

**Economic Viability and Impact of EAMCEF Supported Income Generating
Projects Implemented Adjacent to the Eastern Arc Mountains Forests,
Tanzania**

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**COMPREHENSIVE REPORT ON PHYSICAL PERFORMANCE OF FIELD
ACTIVITIES**

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EXECUTIVE SUMMARY

The Eastern Arc Mountains Conservation Endowment Fund (EAMCEF) runs a grant scheme for supporting conservation efforts in the Eastern Arc Mountains (EAMs) of Tanzania. One of its funding areas is Community Based Conservation and Development projects. This funding area aims at improving forest conservation by engaging local communities, through supporting income generating activities (IGA) and hence reducing pressure on forests. The grant scheme provides three type of grant sizes, small grants, medium and large grants. However, it is not clearly known which is the potential IGAs projects among the EAMCEF funded projects? What are the impact of the projects to peoples livelihood and conservation of the Eastern Arc Mountain forests? What factors constraining project implementation, which funding options/ approach offers cost effective conservation approach and what new projects that if funded would bring positive impact to the conservation of the Eastern Arc mountain biodiversity and improve livelihood of the people. This study therefore aims at responding all these questions. Results indicate that, about 67 projects of 26 types have been implemented have been foundered across the Eastern Arc mountain. Beekeeping was not only mostly funded project but also mostly distributed in the Nature Reserves and National Parks of the Eastern Arc Mountains. Among all funded projects, Avocado fruits had the highest gross margin 99.6%, implies that it is the most profitable project. The major positive impact of the project to conservation include decrease threats to the forest compared to the past, such threats include illegal harvest of trees, frequent fire outbreak, mining and poaching. In terms of live hood, the IGAs projects contributed to increase in availability of food (Food security), water availability, ownership of durable goods as well as improved housing condition and household income. Challenges on implementation of projects include market, commitment of group members, lack of extension of officer, prolonged drought, unreliable rainfall, infrastructure, pests and diseases and lack of storage facilities. A total of 18 projects were proposed to be potential for being implemented in communities living adjacent the Eastern arc mountain forest, however, Chicken was ranked the best project if its funding is associated with Incubators. However, this can be possible through through adoption of appropriate funding scheme. Most of respondents preferred many small grants against a single large grant funding scheme, with duration changed from single year to multiple year funding system. Conclusively, supporting IGAs project is important tool for serving biodiversity of the Eastern Arc Mountain forest. However, for smooth and effective running of the EAMCEF the following are recommended: there should be effective allocation of financial resources and management of funded projects, Ensure availability of production material (germplasm) and market for products produced by villagers, Establish Eastern Arc Mountain Forest Conservation

fundere alliance (EAMFC-FA) to avoid duplication of efforts and help many villagers adjacent the Eastern Arc Mountain forest to benefit from conservation activities. More research on: value chain analysis of the IGAs supported by EAMCEF and long term study for monitoring of profitability of funded IGAS and on which is proper funding channels between groups and that to the government or NGO.

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LIST OF ABBREVIATION S

ADP	Agricultural development project
AWF	African Wildlife Fund
WCST	Wildlife Consecration Society of Tanzania
DC	District council
EAMCEF	Eastern Arc Mountain Endowment Fund
FROM ITAL	Ecological Monitoring
GTZ	German development agency
STEP	Southern Tanzania Elephant Project.
IGAs	Income Generating Activities
TANAPA	Tanzania National Parks
TFCG	Tanzania Forest Conservation Group
TFF	Tanzania Forest Fund
TFS	Tanzania Forest Service Agency
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
WB	World Bank
WWF	World Wide Fund for Nature

1.0 PROJECT PURPOSE

The Eastern Arc Mountains Conservation Endowment Fund (EAMCEF) runs a grant scheme for supporting conservation efforts in the Eastern Arc Mountains of Tanzania. One of its funding areas is Community Based Conservation and Development projects. This funding area aims at improving forest conservation by engaging local communities, through supporting income generating activities (IGAs) and hence reducing pressure on forests. The grant scheme provides three types of grant sizes, small grants, medium size grants, and large grants. However, it is not clearly known which is the potential IGAs project among the EAMCEF funded projects? What factors constraining project implementation, which funding options/ approach offers cost effective conservation approach and what new projects that if funded would bring positive impact to the conservation of the Eastern Arc mountain biodiversity and improve livelihood of the people.

The history of EAMCEF to support income generating activities for communities (IGAs and alternative energy sources technology is dated back to 2006 (EAMCEF, 2016a). The aim was to reduce dependence of the communities to forest products for their livelihoods. Among others, projects supported include beekeeping, biogas technology, conservation agriculture, horticulture and livestock keeping (dairy goats, dairy cows, pigs, poultry), tree planting as well as farming of butterfly, spice tree, sunflower and soya beans (EAMCEF, 2016b). Since implementation of each project requires resources (land, financial and human) which are scarce, wise allocations of the resources is essential. Assessing economic viability of projects would aid in deciding on the efficient way of allocating the resources (Kasim, 2016) while knowing the best funding approach is important for effective implementation of project circle.

Recently, a study on assessing Project Results and Impacts of Improving Conservation of the Eastern Arc Mountains Forests of Tanzania has been conducted (EAMCEF, 2016 b). However, the study was based only on secondary data hence lacking a support of field data. Also, lacked the aspect of economic viability, constraining factors in implementation of the projects, best funding approach and what new projects that if funded would bring positive impact to the conservation of the Eastern Arc mountain biodiversity and improve livelihood of the people. Therefore, implementing this project was important as it complement the previous study.

The results of the study are important as it addresses sustainability of IGAs projects. Also, they are important to funders (local and international) for proper allocating of financial resources to projects that will bring positive impacts to conservation of biodiversity and livelihood of the people.

1.1 OBJECTIVES

1.1.1 Overall objective

The overall objective of the study was to assess the economic Viabilities and Viability and impact of EAMCEF supported income generating projects implemented adjacent to The Eastern Arc Mountains Forests, Tanzania

1.1.2 Specific objectives

The specific objectives of the study were to:

- i. identify and assess the Funded IGAs project in the study area
- ii. evaluate economic viability of each of the funded IGAs
- iii. assess the impact of the funded project
- iv. assess factors affecting implementation of IGAs
- v. determine the best funding approach
- vi. Find out new projects that if funded will bring positive impacts to in terms of income and conservation of the Eastern Arc mountains forests.

1.1.3 Planned activities

A summary on the planned activities for implementation of the project and their respective output is shown in table 1.

Table 1. Planned Activities and Outputs

Planned Activity	Outputs
Collection of data for: - Identifying and assessing the EAMCEF Funded income generating activities (IGAs) project - Assessing economic viability of each of the funded IGAs projects - Assessing impacts of the respective IGAs supported by the EAMCEF to the community livelihood - The best funding approach - New project that if funded will give a better return - Assessing factors affecting effective implementation of IGAs supported by the EAMCEF.	- Data was collected in 10 districts such as Same, Lushoto, Mkinga, Mheza, Korogwe, Mvomelo, Morogoro, Kilolo, Mufindi and Ifakara, in one village located adjacent to either national park or nature reserve
Data coding, analysis	Data was coded and analysed
Final report preparation.	Finalized
Publishing and disseminating the results	Under preparation

2.0 IMPLEMENTATION METHODOLOGIES

2.1 Study area description

The EAM consist of 13 mountain blocks extending from Southern Kenya to Eastern Tanzania with a total area of over 50,000km². The dominant natural and cover is miombo wood land, covering approximately 42% of the total area, of which 10% is ‘disturbed miombo in the form of wood land with scattered crops (Schaafsma et al, 2014). The Eastern Arc Mountains contain 8 Nature reserves and 1 National Park. These include, Amani, Nilo, Chome, Magamba, Mkingu, Uluguru, Uzungwa Scarp and Kilombero Nature Reserves and Udzungwa Mountains National Park (Figure 1; Table 2). The Eastern Arc Mountains is a chain of isolated ancient crystalline mountains, extending from Makambako Gap in South Udzungwa of Tanzania to the Taita Hills in Kenya (Isango, 2007). It is located between 8°51’ S 34° 49’ E to 3° 2’ S 38° 20’ E). The Eastern Arc Mountain forests occupy about 535,000 hectares (EAMCEF, 2013).



Figure 1: Location of the Eastern Arc Mountain (Source: Modified from EAMCEF, 2013)

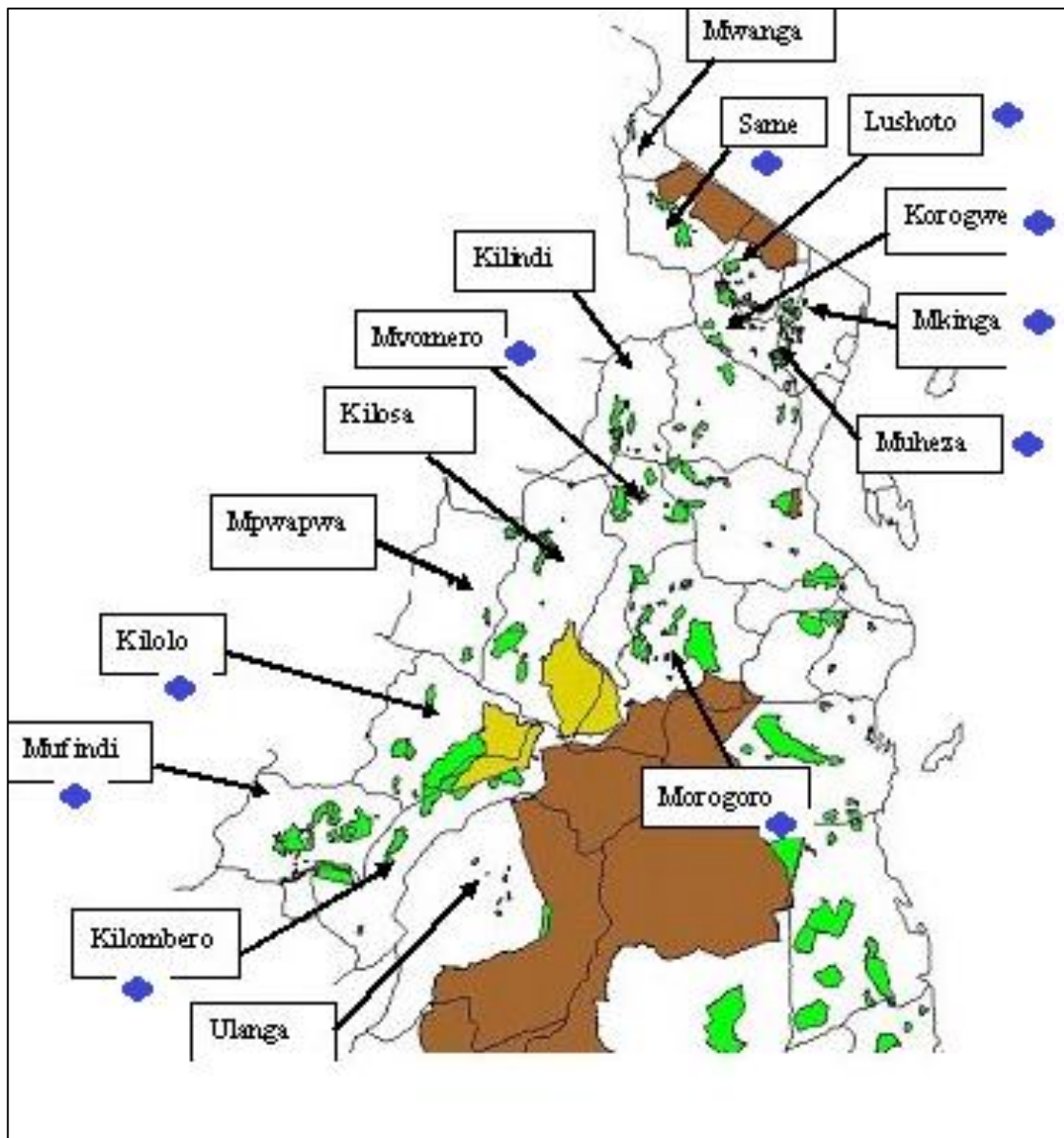


Figure 2. Districts of the Eastern Arc Mountains of Tanzania (Sources: Modified from <http://www.easternarc.or.tz/eastern-arc-mountains/index.html#>), accessed on 5, August, 2019). the blue cross in the map indicate the district where data was collected.

2.2 Sampling methods

Purposive and random sampling techniques were used. Ten villages located in 10 districts (Figure 2) were purposefully selected for data collection. The criterion for selection was the presence of IGAs project funded by EAMCEF. Sample size selection (households) was based on a case study research design method of the qualitative and quantitative nature as describe by (Yin, 2003). Case study method enables a researcher to closely examine the data within a specific context (Zainal, 2007).

2.3 Data collection methods

Secondary data were acquired through reviewing previous studies on IGAs and alternative energy source technologies. Literature survey involved a review of relevant published and unpublished reports, searched online repositories and visiting EAMCEF library.

Primary data were collected through key informant interviews, Focus Group Discussions (FGD), Participatory Rural Appraisal (PRA) household questionnaire survey and field observations. A mixture of these methods facilitated to crosscheck and validate collected information. A checklist was used to obtain information during key informant interviews and FGD. A key informant was regarded as an individual who is accessible, willing to talk and has a depth of knowledge on the respective subject. In this study, key informants included village leaders, influential village elders, District Forest Officer (DFO), conservators and other conservation stakeholders. Data from the Key informant interview were collected in all districts (Figure 2). The information collected include, factors affecting implementation of IGAs, PRA (pair wise ranking) was used during the FGD to determine the best project in the study area. The aim here was to find out new projects that, if will be funded will bring positive impacts to in terms of income and conservation of the Eastern Arc mountains.

Household questionnaires were administered to heads of households. In their absence, representative members were interviewed in which they were supposed to state their relationship to the head of household. A household was defined according to Wallace (2002) as a group of people/social unit composed of those who dwell or live under the same roof. The questionnaire aimed at collecting quantitative information on conservation and livelihood impact of EAMCEF Funded IGAs. In selecting household for the interview, sampling frame was the names of all households from village registers, whereas household was a sampling unit. A random sampling technique was employed for selection of sample households for interview. A total of 135 respondents, 75 and 60 respondents from Northern and Southern zone respectively were interviewed. The households were picked from the list of individuals who benefited from EAMCEF projects.

Impact of the projects to the livelihood was assessed based on some of livelihood assets elements such as food security, household income, availability of water, average household income,

housing condition and ownership of assets. Likert scale was used to measure impact of IGAs to biodiversity conservation and livelihood improvement. A Likert scale is commonly used to measure attitudes, knowledge, perceptions, values, and behavioral changes (Vogt, 1999). Economic variability of the projects was determined by Growth margin. Gross margin is the difference between revenue and cost of goods sold divided by revenue. Gross margin is expressed as a percentage. Physical observations were conducted to facilitate understanding of the real situation of areas under study and to cross checking of information collected from other sources of information.

2.4 Data analysis

The data collected was analysed by different approaches. Qualitative data from interviews was subjected to content analysis. Quantitative data from the household questionnaire was carefully coded by using computer sheets and analysed by using the Statistical Package for Social Sciences (SPSS) and Ms Excel computer programmes. The descriptive statistics such as frequencies, percentages, mean were determined. Economic variability data was calculated as the selling price of an item, less the cost of goods sold and expressed as percentage.

3.0 RESULTS AND DISCUSSION

3.1 Types and Distribution of the funded Income generating projects

About 67 projects of 26 types have been implemented have been founded across the Eastern Arc mountain. Beekeeping was the most project funded. Also, the beekeeping projects are mostly distributed in the Nature Reserves and National Parks of the Eastern Arc Mountains. In descending order other project mostly funded include Tree planting (17.6%), Dairy cow, poultry and Horticulture (5.9%) while the rest occupy the remaining percentage. Most of the projects (more 35 %) were funded by the EAMCEF. The EAMCEF concentrated funding only 16 types of projects whereas also beekeeping was dominant (Table 2 (a, b & c). Most of projects 25 % supported by the EAMCEF were located at Uzungwa scarp while Udzungwa National Park had less number of project 2 %. About 40% of the funded projects were Beekeeping Production Together with the EAMCEF other funding organization and their funding contribution shown in (Figure 3).

Table 2 a. types and percentage of project implemented in the Eastern Arc Mountain, Tanzania

S/n	Project	NP	%	S/n	Project	NP	%
1	Agroforestry (SECAP)	2	2.9	15	Feed the future	1	1.5
2	Bee Keeping	17	25.0	16	Fish	1	1.5
3	Bench terraces	1	1.5	17	Fuel efficient	1	1.5
4	Butterfly	2	2.9	18	Goat	2	2.9
5	Climate change adaptation	1	1.5	19	Horticulture	4	5.9
6	Cattle	4	5.9	20	Maize	1	1.5
7	Chicken	1	1.5	21	Mbegu Bora	1	1.5
8	CLM.	1	1.5	22	Pig	1	1.5
9	Community curio shops	1	1.5	23	Poultry	4	5.9
10	Dairy cow	2	2.9	24	Rigrow	1	1.5
11	Dairy goat	2	2.9	25	Sun flower	1	1.5
12	Eco tourism	1	1.5	26	Tree planting	12	17.6
13	Elephant	1	1.5				
14	Feed the future	1	1.5	TOTAL		67	

Table 2 (b). Contribution of EAMCEF to Financing IGAs projects and alternative energy source in the Northern Zone districts

TPROJECT	DISTRICTS														
	KOROGWE			LUSHOTO			SAME			MHEZA			MKINGA		
	Status	Funder	Pc	Status	Funder	Pc	Status	Funder	Pc	Status	Funder	pc	Status	Funder	pc
Bee Keeping	Ong	EAMCEF	S	Ong	EAMCE F	S	Ong	TFCG	M	Ong	TFCG	m	Ong	EAMCEF	s
	Ong	TFF	S	-	-	-	-	TANAPA	-	-	UNDP	m	Past	ARBOT	m
Tree Planting	Ong	World Vision EAMCEF	M	-	-	-	-	EAMCEF	S	-	FINIDA	m	-	-	-
	Ong	EAMCEF	S	Ong	EAMCE F	S	Past	TFCG	M	Ong	TFG	m	-	-	-
	Past	TFCG	M	-	-	-	Ong	TFS	-	-	EAMCEF	s	-	-	-
Poultry	Past	UNDP	M	-	-	-	-	-	-	-	-	-	-	-	-
	Past	EAMCEF	S	-	-	-	Ong	EAMCEF	S	-	-	-	-	-	-
Cattle	Ong	NILO	S	-	-	-	-	TFS	-	-	-	-	-	-	-
	Ong	ADP	M	-	-	-	Past	TFCG	M	-	-	-	Past	ARBOT	m
Fish	Ong	EAMCEF	S	-	-	-	Ong	TFS	-	-	-	-	-	-	-
	Ong	/NILO	S	-	-	-	-	-	-	-	-	-	-	-	-
Goat	Ong	EAMCEF/ NILO	S	-	-	-	-	-	-	-	-	-	Past	EAMCEF	s
Agroforestry (SECAP)	-	-	-	Past	GTZ/ DNRMP	M	-	-	-	-	-	-	-	-	-
Butterfly	-	-	-	-	-	-	Ong	EAMCEF/ UNDP	M	Ong	TFCG	m	-	-	-
C. C. adaptation	-	-	-	-	-	-	-	-	-	Past	WORLD BANK	m	-	-	-
Horticulture	-	-	-	-	-	-	-	-	-	-	-	-	Ong	EAMCEF	s

Table 2 (c). Contribution of EAMCEF to Financing IGAs projects and alternative energy source in the southern Zone district

Projects	Mvomero			Morogoro			Kilolo			Kilombero				
	Status	Funder	Duration	Projects	Status	Funder	Duration	projects	Status	Funder	Duration.	project	Status	funder
Feed the future	Ong	USAID	m	CLM.	Ong	UNDP	M(5)	Dairy cow	Ong	EAMCEF	S	Elephant	ong	STEP
Mbegu Bora	Ong	EAMCEF	S	Bee keeping	Ong	TFS	S	Pig	Ong	EAMCEF	S			AWF
Tree		EAMCEF	S	Tree planting	Ong	EAMCEF	S	Beekeeping	Ong	EAMCEF	S	Tree Plating	Ps	WWF
Fuel efficient	Ong	EAMCEF	S	Eco tourism	Ong	TFS	S	Tree planting	Ong	EAMCEF	S	Beekeeping	ong	TANAPA
Sun flower	Ong	EAMCEF	s	Bee keeping	Ong	WCST	M	Feed the future	Ong	USAID	S		ong	EAMCEF
Horticulures	Past	DC	-	Chicken	Past	WCST	M	One acre fund	Ong	USAID	S	Community curio shops	Ong	FROM ITAL
Maize	Past	Dakawa RCol	-	Dairy cow	Ong	EAMCEF	1	Dairy goat	Ong	EAMCEF	S	Rigrow	Ong	WB
Beekeeping	Ong	EAMCEF	S	Horticulture	Past	CWST	-	-	-	-	-			
Dairy goat	Ong	EAMCEF	S	Bench terraces	Past	EAMCEF	-	-	-	-	-			

Key: Ong = Ongoing; m = Multiple year; S = single year

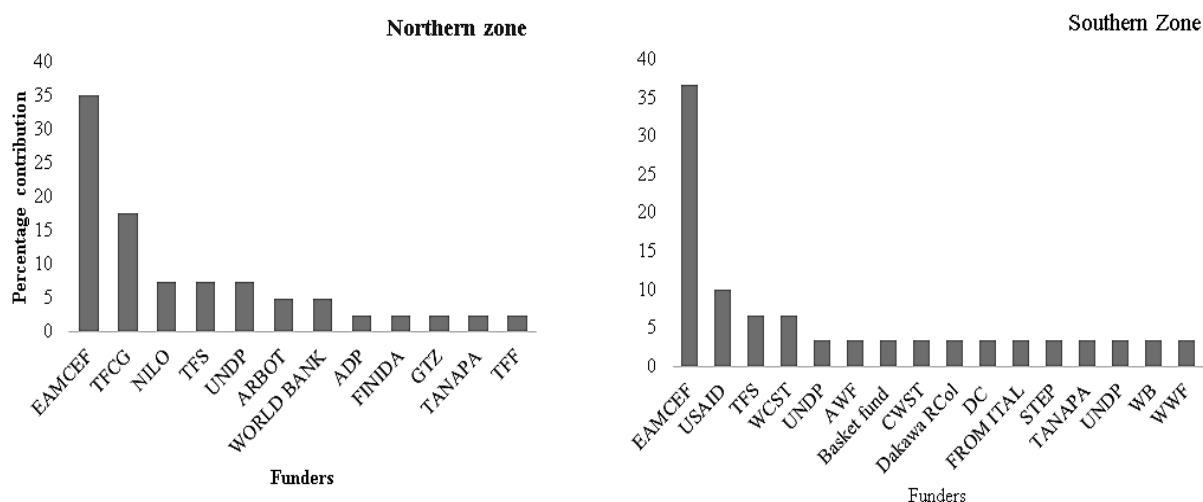


Figure 3. Contribution of EAMCEF on financing projects to the District with Nature Reserve in Northern and Southern zones

3.2 Economic viability of the IGAs

Economic variability of IGAs in terms of Gross Margin (%) in the study villages are presented in Table 3, appendix 2. Avocado fruits had the highest gross margin (99.6 %), implies that it is the most profitable project. This was followed by Porn farming (79.52%), Dairy Cattle (for slaughtered mature animals) (51,09%), rice farming and beekeeping.

Table 3. Profitability of the IGAs supported by the EAMCEF to communities adjacent Eastern Arc Mountains

IGAS	village/district (Node)	Nature Reserve	Gross Margin (%)	Remarks
Beekeeping	Morogoro	Uluguru	33	
Rice Farming	Mvomelo	Mkingu	37	June - August market
			68.5	December- January market)
Pig Farming	Kilolo	Kilombelo	79.5	
Dairy Cattle			51.1	(For slaughtered mature animals)
Fruit (Avocado)	Mufindi	Uzungwa scarp	99.6	

3.3 The impact of the Income generating and alternative energy source projects

3.3.1 Impact of the conservation on forest cover of the Nature reserves

The results show that major threats such as illegal harvest of trees, frequent fire outbreak, mining and poaching activities that have decreasing across the Nature Reserve and the National park located within the Eastern Arc mountains (table 4).

Table 4. Community perspective on trend of threat in the Nature Reserve across the Eastern Arc Mountains forest for the past 5 years (n = 135)

Zones	Nature Reserve	Threats											
		Illegal tree harvesting			Fire outbreak			Mining			Animal Poaching		
		D	S	I	D	S	I	D	S	I	D	S	I
Northern	Nilo	80	13	7	80	13	7	73	13	13	87	7	7
	Amani	53	33	13	60	27	7	60	20	20	47	27	27
	Chome	60	33	7	20	60	20	60	13	20	80	13	7
	Magamba	53	40	7	13	53	13	53	33	13	73	13	13
Southe	Urugulu	67	20	13	53	40	7	40	40	20	73	0	13
	Mkingu	13	20	13	13	40	33	40	33	27	53	7	27
	Uzungwa scarp	40	13	7	40	27	13	53	27	20	53	33	13
	Kilolo	53	7	13	33	47	20	53	20	13	40	13	27
	Kilombero	86	14	0	93	7	0	100	0	0	100	0	0
	Score	505			405			532			606		
	Rank	2			3			4			1		

The decrease of poaching activities in the Nature Reserves and a National Park was ranked the highest impact of IGAs supported by EAMCEF and other organizations in the villages adjacent the Eastern Arc mountains forest. It was revealed that, several animal species have been hunted across the Nature reserves where the most hunted were: small animals such as digidigi and wild pigs have been hunted in Kilombero Nature Reserve; Wild pigs for food, Monkeys for food, Impalas and Madoqua Kirkii in the Nguru Nature Reserve and Digidigi in the Urugulu Nature Reserve. The hunting activity of these wildlife species have been accompanied by forest fires burning which disturbs the forest ecology.

Decrease of illegal harvesting of trees in the nature reserve was ranked the second. This entailed harvesting trees for timber product, poles and fuel wood for domestic and commercial purposes. The harvesting of trees has been negatively affect the forest cover and services such as carbon sequestration and storage as well as habitat for biodiversity.

The reduced mining activities in the EAMFs was ranked the third. Mining activities threatened almost all nature reserves in the Northern zone. Extraction of alluvial gold has been associated with tree cutting and destruction of water sources.

The fire outbreak was ranked the fourth threat affecting the Nature Reserve. This had been caused by bad practice of animals and wrong believes of some villagers that, when you burn trees on the top of mountains, the god can hear their problem fast especial scarcity of rain. All these have been contributing to the improved forest condition and cover .Several indicators shows the forest is recovering including: revival of water sources and the increase of water flow from the Nature Reserves; regeneration of the forest due to increases of tree population identifies the changes in the forest whereby all those way paths across the forest has been disappeared by being covered by grasses and trees and increases of species of wild animals which were in danger to disappear due to poaching and destructive environment like white and black Colabas monkey in Magamba forest. This indicates that, there are changes of forest health.

3.3.2 Impact of IGAs projects on peoples' livelihoods

The results show that, IGAS supported by EAMCEF has positive impact to livelihood improvement to community living adjacent Nature Reserves in the Eastern Arc Mountains. Food security livelihood component was ranked as the highest impact of IGAs to peoples' livelihood. This was followed Water availability, Ownership of durable goods, Housing condition and household income (table 5).

Table 5. Perception on impact of IGAS supported by EAMCEF on livelihood improvement to community living adjacent Nature Reserves in the Eastern Arc Mountains (n = 135)

Zones	Village	Livelihood component														
		Water availability			Food security			Household income			Ownership of assets			Housing condition		
		W	S	B	W	S	B	W	S	B	W	S	B	W	S	B
Northern	Kwamkole	13	47	40	13	27	60	27	27	47	33	47	20	20	60	20
	Bwambo	0	7	93	13	40	47	20	53	27	33	47	20	33	47	20
	Ndabwa	7	7	87	7	13	80	13	33	53	0	47	60	33	40	27
	Bosha	13	47	33	13	53	33	20	60	20	20	53	27	20	47	33
	Shembekeza	7	53	40	13	47	40	20	47	33	20	40	40	20	53	27
Southern	Choma	32	23	45	23	15	61	23	46	31	54	15	31	54	15	31
	Msufini	33	13	53	7	0	93	27	13	.9	7	7	86	7	0	83
	Ukwega	9	0	91	0	0	100	9	0	91	9	0	91	9	0	91
	Idegenda	0	27	73	0	50	50	36	18	46	0	0	100	0	0	100
	Mkula	0	79	21	0	86	14	0	36	64	0	79	21	0	50	50
Score				576			578			412			496			482
Rank				2			1			5			3			4

Key: W = Worse; S = Same as before; B = Better

Local communities ranked food security as most improved livelihood component compared to the past. This is because EAMCEF funding focus much on projects geared towards solving the problem of food security in the society. Projects like Dairy Goat and Cow, Sunflower, Mbegu Bora, Fish, Poultry, Agro forestry and Beekeeping area geared towards food production for improving food security in the communities. Also the products from the IGAs are sometimes sold to get extra income, which in turn used to pay food for families, hence enhancing the food security.

Improvement of water availability was ranked the second. Availability of water has improved livelihood component compare to the past. For example, local communities adjacent the Magamba Nature Reserve in Lushoto, admitted that there was improvement of water sources of Kibohelo. In the villages, farmers were getting enough water flowing from the Nature Reserve compared to the past five years. The Kibohelo source of water has been used as the main source of water which supply large area of Lushoto district. Similar trends were observed in Bwambo, Kwamkole and Shembekeza villages whereas sources of water from Chome, Nilo and Amani respectively, were said, have been increasing for the past five years. As a result of increased availability, food production and income of households in the villages have been increased, hence making the life of the communities better.

Ownership of assets, housing condition and income was ranked the third fourth and fifth respectively. The IGAs have been contributing on the improvement of the income and ownership of durable goods (household assets). For instance, in Kilolo and Mvomero some villagers were able to build their good houses, bought solar systems, motorcycles and other household assets and accommodate their children to acquire better and quality education.

3.4 Challenges on implementation of IGAs and alternative energy source technologies

The majority of respondents (77%) and (86%) in the Northern and Southern zone respectively, ranked market as the most constrain factor on implementation of the projects (table 7). The main market challenges were poor market information and low market price. Also, the market chain of products produced by the farmers is not well understood, this caused by accumulation of product during the harvest period. Butterfly and rice farming areas are among areas that face

severe market problem. This discourages farmers from investing more their efforts into IGAs activities.

Table 6. Constraining factors for implantation of the projects in the Northern and southern zone

Variable	Percentage of respondents	
	Northern (N = 75)	Sothern (N = 60)
Market	77	86
Commitment of group members	75	23
Lack of extension of officer	68	84
Prolonged drought	64	29
Unreliable rainfall	63	42
Pests and diseases	61	75
Infrastructure	52	56
Lack of storage facilities	35	-

Commitment of group members was ranked the second challenge constraining successful implementation of projects. It has been realized that all projects in the areas had been implemented through groups composed people ranging from 10 to 20. While some groups did very well in implementing projects, other got totally failure. Lack of cooperation and commitment among group members and poor leadership had been contributing to the failure. However, severity of this problem deferred across with zones. For example, commitment of group members was a big problem in the Northern zone, while in the Southern zone was not.

Lack of extension was ranked the third challenge in Northern while in the Southern zone, it was the second. Extension officers are important for giving guidance to farmers on proper implementing agricultural, livestock forest/beekeeping, aquaculture and other IGAs related projects. However, in the study area, the extension services to farmers were not reliable contributing to the failure on the implementation of the projects.

Prolonged drought and Unreliable rainfall were ranged the fourth and fifth in the Northern zone. This is one of the impacts of climate change. Rainfall in the area is unreliable as sometimes there is variability of rain seasons. While sometimes rainfall exceeds the normal level, sometimes areas there are floods which destruct farms when. Climate change leads to change on rainfall

pattern. Prolonged drought has been posing effects to almost all projects. For example, Fish and Rice farming were among of the projects that have been highly affected because of prolonged drought in the villages' adjacent Eastern Arc Mountains.

Pest and Disease have been affecting crops and animals in the study areas. For example, chicken diseases which affect its growth. Also, rice production in Mvomero district has been affected by a number of pests such as stem borers, rats and birds.

Poor infrastructure (roads) was another challenge for the sustainable implementation of the project. Most of villages adjacent the Eastern Arc Mountains are located in Mountains areas, where there are no reliable roads. Roads facilitate farmers to transport their products to market places. Also, roads are important for transporting agricultural implements and for the movement of extension officers from urban areas to the villages where farmers' farms are located.

Lack of storage facilities was the last challenge. This challenge was only mentioned in the Northern zone (Amani Nature Reserve) by butterfly keepers and Kilolo by fish farming farmers. This is because butterfly needs proper storage facilities to keep the pupa in a conducive environment for their better survival. Also, storage facilities like cold rooms area important for keeping the fish safe while waiting for customers or exporting to the market.

3.5 New projects proposed in the districts of the Northern and Southern zone

A total of 18 projects were proposed to be potential for being implemented in communities living adjacent the Eastern arc mountain forest (table 6). Among the projects, only six projects were mentioned to be potential to be implanted both in the Eastern and Northern part of the Eastern Arc Mountain. However, Chicken was ranked the best project to be implemented in both zones. However, it has been urged that for this project to be more productive it should be associated with Incubators. In the Northern zone, other projects scored higher include dairy cow and horticultural while in the Southern zone, beekeeping and Aquaculture projects scored higher. Moreover, it was found that, some projects proposed in one zone were not the preference in other zone while some were. For example, Aquaculture and beekeeping scored very high in the Southern zone, while in Northern was low. Also, Rabbit faming project was mentioned only in Kilolo in the Northern zone.

Table 6. Proposed new projects in the districts of the Northern and Southern of the EAMCEF operating areas

S/N	Project	Northern zone						Southern zone				%		
		Same	Lushoto	Korogwe	Mheza	Mkinga	Score	%	Morogoro	Mkingu	Kilolo		Ifakara	Score
	Poultry/								2	3	1	5		
1	Chicken	4	2	5	5	6	22	30					6	16
2	Dairy goat	5	1	4	2	1	13	18	-	2	0		5	14
3	Horticultural	2	3	1	1	-	7	10	-	-	-		-	-
4	Ginger/species	6	-	-	-	-	6	8	1	-	-		1	2,7
5	Goat	2	-	2	-	-	4	5	-	2	-	3	6	16
	Small scale.								-	-	-			
6	industries	-	4	-	-	-	4	5					-	-
7	Ground nut	-	-	-	-	4	4	5	-	-	-		-	-
8	Beekeeping	-	-	3	-	-	3	4	4	1	-		-	-
9	Cassava	-	-	-	-	3	3	4	-	-	-		-	-
10	Black pepper	-	-	-	2		2	3	-	-	-		-	-
11	Cashew nut	-	-	-	-	2	2	3	-	-	-		-	-
12	Cocoa	-	-	-	1	-	1	1	-	-	-		-	-
13	Aquaculture	1	-	0	-	-	1	1	3	-	-		3	8
14	Coffee	-	-	-	-	1	1	1	-	-	-		-	-
15	Rabbit	-	-	-	-	-	-	-	-	-	3	3	6	16
16	Fish farming	-	-	-	-	-	-	-	-	-	-	6	6	16
17	Rice	-	-	-	-	-	-	-	-	-	-	3	3	8
18	Sugar cane	-	-	-	-	-	-	-	-	-	-	1	1	3

3.6 Funding approach

Results show that, most of respondents (19 individuals) suggested numerous small grants funding scheme against the larger single grand funding scheme. The responses from groups such as Nature Reserves Officials, projects leaders in districts, groups' leaders of IGAs groups in the village and other conservation stakeholders are shown in table 8.

Table 8: Responses from EAMCEF grantees beneficiaries and other conservation stakeholders on funding options

Grantee/Beneficiary	Number of respondents	
	Funding Scheme	
	Many Small Grants	A single Large Grants
Nature Reserves and National Park	5	2
Project leaders in Districts	4	1
Group leaders of IGA groups in the project villages	6	0
Others conservation stakeholders	4	1
Total	19	4

3.7 Cost and benefits of many small grants funding scheme

The survey findings indicate that, most of the interviewed officers, individuals suggest that small grants scheme involving many project implementers. The supporters of this scheme argue that, would offer more conservation and community development benefits than large grant scheme as more local communities can benefit. The risk is very low in such a way that if one project fails there will be other projects that will compensate the failed project. If the fund is given to one district council or one organization, it cannot cover all parts in which nature reserve extends; thus funding different organization can help to cover all parts in which nature reserves extends. However, the funding scheme can have cost of monitoring the project activities.

- **A suggestion for either single or large grants funding scheme**

The supporters of this scheme, a single Large Grants Funding Scheme argue that, it is better to give fund to one organization so that the organization can carry out all project activities than dividing the fund in portions to fund different sectors or groups. Few large grants are easy to monitor than so many small grants. Providing large grant to one organization can have high vision and focus than many organizations or groups of people hence it can do the best in implementing the project in order to build its reputation.

However, the funding scheme has high risk, as if one project fails there, there will be no other projects that will compensate the failed project. This will bring a big loss to the EAMCEF.

- **Common suggestion from both groups**

Small and medium size grants provided by EAMCEF normally last up to 1 year which is not sufficient for measuring the impacts of most of IGAs. This is because some IGAs have production cycles which go beyond 1 year, thus the support ends before the beneficiaries start realizing the benefits. For the IGAs to have significant impact on local livelihoods, the funding period should consider both production cycle and market component. Supporting local communities to establish IGAs without empowering them to access markets for their products may be futile. It is important to recognize that supporting production and market access cannot be achieved in a span of one year.

4.0 LESSONS LEARNT

- Most of IGAs projects implementers have no enough skills on reporting impact and outcome of their project
- Some funders do like to fund in the villagers where EAMCEF have funded, but there is no communication between funding organizations.
- There is no framework that links all funders funding conservation activities adjacent the Eastern Arc mountains
- Some villages benefit much from conservation funding than others
- The implementers formulate community groups during implementation of projects at village level; however, most of these groups are not effective.
- Potentiality of projects differed with location, for Instance, sugarcane project is potential in Kilombero while Mheza is not.
- IGAs/ conservation funds channelled through districts council have been later disbursed due to the intended project implementer due to long transaction procedures and sometimes misallocation of the funds to other council activities.
- Funds disbursement sometimes differs with season as commencement of production differed across IGAS projects.
- Bricks making is a very big problem that contributes to severe destruction of forests because it involves use of fire woods which requires big sized trees. This makes bricks makers to encroach the forest reserves and cause deforestation.

- Channelling funds brings a lot of problem for project implementers,

5.0 CONCLUSION

EAMCEF supported income generating projects and alternative energy sources brought positive impact to the conservation of Eastern arc mountain forest and livelihood of people in terms of conservation, threats to the forest have decreased and as a results there was a recovering of forest cover, which results to revival and increase of water from the forest. In terms of people's livelihoods, they use water flowing from the forest for their domestic and agricultural activities. These and supported IGAs help to increase household income and quality of life of the communities living adjacent the nature reserves. Moreover, the current funding scheme implemented by EAMCEF comprising of small, medium size and large grants to support IGAs can achieve both conservation and development targets. Such kind of grant mix ensures that the impacts of projects are complimentary. Each grant size has its own role and spatial coverage. To reach different sites and communities within Eastern Arc Mountains forests effectively, it is imperative that small, medium and large grants are simultaneously implemented covering the entire Eastern Arc Mountains regions of Tanzanian.

6.0 RECOMMENDATIONS

For effective conservation and management of the Eastern Arc Mountain forest though Financing IGAs, the following are recommended:

a. Effective financial allocation and management of funded projects

- Need assessment should be thoroughly conducted to identify desired people to form a group that will be participating in project implementation.
- Formulation of by-laws from the village level to the group implemented project to sort those problems occurred in the group
- The government (district council) should employ more ward/village extension staffs that will be guiding farmers the proper way of farming.
- Trainers of trainee (TOT) should be done frequently on the project management and proper implementation of projects.
- Proper knowledge for the selection and allocation of planting right tree to the right place, and appropriate of farm management of those tree should be given

- In terms of crops, most of projects financed were of commercial crops, we recommend financing of food crops project, to reduce the risk of food insecurity.
- Tree planting project in terms of woodlots or agro forestry should be more encouraged that will reduce pressure on poles obtained from nature reserve for construction, charcoal burning and other income generation activities associated with the use of trees.
- Crops processing projects should be established, this will add value to our products hence improve our economy, for example we produce sunflower but we walk long distance to process sunflowers in Oder to get oil. Through crops processing project we will be able to process our crops and add value to them. One of respondents explained.
- Livestock keeping projects, this will also increase house hold income and food, for example through these projects people will get manure for producing quality crops as well as meat and milk for home uses and income generation
- Conservation education at different level of communities living is of vital importance because some people are still engaging in illegal activities within nature reserve because of lack of conservation education.
- Seminars should be provided regularly to District Directors, other leaders of municipal council and other stake holders in order to expand the knowledge on how to implement projects successfully. This will reduce challenges in project implementation especially those which occurs due to governance, funds delay and misallocation issues.
- The results are difficult to measure in short term projects therefore the length of time should be extended at least three years' project where the results and outcome can be easily seen.
- Group's formation mode should be reviewed in order to bring about successful activities carried out in the project implementation.
- The society must be taught or given seminars on how to run the funded socio-economic developmental projects in the best ways so as to have proper utilization of the funds. For example, people may be advised to form a group of 30 people, in this group of 30 people, the people are further divided into smaller groups, let say of 5 people in this group of 30. Then after given funds from the funding agents should be provided to each individual, and each person must be set free to conduct his/her own socio-economic projects. But the people in group of 5 will be responsible for the failure or poor commitment of even a single person in them on his/her behalf. This will enforce the people in the groups of 5 people to have self-commitment on implementation of their project plans funded. The result of this way is the proper and maximum utilization of the provided project funds

b. Ensure availability of production material (germplasm) and market for products produced by villagers

- Cooperative union/product collection centres particularly beekeeping products should be formulated, so that they can sell their products/crops to ensure desirable market for farmers' products. For example, Bee-honey collection centre should be established
- TFS and District councils should not produce seedlings, rather should stand as the market for the seedling produced by Income generating groups formulated by the communities living adjacent the Nature Reserves.
- Establish desirable milk goats' production centre, from the centre where farmers will be buying goats for their farming activities.
- Ensure availability of packaging materials

c. Establish Eastern Arc Mountain Forest Conservation funders alliance (EAMFC-FA)

- Since, there are many organizations (both local and international) working towards conservation of Eastern Arc Mountain forests; there is a need of establishment of a platform where, there will be a communication among the organizations. This will help to avoid duplication of efforts and help many villagers adjacent the Eastern Arc Mountain to benefit from conservation activities. With this regard, I therefore propose EAMCEF to establish a wing (desk) for that purpose

d. Areas for further research.

- More research on value chain analysis of the IGAs supported by EAMCEF should be conducted.
- Long term study for monitoring of funded IGAS.
- Proper way of financing groups directly should be established. This is important as there will be no either allocation or delay of fund disbursement.

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8.0 APPENDICES

Appendix 1. PRA (Pairwise ranking) results in in the study villages

(a) Ndabwa-Lushoto

	Cow	Chicken	Rabbit	Hort	S.S. industries	S	R
Cow		Chicken	Cow	Hort	S.S. industries	1	4
Chicken			Chicken	Hort	S.S.industries	2	3
Rabbit				Hort	S.S. industries	0	5
Horticultural					S.S.industries	3	2
S.s. industries						4	1

(b) Kwankole-Korogwe

	Chicken	Cow	Goat	Bees	Fish	Hort	S	R
Chicken		Chicken	Chicken	Chicken	Chicken	Chicken	5	1
Cow			Cow	Cow	Cow	Cow	4	2
Goat				Bees	Goat	Goat	2	4
Bees					Bees	Bees	3	3
Fish						Hort	0	6
Hort							1	5

(c) Bwambo - Same

	Chicken + Incubator	Ginger irrigation	Cow	Goat	Sheep	Horti	Fish	S	R
Chicken + Incubator		Ginger irrigation	Cow	Goat	Chic+ Incu	Chic+ Incu	Chic+ Incu	3	4
Ginger			Ginger	Ginger	Ginger	Ginger	Ginger	6	1
Cow				Cow	Cow	Cow	Cow	5	2
Goat					Goat	Goat	Goat	4	3
Sheep						Hort	Fish	0	6
Hort							Hort	2	5
Fish								1	7

(d) Bosha - Mkinga

	Mushr	Chicken	Coffee	Cassava	G. nuts	Cashnuts	Cow	S	R
Mushroom		Chicken	Coffee	Cassava	G.nuts	Cashnuts	Cow	0	6
Chicken			Chick	Chicken	Chicken	Chicken	Chick	6	1
Coffee				Cassava	Grnuts	Cashnuts	Cow	1	5
Cassava					Cassava	Cassava	Cow	3	3
Ground nuts						G.nuts	G.nuts	4	2
Cashnuts							Cow	2	4
Cow									

(e) Shembekeza - Mheza

	Chicken	Cocoa	Black p	Hort	Butterfly	Cow	S	R
Chicken		Chicken	Chicken	Chicken	Chicken	Chicken	5	1
Cocoa			Black p	Cocoa	Butterfly	Cow	1	3
Black paper				Black p	Butterfly	Cow	2	2
Hort.					Butterfly	Hort	1	3
Butterfly						Butterfly	4	2
Cow							2	1

(f) **Uluguru Nature Reserve**

	Beekeeping	Poultry	Spices	Fruit trees	Aquaculture	Scores	Rank
Beekeeping		Beekeeping	Beekeping	Beekeeping	Beekeeping	4	1
Poultry			Poultry	Poultry	Aquaculture	2	3
Spices				Spices	Aquaculture	1	4
Fruit trees					Aquaculture	0	5
Aquaculture						3	2

Mkingu Nature Reserve

	Poultry	Aquaculture	Beekeeping	Diary goat	Scores	Rank
Poultry		Poultry	Poultry	Poultry	3	1
Aquaculture			Beekeeping	Diary goat	0	4
Beekeeping				Diary goat	1	3
Diary goat					2	2

Kilombero Nature Reserves

	Diary cattle	Cookstoves	Rabbits	Poultry	Scores	Rank
Diary cattle		Diary cattle	Rabbits	Diary cattle	2	2
Cookstoves			Rabbits	Poultry	0	4
Rabbits				Rabbits	3	1
Poultry					1	3

Ifakara

	Fish	Poultry	Rice	Cow	Goat	S. cane	Ho
Fish		Fish	Fish	Fish	Fish	Fish	
Poultry			Poultry	Poultry	Poultry	Poultry	Po
Rice			Rice	Rice	Goat	S.cane	
Cow					Goat	S.cane	Ho
Goat						S. cane	S
Sugar cane							
Horticulture							

Appendix 2. Tools used for data collection

- i. Key informant interview and Focus group discussion
 2. Village.....
 3. Ward
 4. Date
 5. Respondent Occupation
 6. Total Village population (Male.....Female.....)
 7. Number of Households
 8. Dominant Ethnic group.....
 9. Dependence level from forest resources.....%
 10. List of products harvested (timber, poles,.....)
 11. List of wildlife species harvested
 12. List IGAs and alternative resource use Energy technologies (ART) projects supported by different organizations implemented in the village.
 - a. What is their status?
 - b. Who was the funder?
 13. EAMCEF Funded IGAs and ART project in villages adjacent to EAMFs
 14. List of new income generating projects that if funded will bring impact to people's livelihoods and conservation of biodiversity (PRA-pairwise ranking)
 - a. Requirements and their costs
 - b. Benefits
 - c. If IGAs market and unit price
 15. Approach for implementation of project
 - a. Which is the best approach of implementing a project (single year or multiple year) why?
 - b. Benefits of implementing a project in single year
 - c. Costs of implementing a project in single year
 - d. Benefits of implementing a project in multiple year
 - e. Costs of implementing a project in multiple year

*****THE END*****

- (i)
...
- (ii)
....
- (iii)
....
- (iv)
....
- (v)
....

*******THE END*******

iii. Household Questionnaire

1.0 Household information

1.1 Interviewer's name.....		1.2 Date.....
1.3 Village.....		1.4 District.....
1.5 Gender: 1=Male 2= Female ...	1.6 Age of respondent (years)	
1.7 Marital status of respondent... 1= Married 2=Single 3=Divorced/separated 4= widowed		
1.8 What is your main occupation.....		
1.9 Experience (years)		
2.1 Level of education 1=No form education, 2=Primary 3=Secondary 4=Post-Secondary education		
2.2 Number of members in your household?		

2. Household age distribution (Tick appropriate)

Age range	Male	Female
<5		
6-18		
19-35		
36 - 54		
>54		

3.0 Land size (acre)

3.1 Land size around home (farm)

3.2 Land size away from home (farms).....

4.1 Name the main project.....

4.2 Revenue (per production cycle) obtained from the main project (intended project)

.....

4.2 What are the other sources of income of your household?.....

Source of income (sale of)	Annual Revenue
Crop (specify _ which products)	
Livestock/Animal (specify)	
Animal product (specify)	
Beekeeping products	
Fishing	
Handcrafts	
Tree products	
Others (specify)	

5. Assessing impacts of IGAs supported projects to the community livelihoods. Compared to the past (Tick the appropriate column)

Variable improvement	Levels of change				
	1	2	3	4	5
Water flow from forest					
House condition					
House assets (e.g. furniture)					
Education infrastructure					
Conservation education					
Health infrastructure and services					
Other extension service (e.g. Agricultural, fish)					
Food security					
Financial services					
Others (Specify)					

1= Strongly disagree 2= Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree

6.0 Constraints/challenges for projects sustainability

Constraint	Tick
Lack of market	
Leadership problem	
Carelessness	
Prolonged draught	
Rainfall variability	
Flash floods	
Diseases	
Lack of extension officer	
Lack of education	
Others (Specify)	

7. Any suggestion for improving conservation of the nature reserve

- (i)
- (ii)
- (iii)
- (iv)
- (v)