COSTS	14,692	15.5	26,483	28.0	26,540	28.1	7,151	7.6	7,063	7.5	498	0.5	3,000	3.2	9,120	9.6	94,547	100.0

22. **ERASP Sustainability**. Most ERASP costs are represented by investment costs (the ratio investment to recurrent costs is 8:1). Therefore, post project sustainability is not considered a risk. Furthermore, as this project is expected to increase the effectiveness of PRIDE investments and related improved farming and marketing of high-value crops on irrigated areas, ERASP investments should leverage more private sector investment through expanded agriculture markets.

ANNEX 1: SUMMARY COST TABLES

Table 31 Components Project Cost Summary

Republic of Malawi
Enhancing the resilience of agro-ecological systems Project
Components Project Cost Summary

	(MK Million)			(USD '000)			% Foreign	% Total Base
	Local	Foreign	Total	Local	Foreign	Total	Exchange	Costs
1. Multi-stakeholder institutional framew ork for integrated catchment area management	968	156	1,124	1,415	228	1,643	14	17
2. Scaling up catchment level, sustainable land management practices	4,107	608	4,716	6,005	890	6,894	13	71
3. Monitoring and assessment of ecosystem services, resilience and food security	445	65	510	650	95	746	13	8
4. Project coordination unit	282	56	338	412	82	494	17	5
Total BASELINE COSTS	5,802	886	6,687	8,482	1,295	9,777	13	100
Physical Contingencies	195	16	210	285	23	308	7	3
Price Contingencies	1,721	224	1,945	453	60	513	12	5
Total PROJECT COSTS	7,718	1,125	8,843	9,220	1,377	10,598	13	108

Table 32 Expenditure Accounts Project Cost Summary

Republic of Malawi
Enhancing the resilience of agro-ecological systems Project
Expenditure Accounts Project Cost Summary

	(MK Million)			(USD '000)			% Foreign Exchange	% Total Base Costs
	Local	Foreign	Total	Local	Foreign	Total		
I. Investment Costs								
A. Works	314	55	369	459	81	540	15	6
B. Vehicles	56	57	113	82	83	165	50	2
C. Equipment and Materials	1,382	245	1,628	2,021	359	2,380	15	24
D. Studies and consultancies	374	67	441	548	98	645	15	7
E. Trainings	2,584	456	3,040	3,778	667	4,444	15	45
F. Co-funding	29	5	34	43	8	50	15	1
Total Investment Costs	4,740	886	5,625	6,929	1,295	8,224	16	84
II. Recurrent Costs								
A. Operations and maintenance	93	-	93	136	-	136	-	1
B. Salaries and allowances	969	-	969	1,417	-	1,417	-	14
Total Recurrent Costs	1,062	-	1,062	1,553	-	1,553	-	16
Total BASELINE COSTS	5,802	886	6,687	8,482	1,295	9,777	13	100
Physical Contingencies	195	16	210	285	23	308	7	3
Price Contingencies	1,721	224	1,945	453	60	513	12	5
Total PROJECT COSTS	7,718	1,125	8,843	9,220	1,377	10,598	13	108

Table 183 Expenditure Accounts by Components

Republic of Malawi
Enhancing the resilience of agro-ecological systems Project
Expenditure Accounts by Components - Base Costs
(USD '000)

	Multi-stakeholder institutional framework for integrated catchment area management	Scaling up catchment level, sustainable land management practices	Monitoring and assessment of ecosystem services, resilience and food security	Project coordination unit	Total	Physical Contingencies %	Physical Contingencies Amount
I. Investment Costs							
A. Works	-	540	-	-	540	-	-
B. Vehicles	-	35	-	130	165	-	-
C. Equipment and Materials	-	2,376	-	4	2,380	-	-
D. Studies and consultancies	-	151	489	5	645	0.1	1
E. Trainings	1,519	2,779	147	-	4,444	3.4	152
F. Co-funding	-	50	-	-	50	-	-
Total Investment Costs	1,519	5,930	636	139	8,224	1.9	152
II. Recurrent Costs							
A. Operations and maintenance	-	38	-	98	136	10.0	14
B. Salaries and allowances	124	926	110	257	1,417	10.0	142
Total Recurrent Costs	124	964	110	355	1,553	10.0	155
Total BASELINE COSTS	1,643	6,894	746	494	9,777	3.1	308
Physical Contingencies	164	96	11	36	308	-	-
Price Contingencies							
Inflation							
Local	367	1,679	256	166	2,468	-	-
Foreign	11	42	6	1	60	-	-
Subtotal Inflation	378	1,721	262	167	2,528	-	-
Devaluation	-298	-1,369	-211	-137	-2,015	-	-
Subtotal Price Contingencies	80	352	51	30	513	3.4	17
Total PROJECT COSTS	1,887	7,343	807	560	10,598	3.1	325
Taxes	285	1,118	123	83	1,610	3.0	49
Foreign Exchange	261	932	102	83	1,377	1.7	24

Table 34 Project Components by Year

Republic of Malawi
Enhancing the resilience of agro-ecological systems Project
Project Components by Year -- Totals Including Contingencies
(USD '000)

	Totals Including Contingencies							
	2017	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**Total**
1. Multi-stakeholder institutional framework for integrated catchment area management	202	735	582	240	60	55	13	1,887
2. Scaling up catchment level, sustainable land management practices	1,305	1,655	1,726	1,510	722	378	46	7,343
3. Monitoring and assessment of ecosystem services, resilience and food security	163	137	58	160	60	68	163	807
4. Project coordination unit	180	68	64	65	66	67	50	560
Total PROJECT COSTS	1,850	2,595	2,430	1,975	908	568	271	10,598

Table 35 Components by Financiers

Republic of Malawi
Enhancing the resilience of agro-ecological systems Project
Components by Financiers
(USD '000)

	GoM		IFAD GRANT		Beneficiaries		Total		For.	Local (Excl.	Duties &
	Amount	**%**	**Amount**	**%**	**Amount**	**%**	**Amount**	**%**	**Exch.**	**Taxes)**	**Taxes**
1. Multi-stakeholder institutional framework for integrated catchment area management	285	15.1	1,602	84.9	-	-	1,887	17.8	261	1,341	285
2. Scaling up catchment level, sustainable land management practices	1,118	15.2	4,387	59.7	1,837	25.0	7,343	69.3	932	5,293	1,118
3. Monitoring and assessment of ecosystem services, resilience and food security	123	15.2	684	84.8	-	-	807	7.6	102	583	123
4. Project coordination unit	83	14.8	477	85.2	-	-	560	5.3	83	394	83
Total PROJECT COSTS	1,610	15.2	7,151	67.5	1,837	17.3	10,598	100.0	1,377	7,611	1,610

Table 36 Expenditure Accounts by Financiers

Republic of Malawi
Enhancing the resilience of agro-ecological systems Project
Expenditure Accounts by Financiers
(USD '000)

	GoM		IFAD GRANT		Beneficiaries		Total		For.	Local (Excl.	Duties &
	Amount	%	Amount	%	Amount	%	Amount	%	Exch.	Taxes)	Taxes
I. Investment Costs											
A. Works	85	15.0	168	29.8	312	55.3	565	5.3	85	395	85
B. Vehicles	45	26.8	122	73.2	-	-	167	1.6	84	38	45
C. Equipment and Materials	372	15.0	1,039	41.9	1,071	43.1	2,482	23.4	374	1,736	372
D. Studies and consultancies	103	15.0	584	85.0	-	-	686	6.5	104	480	103
E. Trainings	723	15.0	3,642	75.6	455	9.4	4,820	45.5	723	3,374	723
F. Co-funding	8	15.0	43	85.0	-	-	51	0.5	8	35	8
Total Investment Costs	1,335	15.2	5,598	63.8	1,837	21.0	8,771	82.8	1,377	6,058	1,335
II. Recurrent Costs											
A. Operations and maintenance	19	11.8	141	88.2	-	-	160	1.5	-	141	19
B. Salaries and allowances	255	15.3	1,412	84.7	-	-	1,667	15.7	-	1,412	255
Total Recurrent Costs	274	15.0	1,553	85.0	-	-	1,827	17.2	-	1,553	274
Total PROJECT COSTS	1,610	15.2	7,151	67.5	1,837	17.3	10,598	100.0	1,377	7,611	1,610

Table 37 Disbursement Accounts by Financiers

Republic of Malawi
Enhancing the resilience of agro-ecological systems Project
Disbursement Accounts by Financiers
(USD '000)

	GoM		IFAD GRANT		Beneficiaries		Total		For.	Local (Excl.	Duties &
	Amount	%	Amount	%	Amount	%	Amount	%	Exch.	Taxes)	Taxes
1. Works	85	15.0	168	29.8	312	55.3	565	5.3	85	395	85
2. Vehicles	45	26.8	122	73.2	-	-	167	1.6	84	38	45
3. Equipment and Materials	372	15.0	1,039	41.9	1,071	43.1	2,482	23.4	374	1,736	372
4. Studies and consultancies	103	15.0	584	85.0	-	-	686	6.5	104	480	103
5. Trainings	723	15.0	3,642	75.6	455	9.4	4,820	45.5	723	3,374	723
6. Co-funding	8	15.0	43	85.0	-	-	51	0.5	8	35	8
7. Operations and maintenance	19	11.8	141	88.2	-	-	160	1.5	-	141	19
8. Salaries and Allowances	255	15.3	1,412	84.7	-	-	1,667	15.7	-	1,412	255
Total PROJECT COSTS	1,610	15.2	7,151	67.5	1,837	17.3	10,598	100.0	1,377	7,611	1,610

Table 38 Local/Foreign/Taxes by Financiers

Republic of Malawi
Enhancing the resilience of agro-ecological systems Project
Local/Foreign/Taxes by Financiers
(USD '000)

	GoM		IFAD GRANT		Beneficiaries		Total	
	Amount	%	Amount	%	Amount	%	Amount	%
I. Foreign	-0	-	1,053	76.5	324	23.5	1,377	13.0
II. Local (Excl. Taxes)	0	-	6,098	80.1	1,513	19.9	7,611	71.8
III. Taxes	1,610	100.0	-	-	-	-	1,610	15.2
Total Project	1,610	15.2	7,151	67.5	1,837	17.3	10,598	100.0

Table 39 Project Components by Year – Investment/Recurrent costs

Republic of Malawi
Enhancing the resilience of agro-ecological systems Project
Project Components by Year -- Investment/Recurrent Costs
(USD '000)

	Totals Including Contingencies							
	2017	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**Total**
A. Multi-stakeholder institutional framework for integrated catchment area management								
Investment Costs	188	710	557	214	33	28	13	1,742
Recurrent Costs	14	25	26	26	27	27	-	146
Subtotal	202	735	582	240	60	55	13	1,887
B. Scaling up catchment level, sustainable land management practices								
Investment Costs	1,180	1,470	1,538	1,318	526	178	-	6,211
Recurrent Costs	125	185	189	192	196	200	46	1,132
Subtotal	1,305	1,655	1,726	1,510	722	378	46	7,343
C. Monitoring and assessment of ecosystem services, resilience and food security								
Investment Costs	163	116	37	138	38	45	140	677
Recurrent Costs	-	21	21	22	22	22	23	131
Subtotal	163	137	58	160	60	68	163	807
D. Project coordination unit								
Investment Costs	135	6	-	-	-	-	-	141
Recurrent Costs	44	62	64	65	66	67	50	419
Subtotal	180	68	64	65	66	67	50	560
Total PROJECT COSTS	1,850	2,595	2,430	1,975	908	568	271	10,598
Total Investment Costs	1,666	2,302	2,131	1,670	597	251	152	8,771
Total Recurrent Costs	184	293	299	305	311	317	119	1,827

Table 40 Expenditure Accounts by Years -- Totals Including Contingencies

Republic of Malawi
Enhancing the resilience of agro-ecological systems Project
Expenditure Accounts by Years -- Totals Including Contingencies
(USD '000)

	Totals Including Contingencies							
	2017	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**Total**
I. Investment Costs								
A. Works	136	139	95	96	98	-	-	565
B. Vehicles	167	-	-	-	-	-	-	167
C. Equipment and Materials	455	687	754	476	111	-	-	2,482
D. Studies and consultancies	164	121	40	152	25	45	140	686
E. Trainings	694	1,355	1,243	946	363	206	13	4,820
F. Co-funding	51	-	-	-	-	-	-	51
Total Investment Costs	1,666	2,302	2,131	1,670	597	251	152	8,771
II. Recurrent Costs								
A. Operations and maintenance	23	23	23	24	24	25	18	160
B. Salaries and allowances	161	270	275	281	287	292	101	1,667
Total Recurrent Costs	184	293	299	305	311	317	119	1,827
Total PROJECT COSTS	1,850	2,595	2,430	1,975	908	568	271	10,598

Table 41 Multi-stakeholder institutional framework for integrated catchment area management

Republic of Malawi
Enhancing the resilience of agro-ecological systems Project
Table 1. Multi-stakeholder institutional framework for integrated catchment area management

Detailed Costs	Unit	Quantities 2017	2018	2019	2020	2021	2022	2023	Total	Unit Cost (USD)	Totals Including Contingencies (USD) 2017	2018	2019	2020	2021	2022	2023	Total	Breakdown of Totals Incl. Cont. (USD) For. Exch.	Local (Excl. Taxes)	Duties & Taxes	Total	Parameters (in %) Phy. Cont. Rate	For. Exch.	Gross Tax Rate
I. Investment Costs																									
A. Watershed catchment committees (sub-catchment areas)																									
1. Community awareness campaign	session	4	10	14	14	14	10	-	66	250	1,111	2,833	4,046	4,127	4,209	3,067	-	19,392	2,909	13,574	2,909	19,392	10.0	15.0	15.0
2. Village NRM committees establishment/strengthening and development of village action plans /a	Number	4	10	14	14	14	10	-	66	1,000	4,444	11,332	16,182	16,506	16,836	12,266	-	77,567	11,635	54,297	11,635	77,567	10.0	15.0	15.0
3. Development of CAMPs (Catchment area management plans) and functional catchment committees /b	Contract	-	3	2	-	-	-	-	5	150,000	-	509,949	346,765	-	-	-	-	856,714	128,507	599,700	128,507	856,714	10.0	15.0	15.0
Subtotal											5,555	524,114	366,993	20,633	21,045	15,333	-	953,673	143,051	667,571	143,051	953,673			
B. Training of district staff																									
1. Training of district officers in catchment diagnostic, land-use planning and management /c	session	12	12	12	12	-	-	-	48	6,570	87,591	89,343	91,130	92,953	-	-	-	361,017	54,153	252,712	54,153	361,017	10.0	15.0	15.0
2. Training of EPA staff in catchment diagnostic, land-use planning and management /d	session	12	12	12	12	-	-	-	48	4,600	61,327	62,554	63,805	65,081	-	-	-	252,767	37,915	176,937	37,915	252,767	10.0	15.0	15.0
3. Development of training material	Lumpsum										22,220	22,664	23,118	23,580	-	-	-	91,582	13,737	64,107	13,737	91,582	10.0	15.0	15.0
4. Technical exchange session for district staff /e	Workshop	1	1	1	1	1	1	1	7	10,000	11,110	11,332	11,559	11,790	12,026	12,266	12,512	82,595	12,389	57,816	12,389	82,595	10.0	15.0	15.0
Subtotal											182,248	185,893	189,611	193,404	12,026	12,266	12,512	787,960	118,194	551,572	118,194	787,960			
Total Investment Costs											187,803	710,008	556,605	214,036	33,071	27,599	12,512	1,741,634	261,245	1,219,144	261,245	1,741,634			
II. Recurrent Costs																									
A. Allowances for Water Resource Officers	Person year	1.5	3	3	3	3	3	-	16.5	6,140	10,232	20,874	21,291	21,717	22,152	22,595	-	118,861	-	99,249	19,612	118,861	10.0	0.0	16.5
B. Allowances for central government technical staff monitoring the process /f	Person year	0.625	0.625	0.625	0.625	0.625	0.625	-	3.75	6,140	4,263	4,349	4,436	4,524	4,615	4,707	-	26,894	-	22,457	4,438	26,894	10.0	0.0	16.5
Total Recurrent Costs											14,496	25,223	25,727	26,242	26,766	27,302	-	145,755	-	121,706	24,050	145,755			
Total											202,299	735,230	582,332	240,278	59,837	54,901	12,512	1,887,389	261,245	1,340,849	285,295	1,887,389			

\a It includes facilitation of (sub)committee formation sessions, technical trainings (management, finance, land, water management)
\b It implies the development of a plan in each catchment area. A contract will be stipulated with a service provider.
\c Each session involves: 2 days, 6 district officers, 3 districts. Costs include transport and accommodation
\d Each session involves: 2 days, 12 EPA officers, 3 districts. Costs include transport and accommodation
\e Including field visits for involved district level staff
\f Computed for 6 weeks of staff time per year, for 5 officers

Republic of Malawi
Enhancing the resilience of agro-ecological systems Project
Table 1. Multi-stakeholder institutional framework for integrated catchment area management

Detailed Costs	Summary Divisions Component	Expenditure Account	Other Accounts Disb. Acct.	Fin. Rule	Proc. Acct.	Proc. Method	Expenditures by Financiers (USD) GoM 2017	2018	2019	2020	2021	2022	2023	Total	IFAD GRANT 2017	2018	2019	2020	2021	2022	2023	Total
I. Investment Costs																						
A. Watershed catchment committees (sub-catchment areas)																						
1. Community awareness campaign	INSTITUTIONAL_FRAME	TRAININGS_EA	TRAININGS_DA	IFAD_GRANT (100%)	TRAININGS_PA	DIR_CONTRACT_PM (100%)	167	425	607	619	631	460	-	2,909	944	2,408	3,439	3,508	3,578	2,607	-	16,483
2. Village NRM committees establishment/strengthening and development of village action plans /a	INSTITUTIONAL_FRAME	TRAININGS_EA	TRAININGS_DA	IFAD_GRANT (100%)	TRAININGS_PA	DIR_CONTRACT_PM (100%)	667	1,700	2,427	2,476	2,525	1,840	-	11,635	3,777	9,632	13,755	14,030	14,311	10,426	-	65,932
3. Development of CAMPs (Catchment area management plans) and functional catchment committees /b	INSTITUTIONAL_FRAME	TRAININGS_EA	TRAININGS_DA	IFAD_GRANT (100%)	TRAININGS_PA	DIR_CONTRACT_PM (100%)	-	76,492	52,015	-	-	-	-	128,507	-	433,457	294,751	-	-	-	-	728,207
Subtotal							833	78,617	55,049	3,095	3,157	2,300	-	143,051	4,722	445,497	311,944	17,538	17,888	13,033	-	810,622
B. Training of district staff																						
1. Training of district officers in catchment diagnostic, land-use planning and management /c	INSTITUTIONAL_FRAME	TRAININGS_EA	TRAININGS_DA	IFAD_GRANT (100%)	TRAININGS_PA	DIR_CONTRACT_PM (100%)	13,139	13,401	13,669	13,943	-	-	-	54,153	74,453	75,942	77,460	79,010	-	-	-	306,864
2. Training of EPA staff in catchment diagnostic, land-use planning and management /d	INSTITUTIONAL_FRAME	TRAININGS_EA	TRAININGS_DA	IFAD_GRANT (100%)	TRAININGS_PA	DIR_CONTRACT_PM (100%)	9,199	9,383	9,571	9,762	-	-	-	37,915	52,128	53,171	54,234	55,319	-	-	-	214,852
3. Development of training material	INSTITUTIONAL_FRAME	TRAININGS_EA	TRAININGS_DA	IFAD_GRANT (100%)	TRAININGS_PA	DIR_CONTRACT_PM (100%)	3,333	3,400	3,468	3,537	-	-	-	13,737	18,887	19,265	19,650	20,043	-	-	-	77,845
4. Technical exchange session for district staff /e	INSTITUTIONAL_FRAME	TRAININGS_EA	TRAININGS_DA	IFAD_GRANT (100%)	TRAININGS_PA	DIR_CONTRACT_PM (100%)	1,667	1,700	1,734	1,769	1,804	1,840	1,877	12,389	9,444	9,632	9,825	10,022	10,222	10,426	10,635	70,206
Subtotal							27,337	27,884	28,442	29,011	1,804	1,840	1,877	118,194	154,911	158,009	161,170	164,393	10,222	10,426	10,635	669,766
Total Investment Costs							28,171	106,501	83,491	32,105	4,961	4,140	1,877	261,245	159,633	603,507	473,114	181,931	28,110	23,459	10,635	1,480,389
II. Recurrent Costs																						
A. Allowances for Water Resource Officers	INSTITUTIONAL_FRAME	SALARIES_&_ALLOWANCES_EA	SALARIES_&_ALLOWANCES_DA	IFAD_GRANT (100%)	SALARIES_&_ALLOWANCES_PA	DIR_CONTRACT_PM (100%)	1,688	3,444	3,513	3,583	3,655	3,728	-	19,612	8,544	17,430	17,778	18,134	18,497	18,866	-	99,249
B. Allowances for central government technical staff monitoring the process /f	INSTITUTIONAL_FRAME	SALARIES_&_ALLOWANCES_EA	SALARIES_&_ALLOWANCES_DA	IFAD_GRANT (100%)	SALARIES_&_ALLOWANCES_PA	DIR_CONTRACT_PM (100%)	703	718	732	747	761	777	-	4,438	3,560	3,631	3,704	3,778	3,853	3,931	-	22,457
Total Recurrent Costs							2,392	4,162	4,245	4,330	4,416	4,505	-	24,050	12,104	21,061	21,482	21,912	22,350	22,797	-	121,706
Total							30,562	110,663	87,736	36,435	9,377	8,645	1,877	285,295	171,737	624,567	494,596	203,842	50,460	46,256	10,635	1,602,094

\a It includes facilitation of (sub)committee formation sessions, technical trainings (management, finance, land, water management)
\b It implies the development of a plan in each catchment area. A contract will be stipulated with a service provider.
\c Each session involves: 2 days, 6 district officers, 3 districts. Costs include transport and accommodation
\d Each session involves: 2 days, 12 EPA officers, 3 districts. Costs include transport and accommodation
\e Including field visits for involved district level staff
\f Computed for 6 weeks of staff time per year, for 5 officers

Table 42 Scaling up catchment level, sustainable land management practices

Republic of Malawi
Enhancing the resilience of agro-ecological systems Project
Table 2. Scaling up catchment level, sustainable land management practices
Detailed Costs

	Unit	Quantities								Unit Cost (USD)	Totals Including Contingencies (USD)								Breakdown of Totals Incl. Cont. (USD)				Parameters (in %)		
		2017	2018	2019	2020	2021	2022	2023	Total		2017	2018	2019	2020	2021	2022	2023	Total	For. Exch.	Local (Excl. Taxes)	Duties & Taxes	Total	Phy. Cont. Rate	For. Exch.	Gross Tax Rate
I. Investment Costs																									
A. Reforestation and natural regeneration of vegetation cover																									
1. Training of Village NRM Committees in tree nurseries and SPM/a	Session	10	10	10	10	-	-	-	40	2,000	20,200	20,604	21,016	21,436	-	-	-	83,256	12,488	58,280	12,488	83,256	0.0	15.0	15.0
2. Development of community forest management plans for w oodlots and forest conservation areas /b	Plan	5	5	5	5	-	-	-	20	2,000	10,100	10,302	10,508	10,718	-	-	-	41,628	6,244	29,140	6,244	41,628	0.0	15.0	15.0
3. Establishment of Community nurseries /c	Unit	5	5	5	5	-	-	-	20	3,000	15,150	15,453	15,762	16,077	-	-	-	62,442	9,366	43,710	9,366	62,442	0.0	15.0	15.0
4. Input packages for Community nurseries	Unit	5	5	5	5	-	-	-	20	1,200	6,060	6,181	6,305	6,431	-	-	-	24,977	3,747	17,484	3,747	24,977	0.0	15.0	15.0
5. Tree planting and management on communal areas /d	Ha	50	100	100	50	-	-	-	300	5,000	252,500	515,100	525,402	267,955	-	-	-	1,560,957	234,144	1,092,670	234,144	1,560,957	0.0	15.0	15.0
Subtotal											304,010	567,640	578,993	322,618	-	-	-	1,773,261	265,989	1,241,283	265,989	1,773,261			
B. Sustainable energy sources																									
1. Conduct demonstrations and training in the building of cook stoves /e	Session	15	15	15	-	-	-	-	45	350	5,303	5,409	5,517	-	-	-	-	16,228	2,434	11,359	2,434	16,228	0.0	15.0	15.0
2. Conduct trainings and aw areness campaigns for the use of cook stoves /f	Session	15	15	15	-	-	-	-	45	350	5,303	5,409	5,517	-	-	-	-	16,228	2,434	11,359	2,434	16,228	0.0	15.0	15.0
3. Provision of Cookstove material /g	Household	2,500	2,500	2,500	2,500	1,320	-	-	11,320	5	12,625	12,878	13,135	13,398	7,215	-	-	59,251	8,888	41,476	8,888	59,251	0.0	15.0	15.0
4. Building of efficient kilns	Unit	1	1	1	-	-	-	-	3	8,000	8,080	8,242	8,406	-	-	-	-	24,728	3,709	17,310	3,709	24,728	0.0	15.0	15.0
5. Alternative energy sources challenge fund	Lumpsum										50,500	-	-	-	-	-	-	50,500	7,575	35,350	7,575	50,500	0.0	15.0	15.0
Subtotal											81,810	31,936	32,575	13,398	7,215	-	-	166,934	25,040	116,854	25,040	166,934			
C. Conservation on slopes - contour ridges/bounds and other measures																									
1. Training of Village NRM Committees in practices for soil and w ater conservation in hillside farming /h	Session	5	5	5	5	-	-	-	20	2,000	10,100	10,302	10,508	10,718	-	-	-	41,628	6,244	29,140	6,244	41,628	0.0	15.0	15.0
2. Establishment and maintenance of terraces, contour ridges/bounds, small w ater harvesting infrastructures on hillsides	Ha	1,500	1,500	1,000	1,000	1,000	-	-	6,000	90	136,350	139,077	94,572	96,464	98,393	-	-	564,856	84,728	395,399	84,728	564,856	0.0	15.0	15.0
3. Inputs for establishment of demonstration sites /i	Ha	50	100	150	150	-	-	-	450	10	505	1,030	1,576	1,608	-	-	-	4,719	708	3,303	708	4,719	0.0	15.0	15.0
Subtotal											146,955	150,409	106,657	108,790	98,393	-	-	611,204	91,681	427,843	91,681	611,204			
D. Non timber forest products (NTFP)																									
1. Training of Village NRM Committees in technical issues related to NTFP (honey, etc.), business planning and linkages to market /j	Session	4	4	4	4	-	-	-	16	2,000	8,080	8,242	8,406	8,575	-	-	-	33,303	4,995	23,312	4,995	33,303	0.0	15.0	15.0
2. Training of youth in making inputs for NTFP production such as beehives	Session	2	2	2	2	-	-	-	8	2,000	4,040	4,121	4,203	4,287	-	-	-	16,651	2,498	11,656	2,498	16,651	0.0	15.0	15.0
3. Inputs and small equipment for producer groups	Household	150	150	150	150	256	-	-	856	150	22,725	23,180	23,643	24,116	41,981	-	-	135,645	20,347	94,951	20,347	135,645	0.0	15.0	15.0
Subtotal											34,845	35,542	36,253	36,978	41,981	-	-	185,598	27,840	129,919	27,840	185,598			
E. SLM practices in farmers fields (CA, water harvesting, integrated soil fertility management, agroforestry)																									
1. Training of lead farmers and follow er farmers in SLM practices in farmers fields through FFS	Session	100	100	100	100	-	-	-	400	2,000	202,000	206,040	210,161	214,364	-	-	-	832,565	124,885	582,795	124,885	832,565	0.0	15.0	15.0
2. Applying SLM practices in farmers fields	Ha	1,000	1,500	1,500	1,500	800	-	-	6,300	150	151,500	231,795	236,431	241,160	131,191	-	-	992,076	148,811	694,453	148,811	992,076	0.0	15.0	15.0
3. Input packages for lead farmers' demonstrations /k	Site	100	100	100	100	-	-	-	400	220	22,220	22,664	23,118	23,580	-	-	-	91,582	13,737	64,107	13,737	91,582	0.0	15.0	15.0
4. On-farm tree planting /l	Household	1,000	1,500	2,000	1,500	910	-	-	6,910	30	30,300	46,359	63,048	48,232	29,846	-	-	217,785	32,668	152,450	32,668	217,785	0.0	15.0	15.0
Subtotal											406,020	506,858	532,758	527,335	161,037	-	-	2,134,008	320,101	1,493,806	320,101	2,134,008			
F. Agrobiodiversity																									
1. Collection of threatened indigenous varieties for safety keeping at the national gene bank and characterisation of germplasm	Lumpsum										35,350	-	-	-	-	-	-	35,350	5,303	24,745	5,303	35,350	0.0	15.0	15.0
2. Training of frontline extension staff in all issued related to enhanced use of agrobiodiversity	Site	5	5	-	-	-	-	-	10	1,500	7,575	7,727	-	-	-	-	-	15,302	2,295	10,711	2,295	15,302	0.0	15.0	15.0
3. Training of farmer groups in nutrition and resilience benefits of indigenous crops, seed selection and multiplication and operation of community seed banks.	Session	5	5	5	5	-	-	-	20	1,500	7,575	7,727	7,881	8,039	-	-	-	31,221	4,683	21,855	4,683	31,221	0.0	15.0	15.0
4. Equipment for establishing community seed banks	Site	-	-	5	5	-	-	-	10	5,000	-	-	26,270	26,796	-	-	-	53,066	7,960	37,146	7,960	53,066	0.0	15.0	15.0
5. Inputs for seed multiplication	Group	-	-	5	5	-	-	-	10	2,000	-	-	10,508	10,718	-	-	-	21,226	3,184	14,858	3,184	21,226	0.0	15.0	15.0
6. Participatory variety selection and research	Group	-	5	5	-	-	-	-	10	2,000	-	10,302	10,508	-	-	-	-	20,810	3,122	14,567	3,122	20,810	0.0	15.0	15.0
7. Short term training of scientists and technicians	Lumpsum										15,150	-	-	-	-	-	-	15,150	2,273	10,605	2,273	15,150	0.0	15.0	15.0
8. Equipment for storage of duplicate samples in the national gene bank of varieties in community seed banks	Lumpsum										25,250	-	-	-	-	-	-	25,250	3,788	17,675	3,788	25,250	0.0	15.0	15.0
9. Computers and other accessories	Lumpsum										10,100	-	-	-	-	-	-	10,100	1,515	7,070	1,515	10,100	0.0	15.0	15.0
10. Consumable items for supporting the subcomponent	Lumpsum										10,100	-	-	-	-	-	-	10,100	1,515	7,070	1,515	10,100	0.0	15.0	15.0
11. Communication services	Lumpsum										15,150	-	-	-	-	-	-	15,150	2,273	10,605	2,273	15,150	0.0	15.0	15.0
12. Compilation and demonstration of recipes using target indigenous crops	Site	-	-	5	5	-	-	-	10	1,500	-	-	7,881	8,039	-	-	-	15,920	2,388	11,144	2,388	15,920	0.0	15.0	15.0
13. Nutritional studies of the selected crops and varieties	Study	-	-	1	1	-	-	-	2	7,500	-	-	7,881	8,039	-	-	-	15,920	2,388	11,144	2,388	15,920	0.0	15.0	15.0
14. Development of training and awareness material on recommended seed selection and multiplication, community seed bank and prod.practices for farmers and w ider public /m	Lumpsum										-	-	-	21,436	-	-	-	21,436	3,215	15,005	3,215	21,436	0.0	15.0	15.0
15. Demonstrations, exchange visits, public seminars and w orkshop for policy makers	Lumpsum										-	-	-	10,718	10,933	-	-	21,651	3,248	15,156	3,248	21,651	0.0	15.0	15.0
Subtotal											126,250	25,755	70,929	93,784	10,933	-	-	327,651	49,148	229,356	49,148	327,651			
G. Livestock activities																									
1. Training of VNRMCs in livestock management and disease control /n	Session	5	5	5	-	-	-	-	15	2,000	10,100	10,302	10,508	-	-	-	-	30,910	4,637	21,637	4,637	30,910	0.0	15.0	15.0
2. Establishment of livestock pass-on system for goats /o	Set	50	50	50	50	25	-	-	225	190	9,595	9,787	9,983	10,182	5,193	-	-	44,740	6,711	31,318	6,711	44,740	0.0	15.0	15.0
3. Establishment of livestock pass-on system for chicken /p	Set	50	50	50	50	25	-	-	225	50	2,525	2,576	2,627	2,680	1,367	-	-	11,774	1,766	8,242	1,766	11,774	0.0	15.0	15.0
Subtotal											22,220	22,664	23,118	12,862	6,560	-	-	87,423	13,114	61,196	13,114	87,423			
H. Cross-cutting catchment level activities																									
1. Meteorological forecasts integrated into farm planning methoddologies	Study	-	1	-	-	-	-	-	1	11,000	-	11,332	-	-	-	-	-	11,332	1,700	7,933	1,700	11,332	0.0	15.0	15.0
2. Training for extension w orkers in adjustment of crop planning to metereological forecasts	Lumpsum										-	6,181	-	-	-	-	-	6,181	927	4,327	927	6,181	0.0	15.0	15.0
3. Strenghten community climate information/dissemination	District	-	1	1	1	-	-	-	3	6,000	-	6,181	6,305	6,431	-	-	-	18,917	2,838	13,242	2,838	18,917	0.0	15.0	15.0
4. Farmer to farmer extension netw ork, establishment and scaling-up /q	Session	-	50	75	100	100	100	-	425	1,600	-	82,416	126,096	171,491	174,921	178,419	-	733,344	110,002	513,341	110,002	733,344	0.0	15.0	15.0
5. Solar panels for extension w orkers' houses	Unit	6	6	6	6	6	-	-	30	3,000	18,180	18,544	18,914	19,293	19,679	-	-	94,609	14,191	66,227	14,191	94,609	0.0	15.0	15.0
6. Tablets for extension w orkers	Unit	6	6	6	6	6	-	-	30	800	4,848	4,945	5,044	5,145	5,248	-	-	25,229	3,784	17,660	3,784	25,229	0.0	15.0	15.0
7. Motorcycles for extension services /r	Unit	10	-	-	-	-	-	-	10	3,500	35,350	-	-	-	-	-	-	35,350	5,303	24,745	5,303	35,350	0.0	15.0	15.0
Subtotal											58,378	129,599	156,360	202,360	199,847	178,419	-	924,963	138,744	647,474	138,744	924,963			
Total Investment Costs											1,180,488	1,470,404	1,537,641	1,318,124	525,966	178,419	-	6,211,043	931,657	4,347,730	931,657	6,211,043			
II. Recurrent Costs																									
A. Allow ances for District Land Officer /s	Person day	0.75	1.5	1.5	1.5	1.5	1.5	-	8.25	6,140	5,116	10,437	10,646	10,859	11,076	11,297	-	59,430	-	49,624	9,806	59,430	10.0	0.0	16.5
B. Allow ances for District Agriculture Officer /t	Person day	0.75	1.5	1.5	1.5	1.5	1.5	-	8.25	6,140	5,116	10,437	10,646	10,859	11,076	11,297	-	59,430	-	49,624	9,806	59,430	10.0	0.0	16.5
C. Allow ances for District Forest Officer /u	Person day	0.75	1.5	1.5	1.5	1.5	1.5	-	8.25	6,140	5,116	10,437	10,646	10,859	11,076	11,297	-	59,430	-	49,624	9,806	59,430	10.0	0.0	16.5
D. Allow ances for District Livestock Officer /v	Person day	0.1	0.2	0.2	0.2	0.2	0.2	-	1.1	6,140	682	1,392	1,419	1,448	1,477	1,506	-	7,924	-	6,617	1,307	7,924	10.0	0.0	16.5
E. Farmer to farmer extension netw ork facilitators	Person day	22	22	22	22	22	22	-	132	2,496	61,007	62,227	63,472	64,741	66,036	67,357	-	384,841	-	321,342	63,499	384,841	10.0	0.0	16.5
F. Environmental Experts at regional level, North and South (PCO Unit)	Person year	1	2	2	2	2	2	1	12	36,516	40,569	82,761	84,417	86,105	87,827	89,584	45,688	516,950	-	431,653	85,297	516,950	10.0	0.0	16.5
G. Motorcycles (O&M) /w	Unit	10	10	10	10	10	10	-	60	630	6,999	7,139	7,282	7,428	7,576	7,728	-	44,152	-	36,867	7,285	44,152	10.0	0.0	16.5
Total Recurrent Costs											124,606	184,830	188,527	192,298	196,144	200,066	45,688	1,132,159	-	945,353	186,806	1,132,159			
Total											1,305,094	1,655,235	1,726,169	1,510,422	722,109	378,486	45,688	7,343,203	931,657	5,293,083	1,118,463	7,343,203			

\a It includes: fuel, stationery, refreshments, hall hire, allow ances for 5 ext w orkers, 4 facilitators, 25 participants for 5 days. One session covers one Village NRM Committee.
\b It includes: fuel, stationery, refreshments, hall hire, allow ances for 5 ext w orkers, 4 facilitators, 25 participants for 5 days
\c It includes: seeds, Polyethilene tube, w atering cans, fencing, w hiebarros,shovels,hoes,penga knives, slashers.
\d It includes fuel and allow ances for 10 district staff and 10 extension w orkers for 10 days
\e It involves 3 sessions for each Catchment area
\f It involves 3 sessions for each Catchment area
\g It includes: rings provided by the project; additional material (e.g. bricks) and labour provided by the beneficiaries)
\h It includes fuel and lunch allow ances for 5 district staff and 5 extension w orkers for 10 field days. One session covers one Village NRM Committee.
\i It includes 1 pick, 20 line-levels
\j It includes fuel and lunch allow ances for 5 district staff and 5 extension w orkers for 10 field days. One session covers one Village NRM Committee.
\k per lead farmer at least: fertilizer (min. 2 bags), drought tolerant seed (2 bag), small tools
\l Unit cost is based on an estimated number of 30 trees scattered per farm. It includes: provision of tree seedling, transport and labour (planting and management) and input costs (set at 0.8 $/tree)
\m It w ill cover three Districts. It includes: leaflets, new sletter, radio and video messages, publication of research results etc.
\n It includes: fuel, stationery, refreshments, hall hire, allow ances for 5 ext w orkers, 4 facilitators, 25 participants for 5 days. One session covers one Village NRM Committee.
\o A set includes 5 goats. Activity w ill involve: 1 set/HH, 15 HHs/village, 15 villages
\p A set includes 9 hens and 1 cosck. Activity w ill involve: 1 set/HH, 15 HHs/village, 15 villages
\q 1 session per farmer group (25 farmers) per year, 100% intensity support
\r 2 motorcycles for each catchment area
\s One in each district. Part-time (50% staff time). It includes DSA & travel.
\t One in each district. Part-time (50% staff time). It includes DSA & travel.
\u One in each district. Part-time (50% staff time). It includes DSA & travel.
\v One in each district. Part-time (20% staff time). It includes DSA & travel.
\w Unit cost is based on the assumption of 18% of purchase price of about $3,000). It is further assumed that a total of 5 vehicles w ill be operational at anyone year during project

Republic of Malawi
Enhancing the resilience of agro-ecological systems Project
Table 2: Scaling up catchment level, sustainable land management practices

Detailed Costs	Summary Divisions		Other Accounts				Expenditures by financiers (USD)																			
	Component	Expenditure Account	Debi. Acct.	Pin. Rule	Proc. Acct.	Proc. Method	GoM								IFAD GRANT							Beneficiaries					
							2017	2018	2019	2020	2021	2022	2023	Total	2017	2018	2019	2020	2021	2022	2023	Total	2017	2018	2019	2020	2021	2022	2023	Total
I. Investment Costs																												
A. Reforestation and natural regeneration of vegetation cover																												
1. Training of Village NRM Committees in tree nurseries and SFM /a	SCALING_UP_PRACTICES	TRAININGS_EA	TRAININGS_DA		IFAD_GRANT (100%)	TRAININGS_PA	DIR_CONTRACT_PM (100%)	3,030	3,091	3,152	3,215	-	-	-	12,488	17,170	17,513	17,864	18,221	-	-	-	70,768	-	-	-	-	-	-	-
2. Development of community forest management plans for woodlots and forest conservation areas /b	SCALING_UP_PRACTICES	TRAININGS_EA	TRAININGS_DA		IFAD_GRANT (70%), BENEFICIARIES (30%)	TRAININGS_PA	DIR_CONTRACT_PM (100%)	1,515	1,545	1,576	1,608	-	-	-	6,244	6,010	6,130	6,252	6,377	-	-	-	24,769	2,576	2,627	2,680	2,733	-	-	-	10,615
3. Establishment of Community nurseries /c	SCALING_UP_PRACTICES	EQUIPMENT_AND_MATERIALS_EA	EQUIPMENT_&_MATERIALS_DA		IFAD_GRANT (70%), BENEFICIARIES (30%)	EQUIPMENT_&_MATERIALS_PA	NCB_PM (80%), INTL_SHOPPING_PM (20%)	2,273	2,318	2,364	2,412	-	-	-	9,366	9,014	9,195	9,378	9,566	-	-	-	37,153	3,863	3,941	4,019	4,100	-	-	-	15,923
4. Input packages for Community nurseries	SCALING_UP_PRACTICES	EQUIPMENT_AND_MATERIALS_EA	EQUIPMENT_&_MATERIALS_DA		IFAD_GRANT (100%)	EQUIPMENT_&_MATERIALS_PA	NCB_PM (80%), INTL_SHOPPING_PM (20%)	909	927	946	965	-	-	-	3,747	5,151	5,254	5,359	5,466	-	-	-	21,230	-	-	-	-	-	-	-	-
5. Tree planting and management on communal areas /d	SCALING_UP_PRACTICES	EQUIPMENT_AND_MATERIALS_EA	EQUIPMENT_&_MATERIALS_DA		IFAD_GRANT (30%), BENEFICIARIES (70%)	EQUIPMENT_&_MATERIALS_PA	NCB_PM (80%), INTL_SHOPPING_PM (20%)	37,875	77,295	78,810	40,193	-	-	-	234,144	64,398	131,351	133,978	69,329	-	-	-	398,044	150,238	306,485	312,614	159,433	-	-	-	928,769
Subtotal								45,602	85,146	86,849	48,393	-	-	-	265,989	101,732	169,442	172,831	107,959	-	-	-	551,964	156,676	313,052	319,313	166,266	-	-	-	955,307
B. Sustainable energy sources																												
1. Conduct demonstrations and training in the building of cook stoves /e	SCALING_UP_PRACTICES	TRAININGS_EA	TRAININGS_DA		IFAD_GRANT (70%), BENEFICIARIES (30%)	TRAININGS_PA	DIR_CONTRACT_PM (100%)	795	811	828	-	-	-	-	2,434	3,155	3,218	3,282	-	-	-	9,656	1,352	1,379	1,407	-	-	-	-	4,138
2. Conduct trainings and awareness campaigns for the use of cook stoves /f	SCALING_UP_PRACTICES	TRAININGS_EA	TRAININGS_DA		IFAD_GRANT (100%)	TRAININGS_PA	DIR_CONTRACT_PM (100%)	795	811	828	-	-	-	-	2,434	4,507	4,597	4,689	-	-	-	-	13,794	-	-	-	-	-	-	-	-
3. Provision of Cookstove material /g	SCALING_UP_PRACTICES	EQUIPMENT_AND_MATERIALS_EA	EQUIPMENT_&_MATERIALS_DA		IFAD_GRANT (70%), BENEFICIARIES (30%)	EQUIPMENT_&_MATERIALS_PA	NCB_PM (80%), INTL_SHOPPING_PM (20%)	1,894	1,932	1,970	2,010	1,082	-	-	8,888	7,512	7,662	7,815	7,972	4,293	-	-	35,254	3,219	3,284	3,349	3,416	1,840	-	-	15,109
4. Building of efficient kilns	SCALING_UP_PRACTICES	EQUIPMENT_AND_MATERIALS_EA	EQUIPMENT_&_MATERIALS_DA		IFAD_GRANT (70%), BENEFICIARIES (30%)	EQUIPMENT_&_MATERIALS_PA	NCB_PM (80%), INTL_SHOPPING_PM (20%)	1,212	1,236	1,261	-	-	-	-	3,709	4,808	4,904	5,002	-	-	-	14,713	2,060	2,102	2,144	-	-	-	-	6,306
5. Alternative energy sources challenge fund	SCALING_UP_PRACTICES	CO/UNDING_EA	CO/UNDING_DA		IFAD_GRANT (100%)	TRAININGS_PA	DIR_CONTRACT_PM (100%)	7,575	-	-	-	-	-	-	7,575	42,925	-	-	-	-	-	-	42,925	-	-	-	-	-	-	-	-
Subtotal								12,272	4,790	4,886	2,010	1,082	-	-	25,040	62,907	20,381	20,769	7,972	4,293	-	-	116,342	6,632	6,765	6,900	3,416	1,840	-	-	25,553
C. Conservation on slopes - contour ridges/bounds and other measures																												
1. Training of Village NRM Committees in practices for soil and water conservation in hillside farming /h	SCALING_UP_PRACTICES	TRAININGS_EA	TRAININGS_DA		IFAD_GRANT (100%)	TRAININGS_PA	DIR_CONTRACT_PM (100%)	1,515	1,545	1,576	1,608	-	-	-	6,244	8,585	8,757	8,932	9,110	-	-	-	35,384	-	-	-	-	-	-	-	-
2. Establishment and maintenance of terraces, contour ridges/bounds, small water harvesting infrastructures on hillsides	SCALING_UP_PRACTICES	WORKS_EA	WORKS_DA		BENEFICIARIES (65%) , IFAD_GRANT (35%)	WORKS_PA	DPN_PM (100%)	20,453	20,862	14,186	14,470	14,759	-	-	84,728	40,564	41,375	28,135	28,698	29,272	-	-	168,045	75,333	76,840	52,251	53,296	54,362	-	-	312,083
3. Inputs for establishment of demonstration sites /i	SCALING_UP_PRACTICES	EQUIPMENT_AND_MATERIALS_EA	EQUIPMENT_&_MATERIALS_DA		IFAD_GRANT (100%)	EQUIPMENT_&_MATERIALS_PA	NCB_PM (80%), INTL_SHOPPING_PM (20%)	76	155	236	241	-	-	-	708	429	876	1,340	1,267	-	-	-	4,011	-	-	-	-	-	-	-	-
Subtotal								22,043	22,561	15,998	16,318	14,759	-	-	91,681	49,578	51,008	38,407	39,175	29,272	-	-	207,440	75,333	76,840	52,251	53,296	54,362	-	-	312,083
D. Non timber forest products (NTFP)																												
1. Training of Village NRM Committees in technical issues related to NTFP (honey, etc.), business planning and linkages to market /j	SCALING_UP_PRACTICES	TRAININGS_EA	TRAININGS_DA		IFAD_GRANT (100%)	TRAININGS_PA	DIR_CONTRACT_PM (100%)	1,212	1,236	1,261	1,286	-	-	-	4,995	6,868	7,005	7,145	7,288	-	-	-	28,307	-	-	-	-	-	-	-	-
2. Training of youth in making inputs for NTFP production such as beehives	SCALING_UP_PRACTICES	TRAININGS_EA	TRAININGS_DA		IFAD_GRANT (100%)	TRAININGS_PA	DIR_CONTRACT_PM (100%)	656	618	630	643	-	-	-	2,498	3,434	3,503	3,573	3,644	-	-	-	14,154	-	-	-	-	-	-	-	-
3. Inputs and small equipment for producer groups	SCALING_UP_PRACTICES	EQUIPMENT_AND_MATERIALS_EA	EQUIPMENT_&_MATERIALS_DA		IFAD_GRANT (70%), BENEFICIARIES (30%)	EQUIPMENT_&_MATERIALS_PA	NCB_PM (80%), INTL_SHOPPING_PM (20%)	3,409	3,477	3,546	3,617	6,297	-	-	20,347	13,521	13,792	14,068	14,349	24,979	-	-	80,709	5,795	5,911	6,029	6,150	10,705	-	-	34,589
Subtotal								5,277	5,331	5,438	5,547	6,297	-	-	27,840	23,823	24,300	24,786	25,282	24,979	-	-	123,169	5,795	5,911	6,029	6,150	10,705	-	-	34,589
E. SLM practices in farmers fields (CA, water harvesting, integrated soil fertility management, agroforestry)																												
1. Training of lead farmers and follow-er farmers in SLM practices in farmers fields through FFS	SCALING_UP_PRACTICES	TRAININGS_EA	TRAININGS_DA		IFAD_GRANT (100%)	TRAININGS_PA	DIR_CONTRACT_PM (100%)	30,300	30,906	31,524	32,155	-	-	-	124,885	171,700	175,134	178,637	182,209	-	-	-	707,680	-	-	-	-	-	-	-	-
2. Applying SLM practices in farmers fields	SCALING_UP_PRACTICES	TRAININGS_EA	TRAININGS_DA		IFAD_GRANT (70%), BENEFICIARIES (30%)	TRAININGS_PA	DIR_CONTRACT_PM (100%)	22,725	34,769	35,465	36,174	19,679	-	-	148,811	90,143	137,918	140,676	143,490	78,059	-	-	590,285	38,633	59,108	60,290	61,496	33,454	-	-	252,979
3. Input packages for lead farmers' demonstrations /k	SCALING_UP_PRACTICES	EQUIPMENT_AND_MATERIALS_EA	EQUIPMENT_&_MATERIALS_DA		IFAD_GRANT (100%)	EQUIPMENT_&_MATERIALS_PA	NCB_PM (80%), INTL_SHOPPING_PM (20%)	3,333	3,400	3,468	3,537	-	-	-	13,737	18,887	19,265	19,650	20,043	-	-	-	77,845	-	-	-	-	-	-	-	-
4. On-farm tree planting /l	SCALING_UP_PRACTICES	EQUIPMENT_AND_MATERIALS_EA	EQUIPMENT_&_MATERIALS_DA		IFAD_GRANT (70%), BENEFICIARIES (30%)	EQUIPMENT_&_MATERIALS_PA	NCB_PM (80%), INTL_SHOPPING_PM (20%)	4,545	6,954	9,457	7,295	4,477	-	-	32,668	18,029	27,584	37,514	28,698	17,758	-	-	129,582	7,727	11,822	16,077	12,299	7,611	-	-	55,535
Subtotal								60,903	76,029	79,914	79,160	24,156	-	-	320,101	298,758	359,900	376,477	374,440	95,817	-	-	1,505,392	46,359	70,929	76,367	73,795	41,064	-	-	308,515
F. Agrobiodiversity																												
1. Collection of threatened indigenous varieties for safety keeping at the national gene bank and characterisation of germplasm	SCALING_UP_PRACTICES	STUDIES_&_CONSULTANCIES_EA	STUDIES_&_CONSULTANCIES_DA		IFAD_GRANT (100%)	STUDIES_&_CONSULTANCIES_PA	CON_SRVCS_PM (100%)	5,303	-	-	-	-	-	-	5,303	30,048	-	-	-	-	-	-	30,048	-	-	-	-	-	-	-	-
2. Training of frontline extension staff in all issued related to enhanced use of agrobiodiversity	SCALING_UP_PRACTICES	TRAININGS_EA	TRAININGS_DA		IFAD_GRANT (100%)	TRAININGS_PA	DIR_CONTRACT_PM (100%)	1,136	1,159	-	-	-	-	-	2,295	6,439	6,568	-	-	-	-	-	13,006	-	-	-	-	-	-	-	-
3. Training of farmer groups in nutrition and resilience benefits of indigenous crops, seed selection and multiplication and operation of community seed banks.	SCALING_UP_PRACTICES	TRAININGS_EA	TRAININGS_DA		IFAD_GRANT (100%)	TRAININGS_PA	DIR_CONTRACT_PM (100%)	1,136	1,159	1,182	1,206	-	-	-	4,683	6,439	6,568	6,699	6,833	-	-	-	26,539	-	-	-	-	-	-	-	-
4. Equipment for establishing community seed banks	SCALING_UP_PRACTICES	EQUIPMENT_AND_MATERIALS_EA	EQUIPMENT_&_MATERIALS_DA		IFAD_GRANT (100%)	EQUIPMENT_&_MATERIALS_PA	NCB_PM (80%), INTL_SHOPPING_PM (20%)	-	-	3,941	4,019	-	-	-	7,960	-	22,330	22,776	-	-	-	45,106	-	-	-	-	-	-	-	-
5. Inputs for seed multiplication	SCALING_UP_PRACTICES	EQUIPMENT_AND_MATERIALS_EA	EQUIPMENT_&_MATERIALS_DA		IFAD_GRANT (100%)	EQUIPMENT_&_MATERIALS_PA	NCB_PM (80%), INTL_SHOPPING_PM (20%)	-	-	1,576	1,608	-	-	-	3,184	-	9,932	9,110	-	-	-	19,042	-	-	-	-	-	-	-	-
6. Participatory variety selection and research	SCALING_UP_PRACTICES	STUDIES_&_CONSULTANCIES_EA	STUDIES_&_CONSULTANCIES_DA		IFAD_GRANT (100%)	STUDIES_&_CONSULTANCIES_PA	CON_SRVCS_PM (100%)	-	1,545	1,576	-	-	-	-	3,122	-	8,757	8,932	-	-	-	17,689	-	-	-	-	-	-	-	-
7. Short term training of scientists and technicians	SCALING_UP_PRACTICES	TRAININGS_EA	TRAININGS_DA		IFAD_GRANT (100%)	TRAININGS_PA	DIR_CONTRACT_PM (100%)	2,273	-	-	-	-	-	-	2,273	12,878	-	-	-	-	-	-	12,878	-	-	-	-	-	-	-	-
8. Equipment for storage of duplicate samples in the national gene bank of varieties in community seed banks	SCALING_UP_PRACTICES	EQUIPMENT_AND_MATERIALS_EA	EQUIPMENT_&_MATERIALS_DA		IFAD_GRANT (100%)	EQUIPMENT_&_MATERIALS_PA	NCB_PM (80%), INTL_SHOPPING_PM (20%)	3,788	-	-	-	-	-	-	3,788	21,463	-	-	-	-	-	21,463	-	-	-	-	-	-	-	-
9. Computers and other accessories	SCALING_UP_PRACTICES	EQUIPMENT_AND_MATERIALS_EA	EQUIPMENT_&_MATERIALS_DA		IFAD_GRANT (100%)	EQUIPMENT_&_MATERIALS_PA	NCB_PM (80%), INTL_SHOPPING_PM (20%)	1,515	-	-	-	-	-	-	1,515	8,585	-	-	-	-	-	8,585	-	-	-	-	-	-	-	-
10. Consumable items for supporting the subcomponent	SCALING_UP_PRACTICES	EQUIPMENT_AND_MATERIALS_EA	EQUIPMENT_&_MATERIALS_DA		IFAD_GRANT (100%)	EQUIPMENT_&_MATERIALS_PA	NCB_PM (80%), INTL_SHOPPING_PM (20%)	1,515	-	-	-	-	-	-	1,515	8,585	-	-	-	-	-	8,585	-	-	-	-	-	-	-	-
11. Communication services	SCALING_UP_PRACTICES	STUDIES_&_CONSULTANCIES_EA	STUDIES_&_CONSULTANCIES_DA		IFAD_GRANT (100%)	STUDIES_&_CONSULTANCIES_PA	CON_SRVCS_PM (100%)	2,273	-	-	-	-	-	-	2,273	12,878	-	-	-	-	-	12,878	-	-	-	-	-	-	-	-
12. Compilation and demonstration of recipes using target indigenous crops	SCALING_UP_PRACTICES	STUDIES_&_CONSULTANCIES_EA	STUDIES_&_CONSULTANCIES_DA		IFAD_GRANT (100%)	STUDIES_&_CONSULTANCIES_PA	CON_SRVCS_PM (100%)	-	-	1,182	1,206	-	-	-	2,388	-	6,699	6,833	-	-	-	13,532	-	-	-	-	-	-	-	-
13. Nutritional studies of the selected crops and varieties	SCALING_UP_PRACTICES	STUDIES_&_CONSULTANCIES_EA	STUDIES_&_CONSULTANCIES_DA		IFAD_GRANT (100%)	STUDIES_&_CONSULTANCIES_PA	CON_SRVCS_PM (100%)	-	-	1,182	1,206	-	-	-	2,388	-	6,699	6,833	-	-	-	13,532	-	-	-	-	-	-	-	-
14. Development of training and awareness material on recommended seed selection and multiplication, community seed bank and prod.practices for farmers and wider public /m	SCALING_UP_PRACTICES	STUDIES_&_CONSULTANCIES_EA	STUDIES_&_CONSULTANCIES_DA		IFAD_GRANT (100%)	STUDIES_&_CONSULTANCIES_PA	CON_SRVCS_PM (100%)	-	-	-	3,215	-	-	-	3,215	-	-	18,221	-	-	-	18,221	-	-	-	-	-	-	-	-
15. Demonstrations, exchange visits, public seminars and w orkshop for policy makers	SCALING_UP_PRACTICES	STUDIES_&_CONSULTANCIES_EA	STUDIES_&_CONSULTANCIES_DA		IFAD_GRANT (100%)	STUDIES_&_CONSULTANCIES_PA	CON_SRVCS_PM (100%)	-	-	-	1,608	1,640	-	-	3,248	-	-	9,110	9,293	-	-	18,403	-	-	-	-	-	-	-	-
Subtotal								18,936	3,863	10,639	14,068	1,640	-	-	49,148	107,313	21,892	60,290	79,717	9,293	-	-	278,503	-	-	-	-	-	-	-	-
G. Livestock activities																												
1. Training of VHAWCs in livestock management and disease control /n	SCALING_UP_PRACTICES	TRAININGS_EA	TRAININGS_DA		IFAD_GRANT (100%)	TRAININGS_PA	DIR_CONTRACT_PM (100%)	1,515	1,545	1,576	-	-	-	-	4,637	8,585	8,757	8,932	-	-	-	-	26,274	-	-	-	-	-	-	-	-
2. Establishment of livestock pass-on system for goats /o	SCALING_UP_PRACTICES	EQUIPMENT_AND_MATERIALS_EA	EQUIPMENT_&_MATERIALS_DA		IFAD_GRANT (70%) , BENEFICIARIES (30%)	EQUIPMENT_&_MATERIALS_PA	NCB_PM (80%), INTL_SHOPPING_PM (20%)	1,459	1,468	1,497	1,527	779	-	-	6,711	5,709	5,823	5,940	6,058	3,090	-	-	26,820	2,447	2,496	2,546	2,596	1,324	-	-	11,409
3. Establishment of livestock pass-on system for chicken /p	SCALING_UP_PRACTICES	EQUIPMENT_AND_MATERIALS_EA	EQUIPMENT_&_MATERIALS_DA		IFAD_GRANT (70%) , BENEFICIARIES (30%)	EQUIPMENT_&_MATERIALS_PA	NCB_PM (80%), INTL_SHOPPING_PM (20%)	379	386	394	402	205	-	-	1,766	1,502	1,532	1,563	1,594	813	-	-	7,005	644	657	670	683	348	-	-	3,002
Subtotal								3,353	3,400	3,468	1,929	984	-	-	13,114	15,796	16,112	16,435	7,653	3,903	-	-	59,899	3,091	3,152	3,215	3,280	1,673	-	-	14,411
H. Cross-cutting catchment level activities																												
1. Meteorological forecasts integrated into farm planning methodologies	SCALING_UP_PRACTICES	STUDIES_&_CONSULTANCIES_EA	STUDIES_&_CONSULTANCIES_DA		IFAD_GRANT (100%)	STUDIES_&_CONSULTANCIES_PA	CON_SRVCS_PM (100%)	-	1,700	-	-	-	-	-	1,700	9,632	-	-	-	-	-	-	9,632	-	-	-	-	-	-	-	-
2. Training for extension w orkers in adjustment of crop planning to meteorological forecasts	SCALING_UP_PRACTICES	TRAININGS_EA	TRAININGS_DA		IFAD_GRANT (100%)	TRAININGS_PA	DIR_CONTRACT_PM (100%)	-	927	-	-	-	-	-	927	-	5,254	-	-	-	-	-	5,254	-	-	-	-	-	-	-	-
3. Strengthen community climate information/dissemination	SCALING_UP_PRACTICES	TRAININGS_EA	TRAININGS_DA		IFAD_GRANT (100%)	TRAININGS_PA	DIR_CONTRACT_PM (100%)	-	927	946	965	-	-	-	2,838	-	5,254	5,359	5,466	-	-	-	16,079	-	-	-	-	-	-	-	-
4. Farmer to farmer extension netw ork, establishment and scaling-up /q	SCALING_UP_PRACTICES	TRAININGS_EA	TRAININGS_DA		IFAD_GRANT (70%) , BENEFICIARIES (30%)	TRAININGS_PA	DIR_CONTRACT_PM (100%)	-	12,362	18,914	25,724	26,238	26,763	-	110,002	-	49,038	75,027	102,037	104,078	106,160	-	436,340	-	21,016	32,155	43,730	44,605	45,497	-	187,003
5. Solar panels for extension w orkers' houses	SCALING_UP_PRACTICES	EQUIPMENT_AND_MATERIALS_EA	EQUIPMENT_&_MATERIALS_DA		IFAD_GRANT (100%)	EQUIPMENT_&_MATERIALS_PA	NCB_PM (80%), INTL_SHOPPING_PM (20%)	2,727	2,782	2,837	2,894	2,952	-	-	14,191	15,453	15,762	16,077	16,399	16,727	-	-	80,418	-	-	-	-	-	-	-	-
6. Tablets for extension w orkers	SCALING_UP_PRACTICES	EQUIPMENT_AND_MATERIALS_EA	EQUIPMENT_&_MATERIALS_DA		IFAD_GRANT (100%)	EQUIPMENT_&_MATERIALS_PA	NCB_PM (80%), INTL_SHOPPING_PM (20%)	727	742	757	772	787	-	-	3,784	4,121	4,203	4,287	4,373	4,460	-	-	21,445	-	-	-	-	-	-	-	-
7. Motorcycles for extension services /r	SCALING_UP_PRACTICES	VEHICLES_EA	VEHICLES_DA		IFAD_GRANT (100%)	VEHICLES_PA	ICB_PM (100%)	5,303	-	-	-	-	-	-	5,303	30,048	-	-	-	-	-	-	30,048	-	-	-	-	-	-	-	-
Subtotal								8,757	19,440	23,454	30,354	29,977	26,763	-	138,744	49,621	89,143	100,751	128,275	125,265	106,160	-	699,216	-	21,016	32,155	43,730	44,605	45,497	-	187,003
Total Investment Costs								177,073	230,561	230,646	197,719	78,895	26,763	-	931,657	709,529	752,179	810,765	770,473	292,822	106,160	-	3,441,926	293,686	497,665	496,230	349,933	154,249	45,497	-	1,837,461
II. Recurrent Costs																												
A. Allow ances for District Land Officer /s	SCALING_UP_PRACTICES	SALARIES_&_ALLOWANCES_EA	SALARIES_&_ALLOWANCES_DA		IFAD_GRANT (100%)	SALARIES_&_ALLOWANCES_PA	DIR_CONTRACT_PM (100%)	844	1,722	1,757	1,792	1,828	1,864	-	9,806	4,272	8,715	8,889	9,067	9,248	9,433	-	49,624	-	-	-	-	-	-	-	-
B. Allow ances for District Agriculture Officer /t	SCALING_UP_PRACTICES	SALARIES_&_ALLOWANCES_EA	SALARIES_&_ALLOWANCES_DA		IFAD_GRANT (100%)	SALARIES_&_ALLOWANCES_PA	DIR_CONTRACT_PM (100%)	844	1,722	1,757	1,792	1,828	1,864	-	9,806	4,272	8,715	8,889	9,067	9,248	9,433	-	49,624	-	-	-	-	-	-	-	-
C. Allow ances for District Forest Officer /u	SCALING_UP_PRACTICES	SALARIES_&_ALLOWANCES_EA	SALARIES_&_ALLOWANCES_DA		IFAD_GRANT (100%)	SALARIES_&_ALLOWANCES_PA	DIR_CONTRACT_PM (100%)	844	1,722	1,757	1,792	1,828	1,864	-	9,806	4,272	8,715	8,889	9,067	9,248	9,433	-	49,624	-	-	-	-	-	-	-	-
D. Allow ances for District Livestock Officer /v	SCALING_UP_PRACTICES	SALARIES_&_ALLOWANCES_EA	SALARIES_&_ALLOWANCES_DA		IFAD_GRANT (100%)	SALARIES_&_ALLOWANCES_PA	DIR_CONTRACT_PM (100%)	113	230	234	239	244	249	-	1,307	570	1,162	1,185	1,209	1,233	1,258	-	6,617	-	-	-	-	-	-	-	-
E. Farmer to farmer extension netw ork facilitators	SCALING_UP_PRACTICES	SALARIES_&_ALLOWANCES_EA	SALARIES_&_ALLOWANCES_DA		IFAD_GRANT (100%)	SALARIES_&_ALLOWANCES_PA	DIR_CONTRACT_PM (100%)	10,666	10,268	10,473	10,682	10,896	11,114	-	63,499	50,941	51,960	52,999	54,059	55,140	56,243	-	321,342	-	-	-	-	-	-	-	-
F. Environmental Experts at regional level, North and South (PCD Unit)	SCALING_UP_PRACTICES	SALARIES_&_ALLOWANCES_EA	SALARIES_&_ALLOWANCES_DA		IFAD_GRANT (100%)	SALARIES_&_ALLOWANCES_PA	DIR_CONTRACT_PM (100%)	6,694	13,656	13,929	14,207	14,491	14,781	7,538	85,297	33,875	69,106	70,488	71,898	73,336	74,802	38,149	431,653	-	-	-	-	-	-	-	-
G. Motorcycles (OMs) /w	SCALING_UP_PRACTICES	OP_&_MAINTENANCE_EA	OP_&_MAINTENANCE_DA		IFAD_GRANT (100%)	OP_&_MAINTENANCE_PA	LCL_SHOPPING_PM (100%)	1,155	1,178	1,202	1,226	1,250	1,275	-	7,285	5,844	5,961	6,081	6,202	6,326	6,453	-	36,867	-	-	-	-	-	-	-	-
Total Recurrent Costs								20,560	30,497	31,107	31,729	32,364	33,011	7,538	186,806	104,046	164,333	157,420	160,568	163,780	167,055	38,149	945,353	-	-	-	-	-	-	-	-
Total								197,633	261,058	261,753	229,448	111,259	59,774	7,538	1,118,463	813,576	916,512	968,185	931,041	456,602	273,215	38,149	4,387,279	293,686	497,665	496,230	349,933	154,249	45,497	-	1,837,461

Table 43 Monitoring and assessment of ecosystem services, resilience and food security

Republic of Malawi
Enhancing the resilience of agro-ecological systems Project
Table 3. Monitoring and assessment of ecosystem services, resilience and food security

Detailed Costs	Unit	Quantities 2017	2018	2019	2020	2021	2022	2023	Total	Unit Cost (USD)	Totals Including Contingencies (USD) 2017	2018	2019	2020	2021	2022	2023	Total	Breakdown of Totals Incl. Cont. (USD) For. Exch.	Local (Excl. Taxes)	Duties & Taxes	Total	Parameters (in %) Phy. Cont. Rate	For. Exch.	Gross Tax Rate
I. Investment Costs																									
A. Evidence base for ENRM decision making at community, district and central government levels																									
1. District and central level staff trained in monitoring and assessment tools (LDSF, DATAR, MPAT, Ex-Act)	Session	6	-	-	3	-	3	-	12	2,000	12,120	-	-	6,431	-	6,691	-	25,242	3,786	17,669	3,786	25,242	0.0	15.0	15.0
2. HH survey and FGD agrobiodiversity, food security and other dimensions of poverty (MPAT and DATAR)	Survey	1	-	-	-	-	-	1	2	50,000	50,500	-	-	-	-	-	56,871	107,371	16,106	75,160	16,106	107,371	0.0	15.0	15.0
3. Establishment of LDSF (one sampling site for each catchment area)	Site	1	2	-	-	-	-	-	3	25,000	25,250	51,510	-	-	-	-	-	76,760	11,514	53,732	11,514	76,760	0.0	15.0	15.0
4. Mid-term and end-of-project assessment of LDSF	Site	-	-	-	3	-	-	3	6	2,500	-	-	-	8,039	-	-	8,531	16,569	2,485	11,599	2,485	16,569	0.0	15.0	15.0
5. Attendance to regional meetings, cross district learning and field visits /a	Lumpsum										10,100	10,302	10,508	21,438	10,933	-	-	63,279	9,492	44,295	9,492	63,279	0.0	15.0	15.0
6. Staff training on use of information management system /b	Session	-	6	6	6	6	-	-	24	2,000	-	12,362	12,610	12,862	13,119	-	-	50,953	7,643	35,667	7,643	50,953	0.0	15.0	15.0
7. Organisational and training needs assessment /c	Study	3	-	-	-	-	-	-	3	5,000	15,150	-	-	-	-	-	-	15,150	2,273	10,605	2,273	15,150	0.0	15.0	15.0
8. Software for data management at district level	Software	3	-	-	-	-	-	-	3	8,000	24,240	-	-	-	-	-	-	24,240	3,636	16,968	3,636	24,240	0.0	15.0	15.0
Subtotal											137,360	74,174	23,118	48,768	24,052	6,691	65,402	379,564	56,935	265,695	56,935	379,564			
B. M&E system																									
1. Establishment of M&E and Knowledge Management systems and strategies	Contract	1	-	-	-	-	-	-	1	20,000	20,200	-	-	-	-	-	-	20,200	3,030	14,140	3,030	20,200	0.0	15.0	15.0
2. Mid-term survey	Study	-	-	-	1	-	-	-	1	25,000	-	-	-	26,796	-	-	-	26,796	4,019	18,757	4,019	26,796	0.0	15.0	15.0
3. Final impact surveys /d	Study	-	-	-	-	-	-	1	1	30,000	-	-	-	-	-	-	34,123	34,123	5,118	23,886	5,118	34,123	0.0	15.0	15.0
Subtotal											20,200	-	-	26,796	-	-	34,123	81,118	12,168	56,783	12,168	81,118			
C. Identification and dissemination of lessons learned																									
1. Thematic studies	Contract	-	1	-	1	-	-	-	2	20,000	-	20,604	-	21,436	-	-	-	42,040	6,306	29,428	6,306	42,040	0.0	15.0	15.0
2. Thematic national workshops	Workshop	-	1	1	1	1	1	-	5	5,000	-	5,151	5,254	5,359	5,466	5,576	-	26,806	4,021	18,764	4,021	26,806	0.0	15.0	15.0
3. Drafting, revision of fact sheets	Contract	-	1	-	1	-	1	-	3	10,000	-	10,302	-	10,718	-	11,151	-	32,171	4,826	22,520	4,826	32,171	0.0	15.0	15.0
4. Publication of fact sheets-lessons learned	Contract	-	-	1	-	1	-	1	3	2,500	-	-	2,627	-	2,733	-	2,844	8,204	1,231	5,743	1,231	8,204	0.0	15.0	15.0
5. Policy harmonization study	Contract	-	-	-	-	-	1	-	1	14,000	-	-	-	-	-	15,612	-	15,612	2,342	10,928	2,342	15,612	0.0	15.0	15.0
6. National workshop to disseminate project results	Workshop	-	-	-	1	-	-	1	2	8,000	-	-	-	8,575	-	-	9,099	17,674	2,651	12,372	2,651	17,674	0.0	15.0	15.0
Subtotal											-	36,057	7,881	46,088	8,199	32,339	11,943	142,507	21,376	99,755	21,376	142,507			
D. Reporting																									
1. Progress reports (yearly)	Unit	-	1	1	1	1	1	-	5	500	-	515	525	536	547	558	-	2,681	402	1,876	402	2,681	0.0	15.0	15.0
2. Mid-term evaluation report	Contract	-	-	-	1	-	-	-	1	10,000	-	-	-	10,718	-	-	-	10,718	1,608	7,503	1,608	10,718	0.0	15.0	15.0
3. Final evaluation report	Contract	-	-	-	-	-	-	1	1	20,000	-	-	-	-	-	-	22,748	22,748	3,412	15,924	3,412	22,748	0.0	15.0	15.0
4. GEF Project Steering Committee Meetings	Number	1	1	1	1	1	1	1	7	5,000	5,050	5,151	5,254	5,359	5,466	5,576	5,687	37,543	5,631	26,280	5,631	37,543	0.0	15.0	15.0
Subtotal											5,050	5,666	5,779	16,613	6,013	6,133	28,436	73,690	11,054	51,583	11,054	73,690			
Total Investment Costs											162,610	115,898	36,778	138,265	38,264	45,162	139,903	676,880	101,532	473,816	101,532	676,880			
II. Recurrent Costs																									
A. Knowledge management officer (PCO Unit)	Person year	-	0.5	0.5	0.5	0.5	0.5	0.5	3	36,516	-	20,690	21,104	21,526	21,957	22,396	22,844	130,517	-	108,982	21,535	130,517	10.0	0.0	16.5
Total Recurrent Costs											-	20,690	21,104	21,526	21,957	22,396	22,844	130,517	-	108,982	21,535	130,517			
Total											162,610	136,588	57,882	159,791	60,221	67,558	162,747	807,397	101,532	582,798	123,067	807,397			

\a Regional meetings and field trips(it covers travel and accommodation expenses)
\b including Carbon Balance Assessment and biodiversity monitoring tools. Each session involves 20 national staff
\c One per district.
\d This includes the final Beneficiary Impact Sudy that would be used to inform the Programme Completion Report

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Table 3. Monitoring and assessment of ecosystem services, resilience and food security

Detailed Costs	Summary Divisions Component	Expenditure Account	Other Accounts Disb. Acct.	Fin. Rule	Proc. Acct.	Proc. Method	Expenditures by Financiers (USD) GoM 2017	2018	2019	2020	2021	2022	2023	Total	IFAD GRANT 2017	2018	2019	2020	2021	2022	2023	Total
I. Investment Costs																						
A. Evidence base for ENRM decision making at community, district and central government levels																						
1. District and central level staff trained in monitoring and assessment tools (LDSF, DATAR, MPAT, Ex-Act)	MONITORING_ASSESSMENT	STUDIES_&_CONSULTANCIES_EA	STUDIES_&_CONSULTANCIES_DA	IFAD_GRANT (100%)	STUDIES_&_CONSULTANCIES_PA	CON_SRVCS_PM (100%)	1,818	-	-	965	-	1,004	-	3,786	10,302	-	-	5,466	-	5,687	-	21,455
2. HH survey and FGD agrobiodiversity, food security and other dimensions of poverty (MPAT and DATAR)	MONITORING_ASSESSMENT	STUDIES_&_CONSULTANCIES_EA	STUDIES_&_CONSULTANCIES_DA	IFAD_GRANT (100%)	STUDIES_&_CONSULTANCIES_PA	CON_SRVCS_PM (100%)	7,575	-	-	-	-	-	8,531	16,106	42,925	-	-	-	-	-	48,341	91,266
3. Establishment of LDSF (one sampling site for each catchment area)	MONITORING_ASSESSMENT	STUDIES_&_CONSULTANCIES_EA	STUDIES_&_CONSULTANCIES_DA	IFAD_GRANT (100%)	STUDIES_&_CONSULTANCIES_PA	CON_SRVCS_PM (100%)	3,788	7,727	-	-	-	-	-	11,514	21,463	43,784	-	-	-	-	-	65,246
4. Mid-term and end-of-project assessment of LDSF	MONITORING_ASSESSMENT	STUDIES_&_CONSULTANCIES_EA	STUDIES_&_CONSULTANCIES_DA	IFAD_GRANT (100%)	STUDIES_&_CONSULTANCIES_PA	CON_SRVCS_PM (100%)	-	-	-	1,206	-	-	1,280	2,485	-	-	-	6,833	-	-	7,251	14,084
5. Attendance to regional meetings, cross district learning and field visits /a	MONITORING_ASSESSMENT	TRAININGS_EA	TRAININGS_DA	IFAD_GRANT (100%)	TRAININGS_PA	DIR_CONTRACT_PM (100%)	1,515	1,545	1,576	3,215	1,640	-	-	9,492	8,585	8,757	8,932	18,221	9,293	-	-	53,787
6. Staff training on use of information management system /b	MONITORING_ASSESSMENT	TRAININGS_EA	TRAININGS_DA	IFAD_GRANT (100%)	TRAININGS_PA	DIR_CONTRACT_PM (100%)	-	1,854	1,891	1,929	1,968	-	-	7,643	-	10,508	10,718	10,933	11,151	-	-	43,310
7. Organisational and training needs assessment /c	MONITORING_ASSESSMENT	TRAININGS_EA	TRAININGS_DA	IFAD_GRANT (100%)	TRAININGS_PA	DIR_CONTRACT_PM (100%)	2,273	-	-	-	-	-	-	2,273	12,878	-	-	-	-	-	-	12,878
8. Software for data management at district level	MONITORING_ASSESSMENT	TRAININGS_EA	TRAININGS_DA	IFAD_GRANT (100%)	TRAININGS_PA	DIR_CONTRACT_PM (100%)	3,636	-	-	-	-	-	-	3,636	20,604	-	-	-	-	-	-	20,604
Subtotal							20,604	11,126	3,468	7,315	3,608	1,004	9,810	56,935	116,756	63,048	19,650	41,453	20,444	5,687	55,592	322,630
B. M&E system																						
1. Establishment of M&E and Knowledge Management systems and strategies	MONITORING_ASSESSMENT	STUDIES_&_CONSULTANCIES_EA	STUDIES_&_CONSULTANCIES_DA	IFAD_GRANT (100%)	STUDIES_&_CONSULTANCIES_PA	CON_SRVCS_PM (100%)	3,030	-	-	-	-	-	-	3,030	17,170	-	-	-	-	-	-	17,170
2. Mid-term survey	MONITORING_ASSESSMENT	STUDIES_&_CONSULTANCIES_EA	STUDIES_&_CONSULTANCIES_DA	IFAD_GRANT (100%)	STUDIES_&_CONSULTANCIES_PA	CON_SRVCS_PM (100%)	-	-	-	4,019	-	-	-	4,019	-	-	-	22,776	-	-	-	22,776
3. Final impact surveys /d	MONITORING_ASSESSMENT	STUDIES_&_CONSULTANCIES_EA	STUDIES_&_CONSULTANCIES_DA	IFAD_GRANT (100%)	STUDIES_&_CONSULTANCIES_PA	CON_SRVCS_PM (100%)	-	-	-	-	-	-	5,118	5,118	-	-	-	-	-	-	29,004	29,004
Subtotal							3,030	-	-	4,019	-	-	5,118	12,168	17,170	-	-	22,776	-	-	29,004	68,950
C. Identification and dissemination of lessons learned																						
1. Thematic studies	MONITORING_ASSESSMENT	STUDIES_&_CONSULTANCIES_EA	STUDIES_&_CONSULTANCIES_DA	IFAD_GRANT (100%)	STUDIES_&_CONSULTANCIES_PA	CON_SRVCS_PM (100%)	-	3,091	-	3,215	-	-	-	6,306	-	17,513	-	18,221	-	-	-	35,734
2. Thematic national workshops	MONITORING_ASSESSMENT	STUDIES_&_CONSULTANCIES_EA	STUDIES_&_CONSULTANCIES_DA	IFAD_GRANT (100%)	STUDIES_&_CONSULTANCIES_PA	CON_SRVCS_PM (100%)	-	773	788	804	820	836	-	4,021	-	4,378	4,466	4,555	4,646	4,739	-	22,785
3. Drafting, revision of fact sheets	MONITORING_ASSESSMENT	STUDIES_&_CONSULTANCIES_EA	STUDIES_&_CONSULTANCIES_DA	IFAD_GRANT (100%)	STUDIES_&_CONSULTANCIES_PA	CON_SRVCS_PM (100%)	-	1,545	-	1,608	-	1,673	-	4,826	-	8,757	-	9,110	-	9,479	-	27,346
4. Publication of fact sheets-lessons learned	MONITORING_ASSESSMENT	STUDIES_&_CONSULTANCIES_EA	STUDIES_&_CONSULTANCIES_DA	IFAD_GRANT (100%)	STUDIES_&_CONSULTANCIES_PA	CON_SRVCS_PM (100%)	-	-	394	-	410	-	427	1,231	-	-	2,233	-	2,323	-	2,417	6,973
5. Policy harmonization study	MONITORING_ASSESSMENT	STUDIES_&_CONSULTANCIES_EA	STUDIES_&_CONSULTANCIES_DA	IFAD_GRANT (100%)	STUDIES_&_CONSULTANCIES_PA	CON_SRVCS_PM (100%)	-	-	-	-	-	2,342	-	2,342	-	-	-	-	-	13,270	-	13,270
6. National workshop to disseminate project results	MONITORING_ASSESSMENT	STUDIES_&_CONSULTANCIES_EA	STUDIES_&_CONSULTANCIES_DA	IFAD_GRANT (100%)	STUDIES_&_CONSULTANCIES_PA	CON_SRVCS_PM (100%)	-	-	-	1,286	-	-	1,365	2,651	-	-	-	7,288	-	-	7,734	15,023
Subtotal							-	5,409	1,182	6,913	1,230	4,851	1,791	21,376	-	30,648	6,699	39,175	6,970	27,488	10,152	121,131
D. Reporting																						
1. Progress reports (yearly)	MONITORING_ASSESSMENT	STUDIES_&_CONSULTANCIES_EA	STUDIES_&_CONSULTANCIES_DA	IFAD_GRANT (100%)	STUDIES_&_CONSULTANCIES_PA	CON_SRVCS_PM (100%)	-	77	79	80	82	84	-	402	-	438	447	456	465	474	-	2,279
2. Mid-term evaluation report	MONITORING_ASSESSMENT	STUDIES_&_CONSULTANCIES_EA	STUDIES_&_CONSULTANCIES_DA	IFAD_GRANT (100%)	STUDIES_&_CONSULTANCIES_PA	CON_SRVCS_PM (100%)	-	-	-	1,608	-	-	-	1,608	-	-	-	9,110	-	-	-	9,110
3. Final evaluation report	MONITORING_ASSESSMENT	STUDIES_&_CONSULTANCIES_EA	STUDIES_&_CONSULTANCIES_DA	IFAD_GRANT (100%)	STUDIES_&_CONSULTANCIES_PA	CON_SRVCS_PM (100%)	-	-	-	-	-	-	3,412	3,412	-	-	-	-	-	-	19,336	19,336
4. GEF Project Steering Committee Meetings	MONITORING_ASSESSMENT	STUDIES_&_CONSULTANCIES_EA	STUDIES_&_CONSULTANCIES_DA	IFAD_GRANT (100%)	STUDIES_&_CONSULTANCIES_PA	CON_SRVCS_PM (100%)	758	773	788	804	820	836	853	5,631	4,293	4,378	4,466	4,555	4,646	4,739	4,834	31,912
Subtotal							758	850	867	2,492	902	920	4,265	11,054	4,293	4,816	4,913	14,121	5,111	5,213	24,170	62,637
Total Investment Costs							24,392	17,385	5,517	20,740	5,740	6,774	20,985	101,532	138,219	98,513	31,261	117,525	32,524	38,388	118,918	575,348
II. Recurrent Costs																						
A. Knowledge management officer (PCO Unit)	MONITORING_ASSESSMENT	SALARIES_&_ALLOWANCES_EA	SALARIES_&_ALLOWANCES_DA	IFAD_GRANT (100%)	SALARIES_&_ALLOWANCES_PA	DIR_CONTRACT_PM (100%)	-	3,414	3,482	3,552	3,623	3,695	3,769	21,535	-	17,276	17,622	17,974	18,334	18,701	19,075	108,982
Total Recurrent Costs							-	3,414	3,482	3,552	3,623	3,695	3,769	21,535	-	17,276	17,622	17,974	18,334	18,701	19,075	108,982
Total							24,392	20,799	8,999	24,292	9,362	10,470	24,755	123,067	138,219	115,789	48,883	135,499	50,858	57,089	137,992	684,330

Table 44 Project Coordination

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Table 4. Project Coordination

Detailed Costs	Unit	Quantities								Unit Cost	Totals Including Contingencies (USD)								Breakdown of Totals Incl. Cont. (USD)				Parameters (in %)		
		2017	2018	2019	2020	2021	2022	2023	Total	(USD)	2017	2018	2019	2020	2021	2022	2023	Total	For. Exch.	Local (Excl. Taxes)	Duties & Taxes	Total	Phy. Cont. Rate	For. Exch.	Gross Tax Rate
I. Investment Costs																									
A. General coordination																									
1. Four Wheel Vehicles	Unit	2	-	-	-	-	-	-	2	65,000	131,300	-	-	-	-	-	-	131,300	78,780	13,130	39,390	131,300	0.0	60.0	30.0
2. Portable computer and softw ares /a	Set	2	-	-	-	-	-	-	2	2,000	4,040	-	-	-	-	-	-	4,040	2,424	1,010	606	4,040	0.0	60.0	15.0
3. Start-up w orkshop	Workshop	-	1	-	-	-	-	-	1	5,000	-	5,666	-	-	-	-	-	5,666	1,700	3,116	850	5,666	10.0	30.0	15.0
Total Investment Costs											135,340	5,666	-	-	-	-	-	141,006	82,904	17,256	40,846	141,006			
II. Recurrent Costs																									
A. Salaries and Operating Costs																									
1. Driver /b	Person year	2	2	2	2	2	2	2	14	5,492	12,203	12,447	12,696	12,950	13,209	13,473	13,743	90,722	-	81,650	9,072	90,722	10.0	0.0	10.0
2. Per Diem for in-country travel /c	Person day	100	200	200	200	200	200	100	1,200	150	16,665	33,997	34,677	35,370	36,077	36,799	18,767	212,352	-	191,117	21,235	212,352	10.0	0.0	10.0
3. Vehicle O&M + insurance	Per Year	2	2	2	2	2	2	2	14	7,000	15,554	15,865	16,182	16,506	16,836	17,173	17,516	115,633	-	104,070	11,563	115,633	10.0	0.0	10.0
Total Recurrent Costs											44,422	62,309	63,555	64,826	66,123	67,445	50,027	418,707	-	376,837	41,871	418,707			
Total											179,762	67,975	63,555	64,826	66,123	67,445	50,027	559,713	82,904	394,093	82,717	559,713			

\a One for each Regional Environmental Expert.
\b Salary computed as the minimum of the National Project Support Personnel Salary Scale (Annual Gross, November 2013) at Level 1. It includes a gratuity of 10%.
\c DSA includes transport and lodging

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Table 4. Project Coordination

Detailed Costs	Summary Divisions		Other Accounts				Expenditures by Financiers (USD)																		
							GoM								IFAD GRANT										
	Component	Expenditure Account	Disb. Acct.	Fin. Rule	Proc. Acct.	Proc. Method	2017	2018	2019	2020	2021	2022	2023	Total	2017	2018	2019	2020	2021	2022	2023	Total
I. Investment Costs																									
A. General coordination																									
1. Four Wheel Vehicles	PROJECT_COORD	VEHICLES_EA	VEHICLES_DA	IFAD_GRANT (100%)	VEHICLES_PA	ICB_PM (100%)	39,390	-	-	-	-	-	-	39,390	91,910	-	-	-	-	-	-	91,910
2. Portable computer and softw ares /a	PROJECT_COORD	EQUIPMENT_AND_MATERIALS_EA	EQUIPMENT_&_MATERIALS_DA	IFAD_GRANT (100%)	EQUIPMENT_&_MATERIALS_PA	NCB_PM (80%), INTL_SHOPPING_PM (20%)	606	-	-	-	-	-	-	606	3,434	-	-	-	-	-	-	3,434
3. Start-up w orkshop	PROJECT_COORD	STUDIES_&_CONSULTANCIES_EA	STUDIES_&_CONSULTANCIES_DA	IFAD_GRANT (100%)	STUDIES_&_CONSULTANCIES_PA	CON_SRVCS_PM (100%)	-	850	-	-	-	-	-	850	-	4,816	-	-	-	-	-	4,816
Total Investment Costs							39,996	850	-	-	-	-	-	40,846	95,344	4,816	-	-	-	-	-	100,160
II. Recurrent Costs																									
A. Salaries and Operating Costs																									
1. Driver /b	PROJECT_COORD	SALARIES_&_ALLOWANCES_EA	SALARIES_&_ALLOWANCES_DA	IFAD_GRANT (100%)	SALARIES_&_ALLOWANCES_PA	DIR_CONTRACT_PM (100%)	1,220	1,245	1,270	1,295	1,321	1,347	1,374	9,072	10,983	11,203	11,427	11,655	11,888	12,126	12,369	81,650
2. Per Diem for in-country travel /c	PROJECT_COORD	SALARIES_&_ALLOWANCES_EA	SALARIES_&_ALLOWANCES_DA	IFAD_GRANT (100%)	SALARIES_&_ALLOWANCES_PA	DIR_CONTRACT_PM (100%)	1,667	3,400	3,468	3,537	3,608	3,680	1,877	21,235	14,999	30,597	31,209	31,833	32,470	33,119	16,891	191,117
3. Vehicle O&M + insurance	PROJECT_COORD	OP_&_MAINTENANCE_EA	OP_&_MAINTENANCE_DA	IFAD_GRANT (100%)	OP_&_MAINTENANCE_PA	LCL_SHOPPING_PM (100%)	1,555	1,587	1,618	1,651	1,684	1,717	1,752	11,563	13,999	14,279	14,564	14,855	15,153	15,456	15,765	104,070
Total Recurrent Costs							4,442	6,231	6,356	6,483	6,612	6,745	5,003	41,871	39,980	56,078	57,200	58,344	59,510	60,701	45,024	376,837
Total							44,438	7,081	6,356	6,483	6,612	6,745	5,003	82,717	135,324	60,894	57,200	58,344	59,510	60,701	45,024	476,997

\a One for each Regional Environmental Expert.
\b Salary computed as the minimum of the National Project Support Personnel Salary Scale (Annual Gross, November 2013) at Level 1. It includes a gratuity of 10%.
\c DSA includes transport and lodging

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Table 4. Programme Coordination
Detailed Costs

	Summary Divisions			Other Accounts			Expenditures by Financiers (USD)													
							GoM							IFAD GRANT						
	Component	Expenditure Account	Disb. Acct.	Fin. Rule	Proc. Acct.	Proc. Method	2018	2017	2018	2019	2020	2021	2022	Total	2018	2017	2018	2019	2020	2021	2022	Total
I. Investment Costs																						
A. General coordination																						
1. Four Wheel Vehicles	PROJECT_COORD	VEHICLES_EA	VEHICLES_DA	IFAD_GRANT (100%)	VEHICLES_PA	ICB_PM (100%)	19,392	-	-	-	-	-	-	19,392	45,248	-	-	-	-	-	-	45,248
2. Portable computer and softw ares	PROJECT_COORD	EQUIPMENT_AND_MATERIALS_EA	EQUIPMENT_&_MATERIALS_DA	IFAD_GRANT (100%)	EQUIPMENT_&_MATERIALS_PA	NCB_PM (80%), INT._SHOPPING_PM (20%)	455	-	-	-	-	-	-	455	2,576	-	-	-	-	-	-	2,576
3. Financial & accounting softw are	PROJECT_COORD	EQUIPMENT_AND_MATERIALS_EA	EQUIPMENT_&_MATERIALS_DA	IFAD_GRANT (100%)	EQUIPMENT_&_MATERIALS_PA	NCB_PM (80%), INT._SHOPPING_PM (20%)	758	-	-	-	-	-	-	758	4,293	-	-	-	-	-	-	4,293
4. Multifunctional printer/coopiers/s canner	PROJECT_COORD	EQUIPMENT_AND_MATERIALS_EA	EQUIPMENT_&_MATERIALS_DA	IFAD_GRANT (100%)	EQUIPMENT_&_MATERIALS_PA	NCB_PM (80%), INT._SHOPPING_PM (20%)	833	-	-	-	-	-	-	833	4,722	-	-	-	-	-	-	4,722
5. Office Furniture /a	PROJECT_COORD	EQUIPMENT_AND_MATERIALS_EA	EQUIPMENT_&_MATERIALS_DA	IFAD_GRANT (100%)	EQUIPMENT_&_MATERIALS_PA	NCB_PM (80%), INT._SHOPPING_PM (20%)	250	-	-	-	-	-	-	250	1,417	-	-	-	-	-	-	1,417
6. Projector	PROJECT_COORD	EQUIPMENT_AND_MATERIALS_EA	EQUIPMENT_&_MATERIALS_DA	IFAD_GRANT (100%)	EQUIPMENT_&_MATERIALS_PA	NCB_PM (80%), INT._SHOPPING_PM (20%)	83	-	-	-	-	-	-	83	472	-	-	-	-	-	-	472
7. Start-up w orkshop	PROJECT_COORD	STUDIES_&_CONSULTANCIES_EA	STUDIES_&_CONSULTANCIES_DA	IFAD_GRANT (100%)	STUDIES_&_CONSULTANCIES_PA	CON_SRVCS_PM (100%)	-	340	-	-	-	-	-	340	-	1,926	-	-	-	-	-	1,926
8. Audit	PROJECT_COORD	STUDIES_&_CONSULTANCIES_EA	STUDIES_&_CONSULTANCIES_DA	IFAD_GRANT (100%)	STUDIES_&_CONSULTANCIES_PA	CON_SRVCS_PM (100%)	-	850	867	884	902	920	938	5,361	-	4,816	4,913	5,011	5,111	5,213	5,317	30,381
9. Supervision mission /b	PROJECT_COORD	STUDIES_&_CONSULTANCIES_EA	STUDIES_&_CONSULTANCIES_DA	IFAD_GRANT (100%)	STUDIES_&_CONSULTANCIES_PA	CON_SRVCS_PM (100%)	-	4,080	4,161	4,244	4,329	4,416	2,252	23,482	-	23,118	23,580	24,052	24,533	25,023	12,762	133,067
Total Investment Costs							21,771	5,269	5,028	5,129	5,231	5,336	3,190	50,954	58,726	29,860	28,493	29,062	29,644	30,237	18,079	224,101
II. Recurrent Costs																						
A. Salaries (PCO unit)																						
1. Project coordinator / c	PROJECT_COORD	SALARIES_&_ALLOWANCES_EA	SALARIES_&_ALLOWANCES_DA	IFAD_GRANT (100%)	SALARIES_&_ALLOWANCES_PA	DIR_CONTRACT_PM (100%)	-	-	-	-	-	-	-	-	9,580	9,771	9,967	10,166	10,369	10,577	10,788	71,217
2. Procurement Officer /d	PROJECT_COORD	SALARIES_&_ALLOWANCES_EA	SALARIES_&_ALLOWANCES_DA	IFAD_GRANT (100%)	SALARIES_&_ALLOWANCES_PA	DIR_CONTRACT_PM (100%)	-	-	-	-	-	-	-	-	8,346	8,513	8,683	8,857	9,034	9,215	9,399	62,047
3. Accountant /e	PROJECT_COORD	SALARIES_&_ALLOWANCES_EA	SALARIES_&_ALLOWANCES_DA	IFAD_GRANT (100%)	SALARIES_&_ALLOWANCES_PA	DIR_CONTRACT_PM (100%)	-	-	-	-	-	-	-	-	8,346	8,513	8,683	8,857	9,034	9,215	9,399	62,047
4. Administrative assistant /f	PROJECT_COORD	SALARIES_&_ALLOWANCES_EA	SALARIES_&_ALLOWANCES_DA	IFAD_GRANT (100%)	SALARIES_&_ALLOWANCES_PA	DIR_CONTRACT_PM (100%)	-	-	-	-	-	-	-	-	1,000	1,020	1,040	1,061	1,082	1,104	1,126	7,434
5. Office Assistant/Receptionist /g	PROJECT_COORD	SALARIES_&_ALLOWANCES_EA	SALARIES_&_ALLOWANCES_DA	IFAD_GRANT (100%)	SALARIES_&_ALLOWANCES_PA	DIR_CONTRACT_PM (100%)	-	-	-	-	-	-	-	-	782	798	814	830	847	864	881	5,815
6. Driver /h	PROJECT_COORD	SALARIES_&_ALLOWANCES_EA	SALARIES_&_ALLOWANCES_DA	IFAD_GRANT (100%)	SALARIES_&_ALLOWANCES_PA	DIR_CONTRACT_PM (100%)	-	-	-	-	-	-	-	-	6,102	6,224	6,348	6,475	6,605	6,737	6,871	45,361
Subtotal							-	-	-	-	-	-	-	-	34,155	34,838	35,535	36,246	36,971	37,710	38,464	253,921
B. Operating Costs																						
1. Per Diem for in-country travel /i	PROJECT_COORD	OP_&_MAINTENANCE_EA	OP_&_MAINTENANCE_DA	IFAD_GRANT (100%)	OP_&_MAINTENANCE_PA	LCL_SHOPPING_PM (100%)	1,283	2,618	2,670	2,723	2,778	2,834	1,445	16,351	6,494	13,247	13,512	13,783	14,058	14,339	7,313	82,747
2. POD Office Maintenance	PROJECT_COORD	OP_&_MAINTENANCE_EA	OP_&_MAINTENANCE_DA	IFAD_GRANT (100%)	OP_&_MAINTENANCE_PA	LCL_SHOPPING_PM (100%)	2,200	4,488	4,577	4,669	4,762	4,857	2,477	28,030	11,132	22,710	23,164	23,627	24,100	24,582	12,537	141,851
3. Vehicle O&M + insurance	PROJECT_COORD	OP_&_MAINTENANCE_EA	OP_&_MAINTENANCE_DA	IFAD_GRANT (100%)	OP_&_MAINTENANCE_PA	LCL_SHOPPING_PM (100%)	642	1,309	1,335	1,362	1,389	1,417	1,445	8,898	3,247	6,624	6,756	6,891	7,029	7,170	7,313	45,030
Subtotal							4,125	8,414	8,582	8,754	8,929	9,108	5,368	53,280	20,873	42,581	43,432	44,301	45,187	46,091	27,163	269,628
Total Recurrent Costs							4,125	8,414	8,582	8,754	8,929	9,108	5,368	53,280	55,028	77,419	78,968	80,547	82,158	83,801	65,627	523,548
Total							25,896	13,684	13,611	13,883	14,160	14,444	8,558	104,234	113,755	107,280	107,460	109,609	111,802	114,038	83,707	747,650

Appendix 12: Economic and Financial Analysis

Objectives

1. The objectives of this financial analysis are: (i) to assess the financial viability of the development interventions promoted under the Enhancing the Resilience of Agro-ecological Systems (ERAS) Project; (ii) to examine the impact of Project interventions on the net incomes of the households (HHs) targeted, therefore assessing Project contribution to poverty reduction among the rural population; and (iii) to establish the framework for the economic analysis of the Project, which will complement the financial analysis (see section II).

Household Model Analysis

2. **Overview**. Financial models have been developed with reference to the Project activities aimed at increasing the income of HHs operating in the crop production sector, therefore contributing to reducing poverty in rural areas. Specifically, the economic rationale for ERASP hinges on improved agricultural productivity in the rain fed catchment areas thanks to the implementation of good agricultural practices, tree planting and adoption of soil and water conservation (SWC) measures.

3. Given the wide range of rain fed farming systems and agro ecological characteristics of project areas it is not possible to describe all the existing and potential crop production business models farmers will choose to adopt. The model description reported in what follows should therefore be seen only as indicative, being a limited set of possible investment options that could be eventually combined in more complex investment scenarios.

4. While rain fed production at smallholder level in Malawi mainly relies on subsistence food crops in the form of cereals (maize, rice, sorghum and millet), roots and tubers (cassava, sweet potato and Irish potato) and legumes (beans, groundnuts, soybean, pigeon pea, cowpea and Bambara nuts), the mixed maize farming system is largely the most dominant in the country and cuts across all the agro ecological zones of Malawi. It is plausible to select maize and groundnut productions as the baseline crop production activities in rain fed agriculture at national level. Therefore, baseline models used in the analysis are: rain fed conventional maize and rain fed conventional groundnut.

5. ERASP will fund activities aimed at improving the adoption of improved crop management in rain fed areas, including tree planting and adoption of soil and water conservation measures. With training, technology support and input services, the rural households are capable of undertaking improved farming practices and thereby enhancing productions at farm level. This analysis will take into account improved rain fed maize production based on the adoption of minimum soil disturbance (MSD) practices: planting basins and ripping. Two specific models on zero tillage maize production are considered (based on the adoption of both MSD techniques). Additionally, maize grown in agroforestry system and with the support of SWC measures is also taken into account. Through support to sustainable land and water management, the Project will develop climate resilient households.

6. **Methodology**. The analysis of the household (HH) models is developed by building financial budgets and deriving selected financial performance indicators that will be used to examine the impact of Project interventions on targeted HHs. Budgets are built taking into consideration several variables (including revenues, investment and operating costs) in both ‘with’ and ‘without’ Project scenarios. It is assumed that the ‘without’ scenario coincides with the current situation (i.e. baseline is assumed to be static).

7. The key performance indicator for households is the net income before tax, which is computed by subtracting the investment and operating costs from the revenues. Revenues correspond to the total value of production. Investment costs correspond to the activities that are to be set in place only at the beginning of the period under consideration in the business model, while operating costs correspond to the activities conducted every year during the production process. Other performance

indicators computed include: returns to family labor (USD/person-day), financial internal rate of return (FIRR), Net Present Value (NPV), and the Benefit-Cost (B/C) ratio.

8. Inputs. Farmers currently retain seeds and planting materials from their own harvest. Seed selection and exchange is not commonly practiced. The households carry forward sufficient seed to next season's crops, but these are often of poor quality. Availability of quality seed and seedlings remains an issue. With improved practices and extension support, crop productivity can be enhanced. The improved agricultural practices models assume purchases and the use of improved seed (certified and quality declared seed).

9. Labor. Hired and family laborers are both taken into account in the HH models and labor costs are included in the computation of operating costs. The costs for hiring external laborers are estimated using the average wages for general workers (unskilled farm workers). Family labor cost is also estimated using the same wage as for external labor.

10. The wage for hired labor adopted in the financial analysis (340 Mk/person-day) corresponds to the minimum wage rate for unskilled agriculture work, corrected using a 0.65 factor which takes into account the real unemployment rate in the rural areas of the country, which is considerably higher than the low official unemployment rate estimates available (3%). In the economic analysis, the returns to family labor estimated through the traditional rain fed maize production model (546 Mk/person-day) is used instead of the minimum wage rate (opportunity cost for family labor).

11. Net income before family labor does not include the cost of family labor (i.e. the cost of family labor is considered to be zero). On the contrary, net income after family labor – the indicator considered to compute activity benefits – includes the cost of family labor, estimated at the hired labor wage. Family labor costs are therefore explicitly taken into account so to make sure that family incomes (net benefits and remuneration of family labor) are sufficient to cover the costs of all incremental labor required in setting up the new activities.

12. Land. In the analysis it is assumed that smallholder farmers manage 1 ha of land. This is considered reasonable as the average cultivable land holding in Project's EPAs is 0.97 ha (see Appendix 2). The small size of plots can cause deterioration of soil fertility from overuse and has also been shown to be a disincentive to the adoption of productivity-enhancing technologies, which has a negative impact on poverty levels, economic growth and food security (New Alliance for Food Security & Nutrition in Malawi, 2014 Report).

13. Taxes. Financial indicator chosen for the analysis is the net income before tax. Therefore taxes are not taken into account here.

14. Government subsidy. Over the past 10 years, the Farm Input Subsidy Program (FISP) of the Government of Malawi has contributed to an increase of use of hybrid maize seed, fertilizer and chemicals by all farmers. However, FISP is not taken into account in the analysis. This is because (i) the FISP packages might not be available to all beneficiaries; and (ii) crop models should be financially viable without any subsidy in order to guarantee sustainability of Project interventions.

15. **Data.** Financial (farm-gate and market) output and input prices are derived from information compiled at national level by NASFAM and FEWSNet Malawi Price bulletin; all technical parameters used to build the financial models were derived from information obtained during first design mission (December 2015) through focus group discussions with key stakeholders. Data have been integrated with information available from a Household survey on sustainable agriculture practices in Malawi[87] and have been checked for consistency with average costs of goods and services in Malawi. Economic prices have been computed using a Standard Conversion factor (SCF) equal to 0.8983. This has been estimated using the following formula: SCF = (M + X) / [(M + Tm) + (X - Tx)], where M= total imports, X = total exports, Tm = import taxes and Tx = export taxes. For some key imported items (fertilizers such as Urea and Diammonium Phosphate - DAP), however, economic local market prices have been derived starting from the international fob prices at nearest port and considering

[87] The survey has been conducted from FAO within the EC-funded project on Climate-smart agriculture in Malawi and Zambia (see http://www.fao.org/climatechange/epic/home/en/). Data refer to the 2012-3 cropping season.

tariffs and taxes, marketing charges and transportation costs. Details are shown in the Annex to the present Appendix.

16. The list of HH models used in the analysis is provided in Table 1 and a description of the financial and economic models is reported in what follows. The detailed budgets are reported in the Annex to the present Appendix.

Table 45: List of HH Financial Models

Project activities	System	Model name
Baseline	Rain fed conventional	Maize_rainfed_traditional
		Groundnut_rainfed_traditional
Improved agriculture practices and catchment management	Rain fed improved	Maize_MSD_planting basins
		Maize_MSD_ripping
		Maize_MSD (ripping) & Agroforestry
		Maize_MSD (ripping) & SWC

17. **Baseline models**. These financial models describe the current situation and the traditional practices generally adopted by farmers in Project interventions areas.

(i) Traditional rain fed maize and groundnut production ('without' Project). These models describe the activity of traditional maize and groundnuts production in rain fed areas. It refers to a 'without Project' scenario and it represents a baseline for agriculture activity at smallholder level in the country. Maize is in fact is largely the most dominant crop in the country, cutting across all the agro ecological zones and groundnuts is a key cash crop commonly grow by smallholders in the country. The models refer to a HH with 1 ha of land, cropped according to traditional husbandry technique (i.e. mono cropping, land clearing, ridging and no use of mulching or cover crops). Yields are much below the potential and the returns to family labor are very low, estimated at the same level of the minimum wage for agriculture sector.

18. **Improved agriculture practices and catchment management models**. The Project will promote the adoption of good agricultural practices in rain fed fields and in the catchment areas (related to the command areas of the irrigated scheme developed under PRIDE), through the development of ad-hoc extension, provision of seedlings and inputs, and in-situ demonstration activities. The financial models related to such interventions are described below. Detailed models with the full list of parameters and crop budget components are reported in Annex 1. Farmers reached by Project activities will be able to switch from traditional to improved cropping technologies therefore increasing production and net incomes, and overall food security.

(i) Improved rain fed maize production through MSD ('with' Project). Improved maize husbandry relies on the introduction of innovations like MSD (planting basins or ripping), crop rotations and residue management. Also, the use of organic fertilization (e.g. manure or compost) is encouraged. The increase in soil moisture and fertility consequent to the adoption of these practices is expected to increase crop yields, thus resulting in net incomes increase.

(ii) Improved rain fed maize production through MSD and agroforestry ('with' Project). This model simulates the introduction of conservative practices like MSD (ripping) together with fertilizers trees scattered on the plot. Also, the use of organic fertilization (e.g. manure or compost) is encouraged. The increase in soil organic matter consequent to the adoption of these practices combined with the positive effects of the fertilizer trees is expected to increase crop yields, thus resulting in net incomes increase.

(iii) Improved rain fed maize production through MSD and SWC ('with' Project). This model simulates the introduction of conservative practices like MSD (ripping) together with SWC (contour ridges) in sloping plots. Also, the use of organic fertilization (e.g. manure or compost) is encouraged. The increase in soil organic matter consequent to the adoption of these practices is expected to increase crop yields, thus resulting in net incomes increase.

There is a wide literature body reporting the yield benefits deriving from the implementation of conservative practices with respect to traditional management. Primary and secondary data also show such increases. For example, the recent FAO survey on sustainable land management in Malawi mentioned above showed that maize yields increased from 1.6 t/ha (improved till practices) to 2.7 t/ha under minimum soil disturbance techniques[88]. The significant maize yield increase shown in the models is consistent with such evidence and is based on the following assumptions: (a) the improved land husbandry is based on a conservative land management approach (MSD together with mulching and rotation with legumes) which reduces soil erosion and nutrients loss, increases soil moisture and organic matter, improves soil structure and overall soil fertility; (b) in the improved management it is assumed that farmers will use an increased level of fertilization, including organic fertilizer when available (manure/compost), therefore gaining significant yield increases; (c) in estimating yield increase a conservative approach has been adopted, as the yield level used in the improved maize production model is below the potential for the country (5 t/ha); (d) yield increase is assumed to happen in the time range of 4 years, which agronomists consider a sufficient period to build soil fertility. The models used in the analysis also consider that other parameters (e.g. labor) may change as a result of yield changes (e.g. harvesting).

19. Traditional maize production is labour intensive and makes a limited use of agro-chemicals. The use of improved seeds and techniques (e.g. intercropping with legumes) makes possible the yield increase and a small reduction in labour time. Conservative techniques (e.g. zero tillage) will determine a higher yield increase and a significant reduction in labour use, although an increase in the use of chemicals is expected. It should be clarified that the adoption of some conservative techniques (e.g. planting basins) may imply a higher use of labour in the first year (to prepare the basins), but a reduction in subsequent years.

20. It should be also specified that agro-chemicals in Malawi are widely used also at smallholder level (even if in small amounts) thanks to the Farm Input Subsidy Program (FISP) of GOM. Quantities of fertilizers used in the models are therefore considered reasonable and affordable by small farms.

21. **Opportunity cost of capital.** The financial discount rate provides the alternative financial returns/opportunity costs to the investor. It has been used in this analysis to assess the viability and robustness of the investments as compared with market alternatives. The discount rate is estimated at 25%, computed as average between: (i) average deposit interest rate paid by commercial or similar banks in Malawi; (ii) lending interest rate; (iii) real interest rate; and (iv) long-term bonds rate, as shown in Table 2.

Table 46: Computation of discount rate to be used in the financial analysis

Indicator	Deposit interest rate	Lending interest rate	Real interest rate	Long-term bonds rate	**Average**
Rate (%)	13	44	19	25	**25**

Source: The World Bank.

22. **Results.** Expected financial benefits for targeted households are illustrated in Table 3. Selected performance indicators (i.e. NPV, B/C ratio and family net income) show much better results in the 'with project' models than in the 'without project' ones. Results suggest significant potential for creating positive net incomes for targeted households in selected productive activities through the interventions to be supported by the Project, confirming that the proposed ERASP interventions are financially attractive for participants. Favorable cash flows also show that the households will have the capacity to repay the investment costs and to cover the operating costs (see detailed budgets in Annex 1).

[88] Average values in Mzimba, Kasungu, Balaka and Ntcheu districts in the 2012-13 cropping season.

23. The primary objective of the financial analysis is to determine the financial viability and incentives for the target group for engaging in the Project activities, by examining the impact of Project interventions on family labour, cash flow and household incomes.

Table 47: Financial returns for HH business models

Project activities	Model name	Wop/WP	Return to family labour	NPV @ 25%	B/C ratio	Annual net income before family labor	Annual net income after family labor
			USD/day	USD		USD	USD
Baseline	Maize_rainfed_conventional	WoP	1.9	362	1.5	139	150
	Groundnut_rainfed_conventional	WoP	0.8	138	1.2	80	35
Improved agriculture practices and catchment management	Maize_MSD_planting basins	WP	5.2	759	1.8	256	192
	Maize_MSD_ripping	WP	4.0	791	1.9	249	200
	Maize_MSD (ripping) & Agrofores	WP	3.7	719	1.8	231	182
	Maize_MSD (ripping) & SWC	WP	3.5	593	1.6	216	150

Source: own elaboration

Project Benefits and Beneficiaries

24. **Project Benefits.** ERASP will generate financial and social benefits by promoting investments and activities aimed at improving rain fed crop production in catchment areas. Financial benefits will be in the form of increased financial returns (net incomes) of the HHs targeted by the Project. Social benefits will include a reduction in poverty rates in the areas targeted by the Project. This will be the effect of the increased financial returns for HHs consequent to Project intervention and of improved employment opportunities in the agriculture sector. The impact of Project interventions on the financial returns of HHs is estimated on the basis of the HH model analysis (see below). The number of beneficiaries is computed on the basis of planned Project activities and is shown in the following section.

25. **Direct Project Beneficiaries.** The Project would target approximately 16,600 smallholder households in the Project areas, especially young and female-headed HHs. Additional beneficiaries will be represented by smallholders who will be following the adoption of improved practices by lead farmers (approximately 12,600). Assuming an average household size of 5 people, total beneficiaries would be about 146,000 people. A breakdown of direct beneficiaries expected over the years as result of the implementation of Project activities, and phasing, is reported in Table 4.

Table 48: Direct Project Beneficiaries and Phasing

Project activities	Intervention areas & beneficiaries		Households reached									Total area
			2017	2018	2019	2020	2021	2022	2023	Total	Total incl. HH members	Ha
Improved agriculture practices and catchment management	On-farm tree planting	n.	65	65	65	65	-	-	-	259	1,297	200
	Establishment and maintenance of contour ridges in catchment areas	n.	1,297	1,946	1,946	1,946	1,038	-	-	8,171	40,856	6,000
	Improved agriculture practices (leaders - demonstration sites)	n.	1,297	1,946	1,946	1,946	1,038		-	8,171	40,856	6,300
	Sub-total		2,659	3,956	3,956	3,956	2,075	-	-	16,602	83,009	12,500
	Adopters of improved agriculture practices (followers)	n.	-	2000	3,000	3,000	3,000	1,600	-	12,600	63,000	48,510
Totals		n.	2,659	5,956	6,956	6,956	5,075	1,600	-	29,202	146,009	61,010
Phasing in		%	9	20	24	24	17	5	0	100		
Adoption rate 80%		%	7	16	19	19	14	4	0	80		

Source: own elaboration

26. **Indirect Project Beneficiaries.** There will also be large numbers of indirect beneficiaries, primarily the large population of maize producers who will benefit indirectly from the Project through improved access to information and improved agriculture technologies. Consumers would also benefit from more, better quality vegetable products, with positive effects in terms of improved nutrition and overall food security.

27. Crop service providers would benefit from increased service and input demand (e.g. fertilizers, seeds, marketing services). In addition to this, all those living in the rural areas where supported households will be located will benefit from strengthened local economies resulting from inflows of income and strengthened local demand. There will also be increased job opportunities for unemployed and underemployed women and men living in rural areas. The expansion of rain fed crop production will also promote development of other complementary economic activities (e.g. input dealers). Thus, Project activities will indirectly stimulate the whole rural economy benefiting rural population (including the rural poor) through increased demand for goods and services, additional employment opportunities and possibly reduced rural-urban migration.

ECONOMIC ANALYSIS

Objectives

28. The objectives of this economic analysis are: (i) to examine the viability of the Project as a whole, in which aggregated economic benefits are compared with total outlays; (ii) to assess the Project's impact and the overall economic internal rate of return (EIRR); and (iii) to perform sensitivity analysis in order to measure the robustness of the economic analysis and to measure variations in the overall EIRR due to unforeseen factors.

Methodology and Assumptions

29. The economic analysis is based on the estimation of benefits gained from the implementation of improved and climate resilient agricultural practices and catchment management. The costs and revenues estimated in the financial analysis provide the basis for an evaluation to determine the likely economic benefits and costs to the national economy as a whole. The main benefits of the Project would accrue to the Malawi economy in terms of the improved farming systems that will sustainably increase food crop yields, diversify crop production, improve soil fertility and structure, and increase overall food security (in terms of increased food availability, access and improved nutrition). Furthermore, reduced post-harvest losses will come from promoting the adoption of improved post-harvest management practices.

30. Since investments foreseen under the ERASP are linked to PRIDE Program investments, the same economic discount rate adopted in PRIDE economic analysis (i.e. 12%) has been adopted here. Anyhow, this rate is considered appropriate for the case of Malawi and perfectly in line with the social discount rate commonly used in several Development Banks[89].

31. Details of the Economic Analysis are shown in Annex 2. The estimate of the likely economic returns from the Project interventions are based on the following assumptions:

i. **Project life and adoption rate.** The analysis is based on a 20 year period during which ERASP will generate benefits, including the 7-year Project implementation period. The intervention and adoption rate follow the implementation targets foreseen in the cost estimates. In the base case, the adoption rate for planned activities at smallholder level is estimated at 80%.

ii. **Economic prices** have been computed using a Standard Conversion Factor (SCF) equal to 0.899[90]. For some key imported items (fertilizers), economic local market prices have been derived starting from the international free on board prices at nearest port and considering tariffs and taxes, marketing charges and transportation costs.

[89] See: Zhuang, J., Liang, Z. Lin, T. and De Guzman, F. 2007, 'Theory and Practice in the Choice of Social Discount Rate for Cost–Benefit Analysis: A Survey', ERD Working Paper No. 94, Asia Development Bank, May. And also: Harrison, M. 2010, Valuing the Future: the social discount rate in cost-benefit analysis, Visiting Researcher Paper, Productivity Commission, Canberra.

[90] The SCF has been estimated as follows: SCF=(M + X)/[(M + Tm)+(X - Tx)], where M=total imports, X=total exports, Tm=import tax, Tx=export tax.

iii. **Economic Project benefits**. The main quantifiable economic benefits arising from the Project derive from increased financial returns (net incomes) of the HHs involved in the activities targeted by the Project, as described in the financial analysis. Total net incremental economic benefits from development of irrigation system and adoption of good agriculture practices are therefore the components of Project benefits.

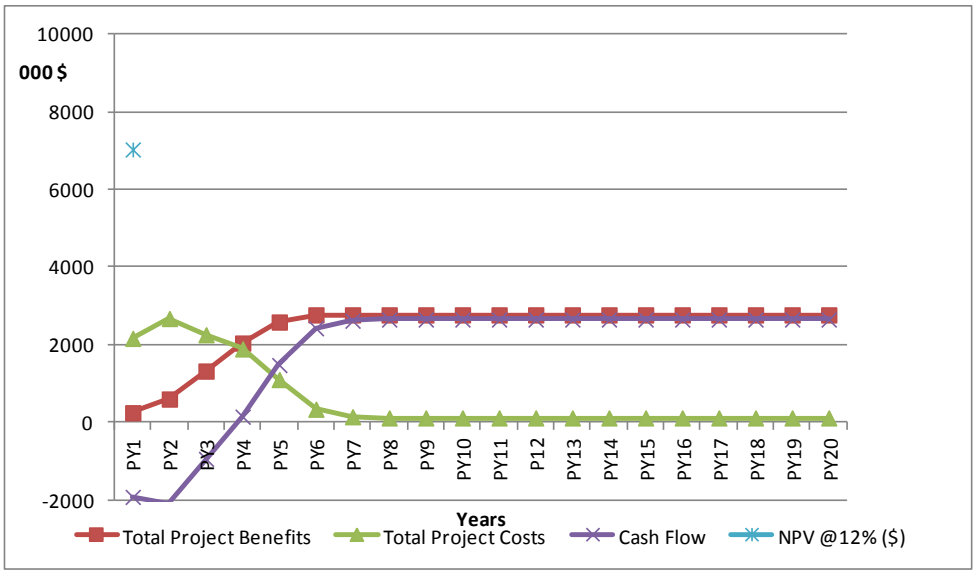
iv. **Economic Project Costs.** Financial costs were converted to economic costs, excluding taxes and duties as well as price contingencies and using the COSTAB software. Economic prices of most inputs and outputs - used to estimate the economic benefits - have been computed using the standard conversion factor (SCF) derived as described above. There are no further investment costs after PY7. However, 5% of total equipment and material cost is included from Year 8 to 20, as it is assumed that these costs will have to be incurred if the future benefits of the ERASP are to be sustained. In order to avoid double counting of the costs, only the incremental economic costs of the Project are considered (i.e. costs that were already included in the estimation of the net incremental benefits have been excluded).

Project Economic Internal Rate of Return and Net Present Value

32. The overall Economic Internal Rate of Return (EIRR) of the Project is estimated at 27.5% (base case) which is above the opportunity cost of capital in Malawi estimated at 25% (see Table 2 above), indicating the economic convenience of the Project. The EIRR is estimated in a conservative way as it is based only on the assumption that only 80% of target farmers will adopt technology packages promoted by the Project. In case of higher % adoption, the EIRR will increase (see benefits increments in the sensitivity analysis below).

33. The Net Present Value (NPV) is USD 7 million over the 20-year period of analysis, with the benefit stream based on the quantifiable benefits that relate directly to the activities undertaken following implementation of the components. These figures are considered as reasonable given the fact that benefits are estimated in a very conservative way. The flow of Project costs and benefits is reported in Figure1. A summary of the economic analysis is presented in the Annex to this Appendix.

Figure 1: Flow of project economic costs and benefits



Source: own elaboration

Sensitivity and risk analysis

34. **Sensitivity Analysis**. In order to test the robustness of the above results, a sensitivity analysis has been carried out. The EIRR and NPV were subject to sensitivity analysis in order to measure variations due to unforeseen factors and account for risk. Criteria adopted in the sensitivity analysis are: 10, 20 and 50% cost over-run, 10 and 20% increase in benefits, and 10 to 50% benefits

decrease. Results are presented in Table 5. Also, the minimum number of beneficiaries needed in order to obtain a positive NPV and therefore a profitable project has been computed. This indicator can turn in hand during the implementation of the project while monitoring project performances. As shown in Table 5 the minimum number of beneficiaries amounts to about 12,500 HHs (corresponding to an adoption rate of about 43%).

Table 49: Sensitivity analysis for informed decision-making

	Base case scenario	Cost increments			Benefits increments		Benefits decrease			Benefits delay		Minimum number of beneficiaries
		+10%	+20%	+50%	+10%	+20%	-10%	-20%	- 50%	1 year	2 year	12,506
EIRR	**27.5%**	24.6%	22.1%	16.6%	30.7%	33.9%	24.3%	21.0%	10.7%	21.6%	17.8%	12.0%
NPV ($)	7,032,283	6,222,151	5,412,019	2,981,623	8,545,643	10,059,004	5,518,923	4,005,562	- 534,519	5,154,200	3,477,341	-

Source: own elaboration

35. **Risk analysis.** In line with what has been already described in the final design main report, the bulk of risk to be considered in the sensitivity analysis relates to: risk of external shocks to the macro-economy; limited smallholders participation in Project activities; and slowdown in the implementation of Project activities due to limited local institutional capacity. Table 6 reports the impact of each of the key risk components on Project economic performance indicators. The probability of occurrence is supposed to affect the entity of cost/benefit increases/decreases reported above, i.e. a low probability translates into a 10% decrease in benefits (or a 1 year delay in benefits), while a medium probability is supposed to determine a 20% benefits decrease (or a 2 years benefits delay). It is important to notice that these impacts should be considered purely as indicative and do not rely on any proven evidence.

Table 50: Risk analysis

Risk description (link with the risk matrix)	Prob. of occurrence	Proxy to compare with SA results	EIRR (%)	NPV (million $)
SOCIAL: Lack of community participation; process becomes discredited through unmanaged conflicts	Medium	Decrease in benefits	21.0%	4,005,562
SOCIAL: Low adoption of practices	High	Decrease in benefits	10.7%	- 534,519
SOCIAL: Low level of benefits threaten sustainability of the initiative	Low	Decrease in benefits	24.3%	5,518,923
TECHNICAL: Low quality of lead farmers in the farmer field schools.	High	Decrease in benefits	10.7%	- 534,519
INSTITUTIONAL: Limited District level capacity	Medium	Benefits delay 2 years	17.8%	3,477,341
POLITICAL: Discontinuation of practices once the project ends	Medium	Decrease in benefits	21.0%	4,005,562
ENVIRONMENTAL: project leads to greater deforestation in surrounding areas	Medium	Decrease in benefits	21.0%	4,005,562
ENVIRONMENTAL: reforestation does not succeed because of low survival rate of seedlings	Low	Decrease in benefits	24.3%	5,518,923
ENVIRONMENTAL: Extreme floods and droughts wipe out project gains	Medium	Decrease in benefits	21.0%	4,005,562

Source: own elaboration

Additional benefits and environmental externalities

36. **Additional benefits.** ERASP activities will be conducted in upper-catchment areas linked to downstream PRIDE irrigation schemes. They are aimed at improving land management in the catchment areas, with expected benefits in terms of reduced erosion and sedimentation problems in rivers and dams. This, in turn, is expected to reduce maintenance costs of the irrigation schemes downstream (Nkhulambe/Wowo, Kasimba, Mwenilondo, Chanyungu Mposa and Lingoni). Empirical data available in the literature show that scheme maintenance costs due to reduced sedimentation in the irrigation structures can decrease from 2.5% to 2% of the capital costs. Using costs data available in PRIDE PDR the expected benefits have been estimated at around 10,000$/year for the overall schemes. This amount has been factored in the economic analysis, with a consequent increase in the EIRR and NPV, albeit minimum, as shown in Table 7.

Table 5119: Additional benefits (averted maintenance costs of selected PRIDE irrigation structures)

	Command area	Maintenance cost (over 5 years)		Benefits (averted maintenance cost)		EIRR	NPV
		WoP	WP				
	ha	$	$	$	$/year	%	$
Nkhulambe / Wowo	310	60,388	48,310	12,078	2,416		
Kasimba	162	31,558	25,246	6,312	1,262		
Mwenilondo	524	102,075	81,660	20,415	4,083		
Chanyungu Mposa	114	22,207	17,766	4,441	888		
Lingoni	189	36,817	29,454	7,363	1,473		
Total	1,299	253,045	202,436	50,609	10,122	27.7	7,107,887

Source: own elaboration

37. **Environmental externalities**. Considering the nature and scope of the Project it is considered appropriate to quantify benefits (or costs) related to carbon sequestration (or emissions) resulting from ERASP interventions. The Ex-Act software has been used in order to provide such estimation. Overall ERASP is expected to generate environmental externalities in the form of 1.77 t CO_{2e} (0.03 million t CO_{2e} of GHG emissions avoided and 1.74 million CO_{2e} sequestered) over 20 years. This is considered a conservative estimate. Ex-Act analysis and detailed results have been shown elsewhere in the PDR. Here we include the economic value of such externalities in the final aggregation of the economic analysis valuing Carbon at an average price of 3 $/ton. This amount has been factored in the economic analysis, with a consequent increase in the EIRR and NPV as shown in Table 8.

Table 52: Environmental externalities

Ex-ante Carbon benefits	Carbon balance over 20 years	Carbon value @ average price of 3 $/t		EIRR	NPV
	million t CO_{2e}	000 $ (over 20 years)	000 $/year	%	$
Avoided GHG emissions	0.03	90	5		
Carbon sequestration	1.74	5,220	261		
Totals	1.77	5,310	266	33.4%	9,015,420

Source: own elaboration

Table 53: Baseline models

Maize_conventional_tillage	Without Project (WoP)	ridging with hand hoe	Mw national		[financial]																	
Assumptions and parameters		Unit																				
Unit quantities	Seed rate - improved	Kg/ha	12	64%																		
	Seed rate - local	Kg/ha	22	36%																		
	Manure (and lime)	Kg/ha	0																			
	Basal & top dress fertilizers	Kg/ha	195																			
	Tot chemicals (insecticides & herbicides)	l/ha	0																			
	Land clearing	person-day/ha	17																			
	ridging	person-day/ha	30																			
	planting basin	person-day/ha	0																			
	other min till	person-day/ha	0																			
	other land preparation	person-day/ha	20																			
	sowing/planting	person-day/ha	4																			
	fertilizer/manure application	person-day/ha	5																			
	pesticides application	person-day/ha	0																			
	weeding	person-day/ha	18																			
	harvesting	person-day/t	10																			
	transporting from plot to home	person-day/t	9																			
	Shelling/cleaning/Packing	person-day/t	14																			
Unit prices	Output price, farm gate	Mk/Kg	107																			
	Seed, purchase price - improved	Mk/kg	3,432																			
	Seed, purchase price - local	Mk/kg	123																			
	Seed, weighted average price	Mk/Kg	2,241																			
	Manure	Mk/Kg	5																			
	Basal fertilizer (e.g. 23:21:0)	Mk/kg	273																			
	Top dress fertilizer (e.g. CAN, Urea)	Mk/kg	258																			
	Avg price fertilizer	Mk/kg	265																			
	Herbicides	Mk/l	3,000																			
	Insecticides (e.g. Malathion, Dimethoate)	Mk/kg	1,500																			
	Avg price insect & herbic	Mk/kg	2,250																			
	Transportation (10 km)	Mk/Kg	-																			
	Sacks	Mk/unit	5																			
Labour unit cost	Manual labour	Mk/person day	226																			
Items			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Outputs	Yield	Kg/ha	1,637	1,637	1,637	1,637	1,637	1,637	1,637	1,637	1,637	1,637	1,637	1,637	1,637	1,637	1,637	1,637	1,637	1,637	1,637	1,637
	Plot size	ha	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Inputs	Seeds	Kg	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	Manure	Kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Basal & top dress fertilizers	kg	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195
	Tot chemicals (insecticides & herbicides)	l	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Sacks	units	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Family Labour	Land clearing	person-day	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
	ridging	person-day	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
	planting basin	person-day	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	other min till	person-day	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	other land preparation	person-day	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
	sowing/planting	person-day	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	fertilizer/manure application	person-day	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	pesticides application	person-day	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	weeding	person-day	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
	harvesting	person-day	10	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
	transporting from plot to home	person-day	9	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
	Shelling/cleaning/Packing	person-day	14	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
Financial Budget																						
Revenue	Total production	Mk	174,733	174,733	174,733	174,733	174,733	174,733	174,733	174,733	174,733	174,733	174,733	174,733	174,733	174,733	174,733	174,733	174,733	174,733	174,733	174,733
Costs	Seeds	Mk	27,562	27,562	27,562	27,562	27,562	27,562	27,562	27,562	27,562	27,562	27,562	27,562	27,562	27,562	27,562	27,562	27,562	27,562	27,562	27,562
	Manure	Mk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Basal & top dress fertilizers	Mk	51,709	51,709	51,709	51,709	51,709	51,709	51,709	51,709	51,709	51,709	51,709	51,709	51,709	51,709	51,709	51,709	51,709	51,709	51,709	51,709
	Tot chemicals (insecticides & herbicides)	Mk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Sacks	Mk	164	164	164	164	164	164	164	164	164	164	164	164	164	164	164	164	164	164	164	164
	Transport	Mk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Family labour	Mk	28,919	33,669	33,669	33,669	33,669	33,669	33,669	33,669	33,669	33,669	33,669	33,669	33,669	33,669	33,669	33,669	33,669	33,669	33,669	33,669
Gross margin	Gross margin	Mk	95,299	95,299	95,299	95,299	95,299	95,299	95,299	95,299	95,299	95,299	95,299	95,299	95,299	95,299	95,299	95,299	95,299	95,299	95,299	95,299
Net income	Net Income	Mk	66,380	61,630	61,630	61,630	61,630	61,630	61,630	61,630	61,630	61,630	61,630	61,630	61,630	61,630	61,630	61,630	61,630	61,630	61,630	61,630
	Net Income	$	114	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106
	NPV @ 25%	Mk	247,477																			
	Returns to family labour	Mk/day	1,855	1,316	1,316	1,316	1,316	1,316	1,316	1,316	1,316	1,316	1,316	1,316	1,316	1,316	1,316	1,316	1,316	1,316	1,316	1,316
	Benefit/Cost Ratio		1.61	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54

Groundnut_conventional_tillage	Without Project (WoP)	ridging with hand hoe	Mw national		[financial]																			
Assumptions and parameters		Unit																						
Unit quantities	Seed rate - improved	Kg/ha	25	77%																				
	Seed rate - local	Kg/ha	49	23%																				
	Manure and lime	Kg/ha	-																					
	Basal & top dress fertilizers	Kg/ha	346																					
	Tot chemicals (insecticides & herbicides)	l/ha	4																					
	Land clearing	person-day/ha	11																					
	ridging	person-day/ha	21																					
	planting basin	person-day/ha	0																					
	other min till	person-day/ha	0																					
	other land preparation	person-day/ha	0																					
	sowing/planting	person-day/ha	6																					
	fertilizer/manure application	person-day/ha	0																					
	pesticides application	person-day/ha	0																					
	weeding	person-day/ha	18																					
	harvesting	person-day/t	32																					
	transporting from plot to home	person-day/t	23																					
	Shelling/cleaning/Packing	person-day/t	24																					
Unit prices	Output price, farm gate	Mk/Kg	182																					
	Seed, purchase price - improved	Mk/kg	214																					
	Seed, purchase price - local	Mk/kg	200																					
	Seed, weighted average price	Mk/Kg	211																					
	Manure	Mk/Kg	5																					
	Basal fertilizer (e.g. 23:21:0)	Mk/kg	273																					
	Top dress fertilizer (e.g. CAN, Urea)	Mk/kg	258																					
	Avg price fertilizer	Mk/kg	265																					
	Herbicides	Mk/l	3,000																					
	Insecticides (e.g. Malathion, Dimethoate)	Mk/kg	1,500																					
	Avg price insect & herbic	Mk/kg	2,250																					
	Transportation (10 km)	Mk/Kg	-																					
	Sacks	Mk/unit	5																					
Labour unit cost	Manual labour	Mk/person day	226																					
Items			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
Outputs	Yield	Kg/ha	883	883	883	883	883	883	883	883	883	883	883	883	883	883	883	883	883	883	883	883		
	Plot size	ha	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Inputs	Seeds	Kg	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25		
	Manure	Kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Basal & top dress fertilizers	kg	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346		
	Tot chemicals (insecticides & herbicides)	l	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4		
	Sacks	units	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18		
Family Labour	Land clearing	person-day	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11		
	ridging	person-day	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21		
	planting basin	person-day	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	other min till	person-day	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	other land preparation	person-day	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	sowing/planting	person-day	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6		
	fertilizer/manure application	person-day	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	pesticides application	person-day	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	weeding	person-day	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18		
	harvesting	person-day	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32		
	transporting from plot to home	person-day	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23		
	Shelling/cleaning/Packing	person-day	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24		
Financial Budget																								
Revenue	Total production	Mk	161,124	161,124	161,124	161,124	161,124	161,124	161,124	161,124	161,124	161,124	161,124	161,124	161,124	161,124	161,124	161,124	161,124	161,124	161,124	161,124		
Costs	Seeds	Mk	5,207	5,207	5,207	5,207	5,207	5,207	5,207	5,207	5,207	5,207	5,207	5,207	5,207	5,207	5,207	5,207	5,207	5,207	5,207	5,207		
	Manure	Mk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Basal & top dress fertilizers	Mk	91,750	91,750	91,750	91,750	91,750	91,750	91,750	91,750	91,750	91,750	91,750	91,750	91,750	91,750	91,750	91,750	91,750	91,750	91,750	91,750		
	Tot chemicals (insecticides & herbicides)	Mk	9,556	9,556	9,556	9,556	9,556	9,556	9,556	9,556	9,556	9,556	9,556	9,556	9,556	9,556	9,556	9,556	9,556	9,556	9,556	9,556		
	Sacks	Mk	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88		
	Transport	Mk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Family labour	Mk	30,638	30,638	30,638	30,638	30,638	30,638	30,638	30,638	30,638	30,638	30,638	30,638	30,638	30,638	30,638	30,638	30,638	30,638	30,638	30,638		
Gross margin	Gross margin	Mk	54,523	54,523	54,523	54,523	54,523	54,523	54,523	54,523	54,523	54,523	54,523	54,523	54,523	54,523	54,523	54,523	54,523	54,523	54,523	54,523		
Net income	Net Income	Mk	23,885	23,885	23,885	23,885	23,885	23,885	23,885	23,885	23,885	23,885	23,885	23,885	23,885	23,885	23,885	23,885	23,885	23,885	23,885	23,885		
	Net Income	$	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41		
	NPV @ 25%	Mk	94,438																					
	Returns to family labour	Mk/day	566	566	566	566	566	566	566	566	566	566	566	566	566	566	566	566	566	566	566	566		
	Benefit/Cost Ratio		1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17		

Maize_MSD_planting basins	With Project (WP)	MSD	Mw national		[financial]																	
Assumptions and parameters		Unit																				
Unit quantities	Seed rate - improved	Kg/ha	12	89%																		
	Seed rate - local	Kg/ha	22	11%																		
	Manure and lime	Kg/ha	331																			
	Basal & top dress fertilizers	Kg/ha	239																			
	Tot chemicals (insecticides & herbicides)	l/ha	5																			
	Land clearing	person-day/ha	17																			
	ridging	person-day/ha	0																			
	planting basin	person-day/ha	85																			
	other min till	person-day/ha	0																			
	other land preparation	person-day/ha	23																			
	sowing/planting	person-day/ha	7																			
	fertilizer/manure application	person-day/ha	8																			
	pesticides application	person-day/ha	5																			
	weeding	person-day/ha	16																			
	harvesting	person-day/ha	10																			
	transporting from plot to home	person-day/ha	9																			
	Shelling/cleaning/Packing	person-day/ha	14																			
Unit prices	Output price, farm gate	Mk/Kg	107																			
	Seed, purchase price - improved	Mk/kg	3,432																			
	Seed, purchase price - local	Mk/kg	123																			
	Seed, weighted average price	Mk/Kg	3,068																			
	Manure	Mk/Kg	5																			
	Basal fertilizer (e.g. 23:21:0)	Mk/kg	273																			
	Top dress fertilizer (e.g. CAN, Urea)	Mk/kg	258																			
	Avg price fertilizer	Mk/kg	265																			
	Herbicides	Mk/l	3,000																			
	Insecticides (e.g. Malathion, Dimethoate)	Mk/kg	1,500																			
	Avg price insect & herbic	Mk/kg	2,250																			
	Transportation (10 km)	Mk/Kg	-																			
	Sacks	Mk/unit	5																			
Labour unit cost	Manual labour	Mk/person day	226																			
Items			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Outputs	Yield	Kg/ha	2,710	2,710	2,710	2,710	2,710	2,710	2,710	2,710	2,710	2,710	2,710	2,710	2,710	2,710	2,710	2,710	2,710	2,710	2,710	2,710
	Plot size	ha	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Inputs	Seeds	Kg	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	Manure	Kg	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331
	Basal & top dress fertilizers	kg	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239
	Tot chemicals (insecticides & herbicides)	l	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	Sacks	units	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54
Family Labour	Land clearing	person-day	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
	ridging	person-day	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	planting basin	person-day	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85
	other min till	person-day	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	other land preparation	person-day	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
	sowing/planting	person-day	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
	fertilizer/manure application	person-day	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	pesticides application	person-day	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	weeding	person-day	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
	harvesting	person-day	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	transporting from plot to home	person-day	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Shelling/cleaning/Packing	person-day	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Financial Budget																						
Revenue	Total production	Mk	289,265	289,265	289,265	289,265	289,265	289,265	289,265	289,265	289,265	289,265	289,265	289,265	289,265	289,265	289,265	289,265	289,265	289,265	289,265	289,265
Costs	Seeds	Mk	37,739	37,739	37,739	37,739	37,739	37,739	37,739	37,739	37,739	37,739	37,739	37,739	37,739	37,739	37,739	37,739	37,739	37,739	37,739	37,739
	Manure	Mk	1,711	1,711	1,711	1,711	1,711	1,711	1,711	1,711	1,711	1,711	1,711	1,711	1,711	1,711	1,711	1,711	1,711	1,711	1,711	1,711
	Basal & top dress fertilizers	Mk	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376
	Tot chemicals (insecticides & herbicides)	Mk	11,007	11,007	11,007	11,007	11,007	11,007	11,007	11,007	11,007	11,007	11,007	11,007	11,007	11,007	11,007	11,007	11,007	11,007	11,007	11,007
	Sacks	Mk	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271
	Transport	Mk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Family labour	Mk	43,862	43,862	43,862	43,862	43,862	43,862	43,862	43,862	43,862	43,862	43,862	43,862	43,862	43,862	43,862	43,862	43,862	43,862	43,862	43,862
Gross margin	Gross margin	Mk	175,161	175,161	175,161	175,161	175,161	175,161	175,161	175,161	175,161	175,161	175,161	175,161	175,161	175,161	175,161	175,161	175,161	175,161	175,161	175,161
Net income	Net Income	Mk	131,298	131,298	131,298	131,298	131,298	131,298	131,298	131,298	131,298	131,298	131,298	131,298	131,298	131,298	131,298	131,298	131,298	131,298	131,298	131,298
	Net Income	$	226	226	226	226	226	226	226	226	226	226	226	226	226	226	226	226	226	226	226	226
	NPV @ 25%	Mk	519,139																			
	Returns to family labour	Mk/day	3,543	3,543	3,543	3,543	3,543	3,543	3,543	3,543	3,543	3,543	3,543	3,543	3,543	3,543	3,543	3,543	3,543	3,543	3,543	3,543
	Benefit/Cost Ratio		1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83

Maize_MSD_ripping	With Project (WP)	MSD	Arid areas		[financial]																	
Assumptions and parameters		Unit																				
Unit quantities	Seed rate - improved	Kg/ha	12	84%																		
	Seed rate - local	Kg/ha	22	16%																		
	Manure and lime	Kg/ha	331																			
	Basal & top dress fertilizers	Kg/ha	239																			
	Tot chemicals (insecticides & herbicides)	l/ha	5																			
	Land clearing	person-day/ha	17																			
	ridging	person-day/ha	0																			
	planting basin	person-day/ha	0																			
	other min till	person-day/ha	27																			
	other land preparation	person-day/ha	23																			
	sowing/planting	person-day/ha	7																			
	fertilizer/manure application	person-day/ha	8																			
	pesticides application	person-day/ha	4																			
	weeding	person-day/ha	16																			
	harvesting	person-day/ha	13																			
	transporting from plot to home	person-day/ha	13																			
	Shelling/cleaning/Packing	person-day/ha	20																			
Unit prices	Output price, farm gate	Mk/Kg	107																			
	Seed, purchase price - improved	Mk/kg	3,432																			
	Seed, purchase price - local	Mk/kg	123																			
	Seed, weighted average price	Mk/Kg	2,903																			
	Manure	Mk/Kg	5																			
	Basal fertilizer (e.g. 23:21:0)	Mk/kg	273																			
	Top dress fertilizer (e.g. CAN, Urea)	Mk/kg	258																			
	Avg price fertilizer	Mk/kg	265																			
	Herbicides	Mk/l	3,000																			
	Insecticides (e.g. Malathion, Dimethoate)	Mk/kg	1,500																			
	Avg price insect & herbic	Mk/kg	2,250																			
	Transportation (10 km)	Mk/Kg	-																			
	Sacks	Mk/unit	5																			
Labour unit cost	Manual labour	Mk/person day	226																			
Items			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Outputs	Yield	Kg/ha	2,642	2,642	2,642	2,642	2,642	2,642	2,642	2,642	2,642	2,642	2,642	2,642	2,642	2,642	2,642	2,642	2,642	2,642	2,642	2,642
	Plot size	ha	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Inputs	Seeds	Kg	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	Manure	Kg	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331
	Basal & top dress fertilizers	kg	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239
	Tot chemicals (insecticides & herbicides)	l	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	Sacks	units	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53
Family Labour	Land clearing	person-day	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
	ridging	person-day	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	planting basin	person-day	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	other min till	person-day	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
	other land preparation	person-day	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
	sowing/planting	person-day	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
	fertilizer/manure application	person-day	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	pesticides application	person-day	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	weeding	person-day	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
	harvesting	person-day	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	transporting from plot to home	person-day	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	Shelling/cleaning/Packing	person-day	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Financial Budget																						
Revenue	Total production	Mk	282,007	282,007	282,007	282,007	282,007	282,007	282,007	282,007	282,007	282,007	282,007	282,007	282,007	282,007	282,007	282,007	282,007	282,007	282,007	282,007
Costs	Seeds	Mk	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704
	Manure	Mk	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655
	Basal & top dress fertilizers	Mk	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376
	Tot chemicals (insecticides & herbicides)	Mk	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758
	Sacks	Mk	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264
	Transport	Mk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Family labour	Mk	33,419	33,419	33,419	33,419	33,419	33,419	33,419	33,419	33,419	33,419	33,419	33,419	33,419	33,419	33,419	33,419	33,419	33,419	33,419	33,419
Gross margin	Gross margin	Mk	170,250	170,250	170,250	170,250	170,250	170,250	170,250	170,250	170,250	170,250	170,250	170,250	170,250	170,250	170,250	170,250	170,250	170,250	170,250	170,250
Net income	Net Income	Mk	136,831	136,831	136,831	136,831	136,831	136,831	136,831	136,831	136,831	136,831	136,831	136,831	136,831	136,831	136,831	136,831	136,831	136,831	136,831	136,831
	Net Income	$	236	236	236	236	236	236	236	236	236	236	236	236	236	236	236	236	236	236	236	236
	NPV @ 25%	Mk	541,012																			
	Returns to family labour	Mk/day	2,727	2,727	2,727	2,727	2,727	2,727	2,727	2,727	2,727	2,727	2,727	2,727	2,727	2,727	2,727	2,727	2,727	2,727	2,727	2,727
	Benefit/Cost Ratio		1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94

Maize_MSD (ripping) & Agroforestry	With Project (WP)	Humid areas		[financial]																		
	Unit																					
Seed rate - improved	Kg/ha	12	84%																			
Seed rate - local	Kg/ha	22	16%																			
Manure and lime	Kg/ha	331																				
Basal & top dress fertilizers	Kg/ha	239																				
Tot chemicals (insecticides & herbicides)	l/ha	5																				
Land clearing	person-day/ha	17																				
ridging	person-day/ha	0																				
planting basin	person-day/ha	0																				
other min till	person-day/ha	27																				
other land preparation	person-day/ha	23																				
sowing/planting	person-day/ha	7																				
fertilizer/manure application	person-day/ha	8																				
pesticides application	person-day/ha	4																				
weeding	person-day/ha	16																				
harvesting	person-day/t	13																				
transporting from plot to home	person-day/t	13																				
Shelling/cleaning/Packing	person-day/t	20																				
Output price, farm gate	Mk/Kg	107																				
Seed, purchase price - improved	Mk/kg	3,432																				
Seed, purchase price - local	Mk/kg	123																				
Seed, weighted average price	Mk/Kg	2,903																				
Manure	Mk/Kg	5																				
Basal fertilizer (e.g. 23:21:0)	Mk/kg	273																				
Top dress fertilizer (e.g. CAN, Urea)	Mk/kg	258																				
Avg price fertilizer	Mk/kg	265																				
Herbicides	Mk/l	3,000																				
Insecticides (e.g. Malathion, Dimethoate)	Mk/kg	1,500																				
Avg price insect & herbic	Mk/kg	2,250																				
Transportation (10 km)	Mk/Kg	-																				
Sacks	Mk/unit	5																				
Manual labour	Mk/person day	226																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Yield	Kg/ha	2,656	2,656	2,656	2,656	2,656	2,656	2,656	2,656	2,656	2,656	2,656	2,656	2,656	2,656	2,656	2,656	2,656	2,656	2,656	2,656	
Plot size	ha	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Seeds	Kg	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
Manure	Kg	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	
Basal & top dress fertilizers	kg	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239	
Tot chemicals (insecticides & herbicides)	l	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
Sacks	units	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	
Land clearing	person-day	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	
ridging	person-day	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
planting basin	person-day	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
other min till	person-day	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	
other land preparation	person-day	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	
sowing/planting	person-day	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	
fertilizer/manure application	person-day	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	
pesticides application	person-day	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
weeding	person-day	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	
harvesting	person-day	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	
transporting from plot to home	person-day	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	
Shelling/cleaning/Packing	person-day	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	
Total production	Mk	283,501	283,501	283,501	283,501	283,501	283,501	283,501	283,501	283,501	283,501	283,501	283,501	283,501	283,501	283,501	283,501	283,501	283,501	283,501	283,501	
Seeds	Mk	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	
Manure	Mk	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	
Basal & top dress fertilizers	Mk	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	
Tot chemicals (insecticides & herbicides)	Mk	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	
Sacks	Mk	266	266	266	266	266	266	266	266	266	266	266	266	266	266	266	266	266	266	266	266	
Transport	Mk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Agroforestry costs	Mk	13,920	13,920	13,920	13,920	13,920	13,920	13,920	13,920	13,920	13,920	13,920	13,920	13,920	13,920	13,920	13,920	13,920	13,920	13,920	13,920	
Family labour	Mk	33,419	33,419	33,419	33,419	33,419	33,419	33,419	33,419	33,419	33,419	33,419	33,419	33,419	33,419	33,419	33,419	33,419	33,419	33,419	33,419	
Gross margin	Mk	157,823	157,823	157,823	157,823	157,823	157,823	157,823	157,823	157,823	157,823	157,823	157,823	157,823	157,823	157,823	157,823	157,823	157,823	157,823	157,823	
Net Income	Mk	124,404	124,404	124,404	124,404	124,404	124,404	124,404	124,404	124,404	124,404	124,404	124,404	124,404	124,404	124,404	124,404	124,404	124,404	124,404	124,404	
Net Income	$	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214	214	
NPV @ 25%	Mk	491,877																				
Returns to family labour	Mk/day	2,528	2,528	2,528	2,528	2,528	2,528	2,528	2,528	2,528	2,528	2,528	2,528	2,528	2,528	2,528	2,528	2,528	2,528	2,528	2,528	
Benefit/Cost Ratio		1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	

Maize_MSD (ripping) & SWC	With Project (WP)	SWC	Humid areas		[financial]																			
Assumptions and parameters		Unit																						
Unit quantities	Seed rate - improved	Kg/ha	12	84%																				
	Seed rate - local	Kg/ha	22	16%																				
	Manure and lime	Kg/ha	331																					
	Basal & top dress fertilizers	Kg/ha	239																					
	Tot chemicals (insecticides & herbicides)	l/ha	5																					
	Land clearing	person-day/ha	70			includes SWC																		
	ridging	person-day/ha	0																					
	planting basin	person-day/ha	0																					
	other min till	person-day/ha	27																					
	other land preparation	person-day/ha	23																					
	sowing/planting	person-day/ha	7																					
	fertilizer/manure application	person-day/ha	8																					
	pesticides application	person-day/ha	4																					
	weeding	person-day/ha	16																					
	harvesting	person-day/t	13																					
	transporting from plot to home	person-day/t	13																					
	Shelling/cleaning/Packing	person-day/t	20																					
Unit prices	Output price, farm gate	Mk/Kg	107																					
	Seed, purchase price - improved	Mk/kg	3,432																					
	Seed, purchase price - local	Mk/kg	123																					
	Seed, weighted average price	Mk/Kg	2,903																					
	Manure	Mk/Kg	5																					
	Basal fertilizer (e.g. 23:21:0)	Mk/kg	273																					
	Top dress fertilizer (e.g. CAN, Urea)	Mk/kg	258																					
	Avg price fertilizer	Mk/kg	265																					
	Herbicides	Mk/l	3,000																					
	Insecticides (e.g. Malathion, Dimethoate)	Mk/kg	1,500																					
	Avg price insect & herbic	Mk/kg	2,250																					
	Transportation (10 km)	Mk/Kg	-																					
	Sacks	Mk/unit	5																					
Labour unit cost	Manual labour	Mk/person day	226																					
Items			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
Outputs	Yield	Kg/ha	2,614	2,614	2,614	2,614	2,614	2,614	2,614	2,614	2,614	2,614	2,614	2,614	2,614	2,614	2,614	2,614	2,614	2,614	2,614	2,614		
	Plot size	ha	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Inputs	Seeds	Kg	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12		
	Manure	Kg	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331		
	Basal & top dress fertilizers	kg	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239		
	Tot chemicals (insecticides & herbicides)	l	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5		
	Sacks	units	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52		
Family Labour	Land clearing	person-day	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70		
	ridging	person-day	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	planting basin	person-day	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	other min till	person-day	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27		
	other land preparation	person-day	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23		
	sowing/planting	person-day	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7		
	fertilizer/manure application	person-day	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8		
	pesticides application	person-day	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4		
	weeding	person-day	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16		
	harvesting	person-day	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13		
	transporting from plot to home	person-day	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13		
	Shelling/cleaning/Packing	person-day	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20		
Financial Budget																								
Revenue	Total production	Mk	279,018	279,018	279,018	279,018	279,018	279,018	279,018	279,018	279,018	279,018	279,018	279,018	279,018	279,018	279,018	279,018	279,018	279,018	279,018	279,018		
Costs	Seeds	Mk	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704	35,704		
	Manure	Mk	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655		
	Basal & top dress fertilizers	Mk	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376	63,376		
	Tot chemicals (insecticides & herbicides)	Mk	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758		
	Sacks	Mk	261	261	261	261	261	261	261	261	261	261	261	261	261	261	261	261	261	261	261	261		
	Transport	Mk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	SWC costs	Mk	19,320	19,320	19,320	19,320	19,320	19,320	19,320	19,320	19,320	19,320	19,320	19,320	19,320	19,320	19,320	19,320	19,320	19,320	19,320	19,320		
	Family labour	Mk	45,397	45,397	45,397	45,397	45,397	45,397	45,397	45,397	45,397	45,397	45,397	45,397	45,397	45,397	45,397	45,397	45,397	45,397	45,397	45,397		
Gross margin	Gross margin	Mk	147,944	147,944	147,944	147,944	147,944	147,944	147,944	147,944	147,944	147,944	147,944	147,944	147,944	147,944	147,944	147,944	147,944	147,944	147,944	147,944		
Net income	Net Income	Mk	102,547	102,547	102,547	102,547	102,547	102,547	102,547	102,547	102,547	102,547	102,547	102,547	102,547	102,547	102,547	102,547	102,547	102,547	102,547	102,547		
	Net Income	$	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177		
	NPV @ 25%	Mk	405,458																					
	Returns to family labour	Mk/day	2,369	2,369	2,369	2,369	2,369	2,369	2,369	2,369	2,369	2,369	2,369	2,369	2,369	2,369	2,369	2,369	2,369	2,369	2,369	2,369		
	Benefit/Cost Ratio		1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58		

Project economic benefits																					
Component		Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18	Y19	Y20
		Annual unit incremental benefits																			
from conventional to improved	Mk	83,673	83,673	83,673	83,673	83,673	83,673	83,673	83,673	83,673	83,673	83,673	83,673	83,673	83,673	83,673	83,673	83,673	83,673	83,673	83,673
from conventional to Agroforestry	Mk	73,474	73,474	73,474	73,474	73,474	73,474	73,474	73,474	73,474	73,474	73,474	73,474	73,474	73,474	73,474	73,474	73,474	73,474	73,474	73,474
from conventional to SWC	Mk	53,291	53,291	53,291	53,291	53,291	53,291	53,291	53,291	53,291	53,291	53,291	53,291	53,291	53,291	53,291	53,291	53,291	53,291	53,291	53,291
from conventional to improved	$	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144
from conventional to Agroforestry	$	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127
from conventional to SWC	$	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92
		Beneficiaries (HH)																			
		Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18	Y19	Y20
from conventional to improved	n.	1297	1946	3891	5837	6874	6874	6874	6874	6874	6874	6874	6874	6874	6874	6874	6874	6874	6874	6874	6874
from conventional to Agroforestry	n.	65	65	130	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195
from conventional to SWC	n.	1297	1946	3891	5837	6874	6874	6874	6874	6874	6874	6874	6874	6874	6874	6874	6874	6874	6874	6874	6874
Adopters of improved agriculture practices (followers)	n.	0	2000	5000	8000	11000	12600	12600	12600	12600	12600	12600	12600	12600	12600	12600	12600	12600	12600	12600	12600
		Total annual economic benefits ($)																			
		Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18	Y19	Y20
from conventional to improved	$	187,112	280,668	561,337	842,005	991,695	991,695	991,695	991,695	991,695	991,695	991,695	991,695	991,695	991,695	991,695	991,695	991,695	991,695	991,695	991,695
from conventional to Agroforestry	$	8,215	8,215	16,431	24,646	24,646	24,646	24,646	24,646	24,646	24,646	24,646	24,646	24,646	24,646	24,646	24,646	24,646	24,646	24,646	24,646
from conventional to SWC	$	119,172	178,758	357,516	536,274	631,611	631,611	631,611	631,611	631,611	631,611	631,611	631,611	631,611	631,611	631,611	631,611	631,611	631,611	631,611	631,611
Adopters of improved agriculture practices (followers)	$	-	288,527	721,318	1,154,108	1,586,899	1,817,720	1,817,720	1,817,720	1,817,720	1,817,720	1,817,720	1,817,720	1,817,720	1,817,720	1,817,720	1,817,720	1,817,720	1,817,720	1,817,720	1,817,720
Total		314,499	756,169	1,656,601	2,557,033	3,234,851	3,465,672	3,465,672	3,465,672	3,465,672	3,465,672	3,465,672	3,465,672	3,465,672	3,465,672	3,465,672	3,465,672	3,465,672	3,465,672	3,465,672	3,465,672

	ECONOMIC ANALYSIS																			
	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18	Y19	Y20
Total estimated net incremental economic benefits	**251,600**	**604,935**	**1,325,281**	**2,045,626**	**2,587,881**	**2,772,538**	**2,772,538**	**2,772,538**	**2,772,538**	**2,772,538**	**2,772,538**	**2,772,538**	**2,772,538**	**2,772,538**	**2,772,538**	**2,772,538**	**2,772,538**	**2,772,538**	**2,772,538**	**2,772,538**
Total incremental economic costs of the project	**2,167,250**	**2,679,355**	**2,261,439**	**1,895,788**	**1,107,520**	**343,429**	**149,554**	**119,000**	**119,000**	**119,000**	**119,000**	**119,000**	**119,000**	**119,000**	**119,000**	**119,000**	**119,000**	**119,000**	**119,000**	**119,000**
Benefits-Costs	- 1,915,650	- 2,074,420	- 936,159	149,838	1,480,361	2,429,108	2,622,984	2,653,538	2,653,538	2,653,538	2,653,538	2,653,538	2,653,538	2,653,538	2,653,538	2,653,538	2,653,538	2,653,538	2,653,538	2,653,538

Sensitivity Analysis

	Base case scenario	**Cost increments**			**Benefits increments**		**Benefits decrease**			**Benefits delay**	
		+10%	+20%	+50%	+10%	+20%	-10%	-20%	- 50%	1 year	2 year
EIRR	**27.5%**	24.6%	22.1%	16.6%	30.7%	33.9%	24.3%	21.0%	10.7%	21.6%	17.8%
NPV ($)	7,032,283	6,222,151	5,412,019	2,981,623	8,545,643	10,059,004	5,518,923	4,005,562	- 534,519	5,154,200	3,477,341

Appendix 13: Draft project implementation manual

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[91] Draft PIM included as a separate document.

Appendix 14: Compliance with IFAD policies

OVERVIEW

1. This Annex identifies the key issues with respect to IFAD's relevant policies and strategy documents and procedures covering environment and natural resources, climate change, targeting, gender, land, knowledge management and the Social Environment and Climate Assessment Procedures (SECAP). The compliance with the policies and strategies is summarised in the table below while the SECAP is addressed in the Review Note that follows.

RELEVANT IFAD POLICIES AND STRATEGIES

2. The Enhancing Resilience of Agro-ecological Systems Project is part of the Integrated Approach Pilot (ERASP) Program on Fostering Sustainability and Resilience for Food Security in Sub-Saharan Africa. The funds for the project are sourced from the Land degradation, Biodiversity and Climate Change focal areas of the GEF. The project objectives are thus tailored to meet the goals of the ERASP and the focal areas, which include to promote the sustainable management and resilience of ecosystems and their services as a means to address food insecurity, contribute to arresting and reversing current global trends in land degradation, specifically desertification and deforestation and conservation, sustainable use of biodiversity and the maintenance of ecosystem goods and services and support countries for climate resilience and adoption of low carbon development paths. These objectives also follow the principles of the related IFAD policies and strategy priorities as summarised below:

Table 54: Compliance of ERASP with IFAD policies

Policy	Project Response
Environment and Natural Resources Management	
Environmental management is at the core of the ERASP. The project adheres to the principle of promoting the recognition and greater awareness of the economic, social and cultural value of natural assets. This will be done through the support to establishment of watershed management committees and the sensitization and training activities targeted at community based natural resource management (CBNRM) groups. These activities also follow the principle of equality and empowerment for women and local communities in managing natural resources. The principle of "Climate-smart' approaches to rural development will be followed through the scaling up of catchment level, sustainable land and water management practices by which stream flow and water quality is expected to be recovered in the catchment area. Greater attention to risk and resilience in order to manage environment- and natural-resource-related shocks will be followed by the improved monitoring and assessment of ecosystem services, resilience and food security. The activities under this project component will result in an improved evidence-base for ENRM decision-making at community, district level and central government levels. The principle of livelihood diversification to reduce vulnerability and build resilience for sustainable natural resource management will be adhered to by the introduction and/ or scaling up of agro-livestock systems and the establishment of woodlots along with income generating activities in managed forest areas. The fact that the ERASP is GEF financed and the target beneficiaries are rural communities, it adheres to the principle of increased access by poor rural communities to environment and climate finance.	
Targeting and gender	
The criteria applied in the project targeting include level of food insecurity; rain fall variation; drought and floods occurrence; level of land degradation; size of the irrigation scheme and community willingness to participate in the project. The criteria takes cognisance of poverty levels and also geographic targeting based on the location of the Programme for Rural Irrigation Development (PRIDE) sites for the sub-catchment selection. The irrigation schemes also result in self-targeting as the beneficiaries are communities living in close proximity to the scheme and within the sub-catchment area. In terms of gender the indicators for the project will be sex disaggregated and an analysis on gender differences particularly in natural resources management and agriculture production has been undertaken as part of the design process. The results of the study will ensure an analysis of each project activity from a gender perspective to address any unintentional barriers to women's participation. Through the support to CBNRM groups and also the Water User Associations (that will be the focus for PRIDE) the project will strengthen women's decision-making role in their communities and their representation in membership and leadership in these local institutions. Most of the CBNRM group members are female while in the WUA a minimum representation will be ensured. This support will also ensure women's active participation in project-related activities, decision-making bodies and committees, including setting specific targets for participation. The Programme Coordination Office for PRIDE will include a Gender and Targeting specialist to guide the implementation of specific activities and also address any challenges that may arise.	
Climate change	
One of the sub-objectives of the ERASP is climate change adaptation, mitigation and resilience, which will be achieved mainly through the integrated catchment area management and scaling up of catchment level, sustainable land and water management practices. The specific activities such as ensuring functional CBNRM groups, scaling up conservation agriculture, in situ water harvesting practices and integrating weather and climate information into farm planning methodologies will contribute to two purposes of the Strategy. Purpose one to support innovative approaches to helping smallholder farmers build their resilience to climate change and purpose three to inform a more coherent dialogue on climate change, rural development agriculture and food security.	
Land	

The land access and tenure security will be addressed mainly through the baseline PRIDE. The principles followed in PRIDE will apply to the ERASP as the implementation will be Coordinated by the same Office. The Free Prior and Informed Consent for affected communities will be obtained as detailed in the Resettlement Action Framework for PRIDE.
Knowledge management
The project will provide tools such as the Land Degradation Surveillance Framework, the Diversity Assessment Tool for Agro-biodiversity and Resilience and apply the Ex-ante Carbon Assessment Tool. These tools will guide the data collection that will contribute to national reporting systems and also the evidence base for decision making.

Social, Environment and Climate Assessment Procedures (SECAP) Review Note

1. Major landscape characteristics

The most important geomorphic feature of Malawi is the Great Rift Valley that extends from north to south and forms Lake Malawi. Malawi has four main agro-ecological zones, lowlands, highlands, mountain and escarpment areas. The lowland areas are below 600m in elevation and correspond to the lakeshore and floodplain areas of the Shire River, which is another important water body. Marshy areas (dambos) which are flooded in the rainy season are located mainly in the floodplains. The highland areas, of 900 to 1,400m in elevation, underlain with relatively thick laterites comprise a greater part of Malawi. Mountain areas generally constituted of massive igneous rocks have elevations of 1,400 to 2,500m in the northern region, while in the central to southern regions; the mountains of over 2,000m high tend to exist in isolation. Residual soils or weathered rocks are very thin and vegetation growth is poor. Escarpment areas comprise steep slopes between highlands and lowlands on the west side of Lake Malawi. The subsoil is generally thin and vegetation is relatively poor compared to the highland and lowland areas (Water Resources Master Plan, 2013).

Malawi has an extensive network of river systems. The major rivers are perennial, but due to the seasonal rainfall most of the smaller rivers have ephemeral flow. The drainage system has been divided into 17 Water Resources Areas (WRAs) that are sub-divided into 78 Water Resources Units. Each of the WRA is based on one large river basin or several small basins. Catchment management strategies will be developed for the management, use, development, conservation, protection and control of water resources within each catchment area.

Climate conditions in Malawi are greatly influenced by the dominant wind shift caused by the Inter-Tropical Convergence Zone. The sub-tropical climate is divided into three weather variations warm-wet (November to April), cool-dry winter (May to August) and hot-dry season (September to October).

1.1. Socio-cultural context

The primary livelihood activity in the rural areas of Malawi is agriculture, which is predominantly rain-fed and contributes 63% of the household income. More than 85% of rural households derive their livelihoods from agriculture. Approximately 88% of rural women are employed in the agricultural sector as smallholder farmers, compared with 73% of rural men (NSO 2009).The main crops grown are maize, groundnuts, sorghum, cotton, rice, pigeon peas and sweet potato. Maize as the staple crop is grown in all districts and the production levels are used as an indicator of food security. The land holdings are on average below two hectares and two thirds of the crops produced are consumed by the household. The most common condition of ownership and access to farmland is customary rights. Agro-pastoralism is the second most practiced activity with the main livestock being goats and chickens. Grazing is generally done on communal land and access to these is by customary rights.

Women participate fully in both cash and food crops and their contribution to food and nutrition security is considerable. With respect to other roles, 75% of females are engaged in fetching firewood as compared to 33% of the males; 88% of females are engaged in fetching water as compared to 45% for males and about 53% of females care for the sick while for males it is 40% (NSO 2009).

Poverty data from various national surveys depict predominantly higher rates in the rural southern region compared to those in the north. The higher poverty rates in the South are attributed to land constraints due to higher population density (IFPRI Report, 2011). The 2008 Population Census puts the population density in the south at 184 persons per square kilometre compared to only 63 in the north. Plot sizes are thus smaller in the south, which results in lower agricultural output per capita.

1.2. Natural resources and NRM

The Enhancing Resilience of Agro-ecological Systems Project (ERASP) will be implemented in a few selected sites among the locations where the Programme for Rural Irrigation Development (PRIDE),

which is the baseline programme, will intervene. PRIDE has 15 priority sites in eight districts (in two clusters - southern and northern). The ERASP sites have been selected according to a predetermined set of criteria including: level of food insecurity, rain fall variability, drought and floods occurrence, community willingness to participate in the project and level of land degradation. The selection was further informed by a baseline survey conducted in four districts covering 323 households and 12 focus group discussions, see PDR Section II.

Land degradation, partly due to deforestation, is a factor limiting agricultural productivity and adversely affecting food security. . Over an 18 year period between 1972 and 1990, forest cover reportedly reduced by 27% in the northern region, 51% in the central region, and 45% in the southern region. The Forest Policy (1996), which is currently under review, estimated the total forest cover to be declining at 1.0-2.8 % per year with much higher deforestation rates in the central and southern regions due to their higher population density. Higher rates of deforestation have been noted particularly in the village forest areas in customary forest and in the forest reserve areas. The expansion of agricultural land and logging for charcoal production and utilization of firewood are often the main causes of deforestation.

Water quality indicators also provide evidence of land degradation where in some cases such as in the Shire watershed (where Machinga, one target district, is located) the values for suspended solids and turbidity are approximately 50 times higher than other monitoring points upstream. These figures suggest serious levels of soil erosion have occurred in upstream watersheds. In the highland areas, the three main rivers show similar trends as the Shire River, with higher concentrations at the monitoring stations closer to the discharge basins. Agricultural developments in the central Lilongwe district also contribute to the deteriorating water quality.

The widely practiced maize-based cropping entails land preparation with hoes, where ridges are remade every season and plant residues are covered with inverted soil, removed or burnt. The routine annual tillage of the soil with associated removal or burning of plant residues leads to soil erosion. The reduced physical quality of soil makes it vulnerable to the impacts of drought, less responsive to fertilizer and less able to infiltrate rainfall or irrigation water.

Seasonal rainfall variations have an impact on water flows and quantities, which are a potential concern in irrigation scheme development. Water storage infrastructure can ensure sufficient quantities in years of low rainfall and also as demand increases. Using data provided by Department for Irrigation, the major causes of irrigation scheme abandonment or schemes operating below capacity are water shortages (25%), absence of permanent structures (17%), shortage of treadle pumps (19%) where these are used and high operating costs for schemes with motorised pumps and electricity (16%). Though the focus here is on blue water quantities, improving the management of the watershed would have a positive impact on both the blue and the green water.

1.3. Climate

Mean annual temperature in the southern Africa region has slightly increased since the beginning of the 20th century. Future temperature projections from global climate models suggest a moderate increase in temperature with warming in the range of 2.1 to 3.6 °C (compared to the reference period from 1961 to 1990) is likely for the end of the century. Furthermore, a strong increase in the duration of heat waves as well as a strong reduction in cold spell length is projected.

A tendency for a slight increase in annual total precipitation has been observed in the past. For the future, climate models project a continuation of the positive trend in precipitation amounts. For the end of the century an increase in annual total precipitation in the range of 2 to 14% (compared to the reference period from 1961 to 1990) is likely. The largest increase is projected to occur during the rainy season (up to 17%). Furthermore, projections suggest a slight increase in the duration of dry spells as well as a tendency towards more intense and more frequent rainfall events.

Smallholders identify flooding, late rains, short rains, dry spells, droughts and strong winds as the main climate related risks that they face. The main impacts of the climate risks noted by the farmers

are crop damage by floods, crops drying before maturity during dry spells, reduced crop yield, reduction in land availability for farming due to siltation, loss of soil fertility and soil erosion. The most immediate reported outcome after a climate shock regardless of the type of shock is decline in crop yield, which threatens household food security. Increased food shortage, loss of assets and income are also reported. Farmers acknowledge that agricultural production is considerably lower than in the past, mainly due to land degradation as well as climate variability. Seasonal rainfall outlook, onset of rains, extreme weather events, end of the rain season and number of days of rainfall are the five most important weather and climate information farmers would like to receive.

1.4. Key Issues

The main challenges in the project areas relate to land degradation, increasing climate variability and the lack of participatory planning within catchments and at sub-catchments levels. Climate stress namely erratic rainfall, recurring floods and droughts, pest and diseases and agricultural disturbances including lack of inputs and soil erosion are considered the main threats that jeopardize agricultural activity in Malawi.

The increasing climate variability evident in the changes in rainfall patterns including timing, duration and intensity of the rains are already having adverse impacts on the agricultural productivity as described above. Though irrigation provides some response to water stress, most of the maize staple crop is grown in rain-fed areas. The irrigation water source analysis illustrates approximately 90% rely on surface water with 80% of smallholder farms dependent on streams/rivers and the 8% use ground water sources and rely on shallow wells (Water Resources Master Plan, 2013). The area under irrigation has been steadily increasing and thus the water quantity in the surface water bodies may be a limiting factor to this expansion if measures are not taken to manage the watershed in order to maintain or improve the water flows where possible.

The challenges of declining soil fertility and agricultural productivity associated with land degradation have also been articulated above. Most of the communities link the degradation to land uses and management practices. However, communities visited during the design mission clearly articulated the lack of interaction among them and other water users in the same catchment. Communities downstream pointed out that some of the negative impacts in their locations were a result of communities upstream not managing natural resources well, particularly cutting down trees, which results in soil erosion. Thus there is a clear need for communities to have fora where they can discuss their interdependency within a catchment and have common agreements on the management of their resources. Catchment management guidelines have already been developed for the committees that can be set up at catchment, sub-catchment and micro-catchment levels.

Another practice apart from the tree cutting that was pointed out as causing degradation is cultivation along the river banks, which was also evident during the field visits and equally needs to be addressed. Though a minimum distance is recommended, ranging from 5-40 meters for small streams and larger rivers respectively, it is not adhered to by communities (Catchment Management Guidelines Volume II). The practice leads to high sedimentation levels in streams and rivers and erosion of the banks. The catchment management guidelines stipulate demarcation techniques and measures required for the protection of the buffer zones on the banks.

At the district level one of the main challenges expressed by the environmental officers is the lack of coordination of the various activities being undertaken to manage the environment. Most District Environmental Action Plans (DEAPs) have not been updated and tools are not readily available for the assessment of land degradation and progress made in any rehabilitation efforts. The DEAPs set out the priority environmental management and implementation measures thus their regular updating would support coordinated planning and reporting on the reversing of negative trends such as degradation and pollution. In addition providing tools would also ensure more systematic data collection and analysis for informed decision making and reporting on national commitments.

2. Potential project's social, environmental, and climate change impacts and risks

2.1. Key potential impacts

The project is expected to have mainly positive impacts as it is targeted at enhancing the provision of ecosystem services in specific sub-catchment areas to improve the productivity and resilience of agricultural systems. The positive impacts are expected mainly in terms of improved catchment management including re-vegetation of degraded areas to improve water security for irrigation schemes and also provide bio-physical protection in some flood prone areas. The catchment level planning is also expected to result in positive impacts with improved social interaction and benefit sharing among communities.

Some negative social impacts may occur due to the current membership of community based natural resource management groups being mainly women. In some communities they make up about 75% of the groups. Thus forming more groups will potentially increase the roles for women in target communities. However if the groups are strengthened and also compensated through benefit sharing schemes this may be an incentive for the female members to also have additional sources of livelihoods and enhance the sustainability of the activities.

Other negative impacts may also result from the expansion of agro-livestock systems particularly the grazing on communal lands. Measures would need to be put in place to manage the designated grazing areas.

2.2. Climate change and adaptation

The ERASP baseline investment, PRIDE includes funds from the Adaptation for Smallholder Agriculture Programme (ASAP) targeted at building the resilience of the beneficiaries. Most of the adaptation activities under PRIDE focus on good agricultural practices that are climate sensitive as detailed in Component 2 (PRIDE PDR Section II C). One of the issues thus considered during the design of the ERASP is value addition. This will be done through scaling up of in-situ water harvesting, conservation agriculture and establishment of contour ridges among others (ERASP PDR Section II C). In addition the emphasis on catchment management, which will ensure the implementation of these soil and water conservation measures, will also contribute to climate change adaptation. Additional activities such as the integration of meteorological forecasts into farm planning methodologies will also enhance the capacity of the farmers to manage the risks resulting from the changing climate.

3. Environmental and social category

The main investment activities under the ERASP relate to catchment management and scaling up of sustainable land and water conservation measures and agro-livestock systems. Initial estimates anticipate the project will have a positive impact on approximately 10,000 ha. Based on the activities planned, the project is Category B in terms of environmental and social risks. Though the activities may have an adverse impact on the environment (increase of livestock and pressure on grazing areas), measures will be incorporated that will minimise these impacts. In addition the activities are also expected to have benefits in improving the water security and quality in the sub-catchments where the interventions will take place. The baseline programme, PRIDE, which is Category A includes the development of Environmental and Social Management Plans as part of the Environmental and Social Impact Assessments to be undertaken for the various sites. These will be expanded to include the measures to be undertaken under ERASP to minimise any adverse impacts.

The categorisation is in line with the national guidelines in Malawi for Environmental and Social Impact Assessments (PRIDE ESMF pgs. 25-27). The ESMPs covering the sub-catchment for the PRIDE/ERASP intervention will be developed in close collaboration with the Environmental Affairs Department (EAD), who will approve and certify any Environmental Impact Assessment that will be undertaken during the implementation of PRIDE. The PRIDE/ERASP Coordination Office includes the position of an Environmental Specialist who will coordinate the participatory formulation of ESMPs

and their implementation and monitoring by communities and district/extension planning area teams. Additional expertise to support the implementation of the environmental management activities in the northern and southern clusters will be sourced through the project management resources.

As part of the GEF Integrated Approach pilot programme, particular attention will be given to the monitoring and assessment of the improvements made in addressing land degradation, promoting agro-biodiversity and adapting to climate change. Specific tools building on the national systems will be promoted such as the Land Degradation Surveillance Framework, and Diversity Assessment tool for Agro-biodiversity and Resilience, see PDR Appendix 7.

4. Climate risk category

The climate risk classification is moderate. Climate is expected to have adverse impacts on the agro-livestock systems and production as well as the watershed management activities. The adverse impacts will result from the increasing temperatures and changes in precipitation patterns as outlined above in sections 1.3 and 1.4. Project activities such as incorporating meteorological forecasts into farm planning methodologies, will enhance the resilience of the target communities.

Malawi has developed a national policy on climate change adaptation and an investment plan. The development of the policy and investment plan was led by EAD, who will also provide the oversight for the implementation of the ERASP. The capacity of EAD is limited in terms of human resources at both central and district levels. Some district environmental officers' positions have not been filled. However, the policies, strategies and investment plans provide the building blocks to deliver their mandate including a monitoring and evaluation framework, see Appendix 7 of the PDR. The capacity can be further enhanced through the provision of tools to enable the Department coordinate environmental management activities and report effectively on achievements and progress made.

5. Recommended features of project design and implementation

5.1. Mitigation measures.

The mitigation measures to address the key issues of land degradation and declining agriculture productivity foreseen in the project include re-vegetation of landscapes through tree planting and natural regeneration; promoting efficient cook stoves; introducing efficient charcoal kilns; establishing contour ridges; establishing woodlots; scaling up in situ water harvesting practices and; scaling-up agro-livestock systems. These measures are detailed in Section II C of the PDR.

5.2. Multi-benefit approaches.

The ERASP makes use of funds from four different sources within the GEF structures, the land degradation, biodiversity and climate change focal areas as well as the Integrated Approach Pilot for Food Security set aside. As such the catchment management planning and implementation activities are aimed at multiple benefit approaches to enhance climate change adaptation, reverse land degradation and promote agro-biodiversity while also enhancing food security, see Section II C of the PDR.

5.3. Incentives for good practices.

Potential incentives include the benefit sharing among different water users that can be achieved through the catchment management planning process. The planning also provides a potential for exploring paying for ecosystem services. A study conducted in the Lake Chilwa basin (under the Lake Chilwa Basin Climate Change Adaptation Programme) and also the current discussion in the Shire Basin management Programme proves that if specific users can be identified that have the capacity and interest to pay for ecosystem services, structures can be put in place to ensure communities maintaining watersheds are financially compensated for their efforts.

Other potential incentives are the stabilised yields in crops being cultivated and potential increases in some locations through the climate smart agriculture practices that are being scaled up. The soil and

water conservation measures will also improve water security in the catchment areas being targeted while also contributing to the yields.

5.4. Participatory processes.

Community level consultations through focus group discussions were undertaken in the potential target areas to establish community priorities and solicit inputs for activities that would address the challenges faced in environmental management. During implementation the Environmental and Social Management Plans will be developed with the communities. The catchment level planning will also be participatory through involvement of both the Community Based Natural Resource Management (CBNRM) groups and the Water User Associations (WUAs).

6. Analysis of alternatives.

The alternatives considered during the design process are mainly linked to the approach and techniques that will be applied. In terms of the approach the alternative of targeting a lower hectarage for intervention to ensure impact was selected over intervening in more sites thus increasing the reach but at the expense of ensuring significant tangible impacts. In terms of techniques the promotion of agro-biodiversity could consider new crops and improved seed varieties; however the focus selected is on land races and the engagement of the gene bank. The forest related activities also have various alternatives, of which natural regeneration was preferred over the promotion of exotic fast growing species.

7. Institutional analysis.

7.1. Institutional framework.

The mandate for natural resources and environmental management lies with the Environmental Affairs Department in the Ministry of Natural Resources, Energy, Environment and Mining. The overall mandate of forest management lies with the Forestry Department. The Water Resources Department in the Ministry of Agriculture, Irrigation and Water Development (MoAIWD) is mandated to manage and develop of both surface and ground water, including observation, assessment and conservation of surface water resources. The Land Resources Conservation Department, which is also under MoAIWD, is mandated to ensure conservation of land for agriculture, which is the main land use. These departments will all be engaged in the implementation of various activities under PRIDE/ ERASP based on their mandates.

As part of the decentralisation policy, a CBNRM strategy has been developed to empower communities in environmental management. The CBNRM activities are coordinated by the Village Development Committees and involve Village Natural Resources Management Committees, Catchment Protection Committees, Water Point Committees and Village Health and Sanitation Committees. The village level planning feeds into the DEAPs, which should be part of the District Development Plans. ADC and DESC

The management of water resources is currently being reformed with the creation of a National Water Resources Authority and the Catchment Management Committees (CMCs) (Water Resources Bill 2013). WUAs will be part of the CMCs whose main role will be to advise the Authority on matters pertinent to the proper management of water resources including water resources conservation, use and allocation. CMCs, consisting of the representatives of government agencies and various stakeholders will be established after public consultations on the proposals of the community and stakeholders concerned or the initiative of the Authority.

7.2. Capacity building.

At community level the main capacity building needs will be addressed through the formation and strengthening of the WUAs and the CBNRM groups both under PRIDE and ERASP respectively. Capacity building in the development and participatory monitoring of Environmental and Social

Management Plans is also envisaged as part of the responsibility of the PRIDE/ERASP Programme Coordination Office.

Capacity building is also anticipated for the District and Extension Planning Area Officers mainly on Monitoring and Assessment. The tools to be provided such as the Land Degradation Surveillance Framework (LDSF), the Diversity Assessment tool for Agro-biodiversity and Resilience (DATAR), which are detailed in Section III C of the PDR and Appendix 7, will entail the training of the officers in the application of these tools and integration into the national reporting structures.

7.3. Additional funding.

As indicated above the ERASP provides GEF funding through the Food Security ERASP, which is additional to the ASAP and IFAD resources for PRIDE.

8. Monitoring and Evaluation.

The main outcome and output level indicators are detailed in the Logical framework of the PDR. They include: Ecosystem services protected and sustained; Increase in months with improved water availability for agriculture; reduction in sedimentation affecting irrigation schemes; reduction in GHG emission and increase in sequestration; people trained in NRM related to integrated management of catchment area; Catchment Management Plans developed and adopted; farmers reporting farming system production increase by at least 20%; Ha. forest recovered and conserved; Households adopting efficient cook stoves; efficient kilns in use; Ha production landscapes and households benefitting from rainwater harvesting and infiltration measures; farmers adopting SLM practices and ha where they are successfully applied in terms of increased yields and; number of ha and number of landraces, traditional plant/crop/animal varieties used per ha in the production landscape.

9. Further information required to complete screening, if any

The information available through reports and that collected during the community consultations is sufficient to complete the screening.

10. Budgetary resources and schedule.

The social, environmental and climate risk assessments undertaken as part of the baseline PRIDE apply to the ERASP. An Environmental and Social Management Framework and a Resettlement Action Framework have both been developed for PRIDE. Some of the activities in the ERASP are envisaged to be part of the Environmental and Social Management Plans that will be elaborated during the implementation phase of PRIDE based on the Frameworks.

11. Record of consultations with beneficiaries, civil society, general public etc.

Consultations with communities were carried out during the field visits between 29th July and 3rd August 2015 as part of the initial project design phase. Additional community consultations were also undertaken during the second design mission, 24-25 January 2016. Consultations were also held with the National Smallholder Farmers Association of Malawi and Total Land Care (NGO working with rural communities) and Action Aid. The challenges identified by the communities such as deforestation of the uplands and the evident lack of coordinated participatory planning of natural resources management that involves upstream and downstream users have been incorporated in the design through the catchment planning and forestry activities.

Further consultations were undertaken in four potential target districts as part of the baseline survey using household questionnaires and focus group discussions during October 2015. The results from these consultations will inform the selection of the specific intervention sites and the activities to be implemented at these sites.

Table 55: Climate Risk Screening

Question	Yes	No	Additional Explanation of 'Yes' response
Is the target group of the project dependent on climate-sensitive natural resources (such as drought-prone crops, rainwater-fed agricultural plots, and migratory fishstocks)?	√		The beneficiaries are the smallholders who rely on rain-fed agriculture.
Has the project area been subject to extreme weather events in the past, such as flooding, drought, tropical storms, or heat waves?	√		Both floods and droughts have been recorded in the past.
Could changes in temperature, rainfall, or extreme weather affect the project impact, sustainability or cost over its lifetime?	√		Changes in rainfall will have a more pronounced effect on the rain-fed areas.
Will climate variability likely affect agricultural productivity within the project (crops/ livestock/fisheries) or incidence of pests and diseases?	√		Rainfall variability is already having a negative impact on agricultural production
Would weather-related risks or climatic extremes adversely impact upon key stages of identified value chains in the project (from production to markets)?	√		Floods and droughts will impact the value chains both at production and access to markets
Does the project have potential to integrate climate resilience measures without extensive additional costs (such as applying improved building codes; expanding capacity building programmes; or including climate risk issues in policy processes)	√		Adaptation measures have been incorporated during the design
Would the project benefit from a more detailed climate risk and vulnerability analysis to identify the most vulnerable rural population, improve targeting and identify additional complementary investment actions to manage climate risks?	√		A basic climate risk analysis has been done as part of the design and information is sufficient for identification of investment actions

Appendix 15: Contents of the Project Life File

Documents prepared during development of the PDR

1. Project Design Report – Main report and appendices
2. QE panel report
3. Mhango, W., Chipula, G., Kakota, T. (2015) Baseline Study for Enhancing the Resilience of Agro-Ecological Systems in Malawi, Lilongwe University of Agriculture and Natural Resources, Malawi.
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6. IFAD (2016) Aide Memoire, Design Mission: Enhancing the Resilience of Agro-Ecological Systems, 19-26 January.
7. Initial Site Selection Report, September 2015.

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