



The EAMCEF Work Across the Eastern Arc Mountains of Tanzania:

**Community** Livelihoods,  
**Social Welfare** and  
**Adaptation** to Climate Change Impacts

2021





The EAMCEF Work across the Eastern Arc Mountains of Tanzania

# **Community Livelihoods, Social Welfare and Adaptation to Climate Change Impacts**

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**The Eastern Arc Mountains Conservation Endowment Fund** is a Trust Fund that was established and functions as a long-term and reliable funding mechanism to support Community Development, Biodiversity Conservation and Applied Research Projects, which promote the biological diversity, ecological functions and sustainable use of natural resources in the Eastern Arc Mountains of Tanzania. The Endowment Fund Secretariat is located in Morogoro Municipality.





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# Foreword

The idea behind producing a book like this is very much commended. I am truly humbled to welcome this book on ‘Community Livelihood, Social Welfare and Adaptation to Climate Change’ from the Eastern Arc Mountains Conservation Endowment Fund (EAMCEF). This book is a helpful compilation that a wide range of stakeholders would find it useful in shaping and sharpening their understanding of the Eastern Arc Mountains (EAMs) and the work of the EAMCEF, and in making choices and prioritization on conservation – from policy makers, government line ministries, academia, research and development institutions, forest managers, local communities, global communities, donors and private companies and individuals will find it interesting. The book characterizes the EAMs ecosystem as an invaluable natural environment providing tangible and intangible benefits to the local communities, the national economy and the global environment. The book provides an opportune moment as Tanzania has just graduated to the low-middle income country category, with an industrialization agenda prioritized, the Vision 2025 leading, the Third Five-Year Development Plan (FYDP III) kicking in with an aspiration of prioritizing sustainable natural resource and environmental management at the heart of development. At this time when Tanzania

is setting up its Nationally Determined Contributions (NDC), this book will be useful in linking Tanzania’s ambitions to pursue green growth with an ultimate goal of reduced carbon emission and enhancing the role of forests in global carbon sequestration.

As a leader in conservation, I find this compilation providing key information under one cover thereby making it easy to build a case for conservation of the EAMs. The presence of the EAMCEF as a funding mechanism for the conservation of the EAMs ecosystem provides a window for the donor community, the government, private sectors and the general public to channel their resources to enhance conservation of the EAMs – unfortunately, this potential has not been fully unlocked.

I am happy to see the inclusion of testimonies from local communities and how the interventions are addressing the real needs of the communities which if not addressed would present potential risks to the forests and the ecosystem in general.





# Acknowledgements

**W**ith financial support from the Government of the Kingdom of Norway and other development partners we have been able to deliver resources at the community level and helped local communities improve their livelihoods while at the same time conserving the surrounding forests. With the same support, we have compiled our work and experience across the Eastern Arc Mountains of Tanzania into this book. We are grateful for the continued cooperation of the Government of the Kingdom of Norway and other development partners.

We would like to extend our gratitude to the management at E-Link Consult Limited for managing the production of this book – its expertise and dedication are highly appreciated.

To our editors and reviewers – Euster Kibona, Bettie Luwuge and Shukuru Nyangawa, we sincerely thank you for quality-checking the content of the book and for additional knowledge brought into it. Your experience in the subject matter has assured credibility of our contents.

The willingness and participation of local communities across our project sites is a great asset to delivering

our objectives and theirs– their testimonies included in this book were audio-recorded, transcribed and translated, we thank you for the great exchange of knowledge.

Reported achievements of our projects have been possible due to the good collaboration with our field implementing partners – the Ministry of Natural Resources and Tourism, District and Village Authorities in all project sites, NGOs, CSOs and local community groups. Much of the information regarding the Eastern Arc Mountains and the ecosystem was pooled from existing literatures and recent studies funded through EAMCEF grant support.

Graphic designing, layout, and typesetting have been done by Leyuworks Studio Limited, with language editing and proofreading done by Dr. Fatuma Abdallah – we thank you so much.

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**Francis Sabuni**

Executive Director,  
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CHAPTER

1

# Introduction



## 1.1. Purpose of this Book

Information about the Eastern Arc Mountains and the Endowment Fund is very much scattered – both in print and electronic forms. Putting together this information is important for ensuring that the public is well informed of the importance of the Eastern Arc Mountains and the role of the EAMCEF in brokering resources to strengthen conservation work across the EAMs ecosystem. The book pulls together information from the EAMCEF documentation, studies and relevant researches, field experience and from the voices of local communities benefiting directly from the projects. The book provides key information about the EAMs ecosystem and why it is important to conserve it, urging policy and decision makers to prioritize and allocate resources for conservation of this critical ecosystem. The book positions the EAMCEF as a sustainable funding mechanism for channelling resources for conservation of the EAMs. The institutional structure, facilities, available human resources, partners and local networks, and good relationship with the government at all levels makes the EAMCEF a partner of choice.

## 1.2 Organization of the Book

The book uses a chapter approach to present key topics – in total, nine chapters are presented.

**CHAPTER 1** - is an introductory chapter setting the purpose of producing this book focusing at sharing information about the EAMs and the EAMCEF in general. This chapter also provides a highlight of all other chapters.

**CHAPTER 2** – characterizes and provides key information about the EAMs, providing an understanding of what are they, key features of and distribution of the 13 mountain blocks of North and South Pare, West and East Usambara, Nguu, Nguru, Ukaguru, Uluguru, Malundwe, Rubeho, Udzungwa and Mahenge in Tanzania as well as Taita Hills in Kenya. It is in this chapter where the biological diversity and endemism, economic, environmental and social value of the EAMs are described.

**CHAPTER 3** - tells about the EAMCEF – narrating the story of establishment, its vision on creating harmony between the people and the EAMs ecosystem. The aims and objectives of establishing the EAMCEF are highlighted linked to its vision and mission with an ultimate goal of ensuring sustainability of the EAMs ecosystem and community development. The three thematic areas of work – being; (i) conservation of protected areas and mitigation of climate change, (ii) community development and conservation and (iii) applied biodiversity and climate change research, are provided with examples of supported projects.

**CHAPTER 4** – makes the title of the book; it shares the experience of the EAMCEF in implementing its key thematic area on community-based conservation and development by providing a highlight on how supported livelihood activities contributes to poverty reduction at the community level. The chapter starts by showing how projects are selected, types of grant offered – being micro, single year or discrete project grants and multi-year programme grants. Readers will benefit from examples of supported projects and testimonies from beneficiaries on alternative livelihood activities such as beekeeping, tree planting, livestock and poultry keeping, conservation agriculture and butterfly farming.

**CHAPTER 5** – this chapter describes some interesting local level innovations. The chapter tells the story of three main innovations, one on enhancing production of chicken using locally-made chick brooders which plays the same role as the modern/electronic brooder. The second innovation is on energy efficiency by ensuring that firewood consumption is reduced by 50%, but with additional health benefits. The third innovation is on soil and water conservation techniques helping local communities to achieve multiple benefits.

**CHAPTER 6** – this chapter tries to quantify the investments done on livelihood activities, not only the financial investments which are the ‘hardware’ side but also the ‘software’ side that makes the hardware work – aspects such as provision of capacity building, trainings and awareness, and local level institutional strengthening.

**CHAPTER 7** – is the chapter on awareness activities, awareness about the EAMCEF and the EAMs in general. The chapter shares some results on how awareness activities have helped to change local level perception and participation in conservation activities.

**CHAPTER 8** – provides a highlight of policy environment and legal framework at the national level that support and create enabling environment for various projects implemented through the EAMCEF support in relation to conservation of forest ecosystems, community development and climate change aspects. The design of the EAMCEF projects is linked to various policy provisions. The chapter provides a link on how projects implemented through the EAMCEF support have contributed to the implementation of various national level policy-related priorities, including the Vision 2025 and Global Goals – Sustainable Development Goals (SDGs).

**CHAPTER 9** – shares lessons learned and best practices from project implementation, including lessons on development and implementation of projects by local authorities, participation of local communities in project development, awareness raising, the role of the EAMCEF as a sustainable funding mechanism, partnerships and collaboration, readiness of communities on ecotourism development and the role of alternative livelihood options in addressing local drivers of forest degradation.





CHAPTER

**2**

# The Eastern Arc Mountains

## 2.1 What are the Eastern Arc Mountains

Tanzania's natural resources base is invaluable and critical for the socio economic development of the present and future generations – from the endless plains of arable lands, the forest landscapes, the deep ocean and extensive freshwater bodies, the rich wildlife resources, mineral deposits and natural gas reservoirs, the solar energy potential, to valleys and mountains across the country, among others, are all painting a colourful picture of this truly endowed East Africa's country. Talking of the mountains which is the focus of this section, the Kilimanjaro free-standing mountain with its three main peaks of Kibo, Mawenzi and Shira is well known globally as a unique tourism destination and for being the highest point in Africa (5895m above sea level) referred to as the 'roof of Africa'. Apart from the famous Kilimanjaro Mountain, we are glad to dedicate this chapter to introduce to you the Eastern Arc Mountains – abbreviated as EAMs. From the ancient time in history, stretching from Southern Tanzania to Southeast Kenya, covering an area of up to 23,000 square Kilometres an arc-like chain of mountain blocks exist – hence the name Eastern Arc Mountains – formed by 13 Mountain blocks of North and South Pare, West and East Usambara, Nguu, Nguru, Ukaguru, Uluguru, Malundwe, Rubeho, Udzungwa and Mahenge in Tanzania as well as Taita

Hills in Kenya (Figure 2.1). That is to say; Tanzania's side is covered by 12 mountain blocks with only 1 block standing on the Kenya's side. On the Tanzania's side the mountain blocks are located between 34.5°-36.5° E and 3°-9° S and spread in over fifteen Districts in five regions of Tanzania namely, Tanga, Kilimanjaro, Morogoro, Dodoma and Iringa. Most of the mountain blocks derive their name from the main tribes occupying them

The EAMs are covered by rainforests and grasslands believed to have survived for over 30 million years, and that in biogeography it is believed that these forests and those in Congo Basin and West Africa were once connected as one large ecosystem. In 2010, estimates indicated that over 200 people per square kilometre, and in some cases reaching 300-400 people per square kilometre (URT, 2010).

Globally, the Eastern Arc Mountains are among the most important areas for the conservation of biological diversity and for reducing global carbon dioxide emissions through carbon sequestration activities (Box 2.1). At the national level, the mountains are socially and economically critical – more details are provided in the proceeding chapters.

### BOX 2.1: KEY FEATURES OF THE EAMS



**13 Blocks:**

of separate mountain blocks forming the EAMs



**12 Blocks:**

of the EAMs blocks are within Tanzania



**152 million tons of carbon:**

Estimated to be stored in the EAMs forests, potential for climate change mitigation



**600km:**

of a broad arc formed by the EAMs blocks



**23,000 Sq. km:**

total area covered by the EAMs blocks



**40 percent:**

of the Tanzania's remaining tropical high forests are within the EAMs blocks



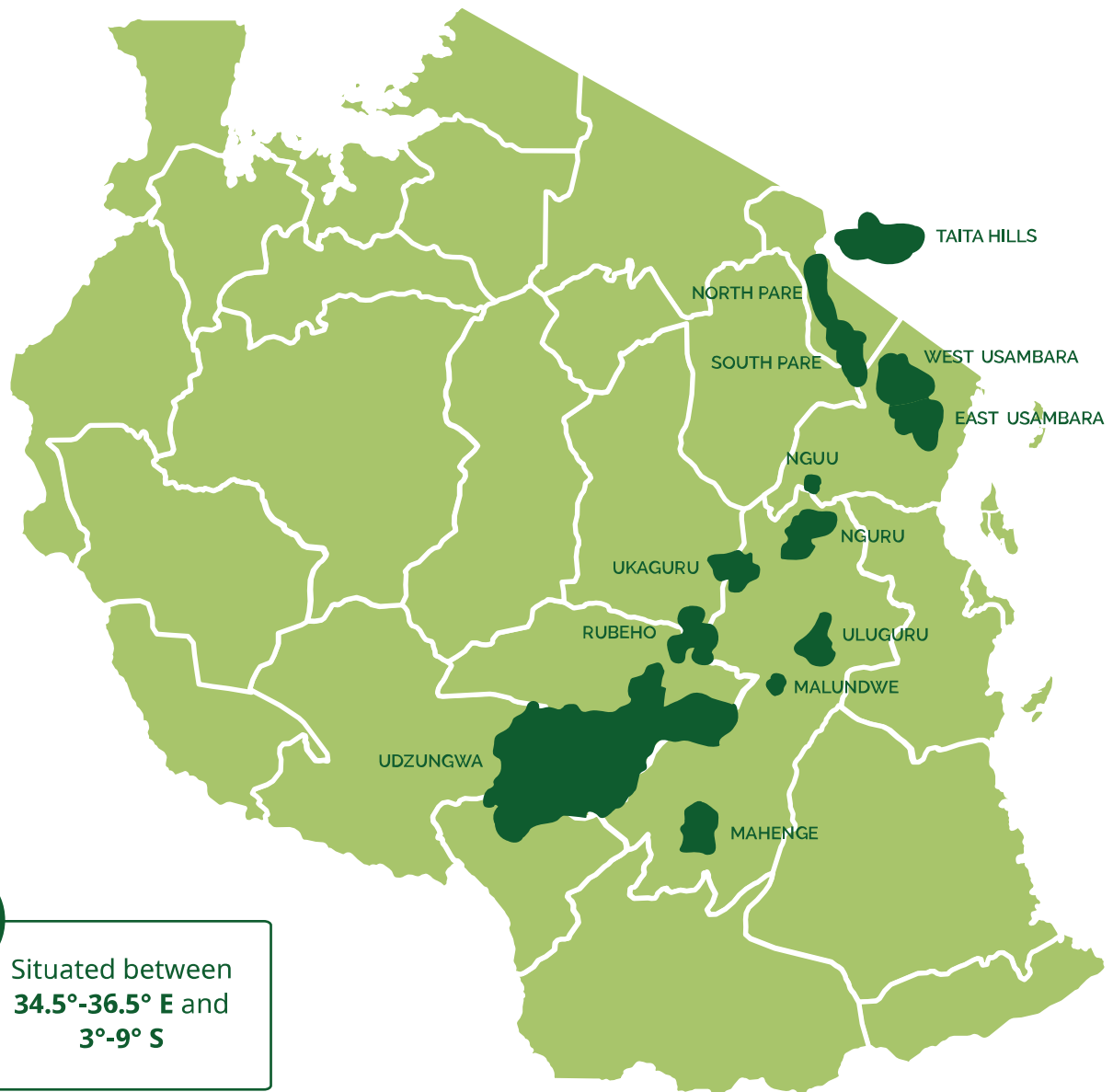
**535 Sq. km:**

of the EAMs blocks are covered by tropical forests



**200 tons of carbon:**

Released into the atmosphere per each hectare degraded



Situated between  
**34.5°-36.5° E** and  
**3°-9° S**



Spread in five regions of  
 Tanzania – **Tanga,**  
**Kilimanjaro, Morogoro,**  
**Iringa and Dodoma.**

**FIGURE 2.1:** Sketch map of Tanzania showing an arc-like positioning of the 13 blocks forming the EAMs (Source: EAMCEF 2020)



## 2.2 The Mountain Blocks

The 12 Eastern Arc Mountain blocks on Tanzania's side presents a wonderful landscape and rich forest resources, with rivers running underneath, and waters percolating through rocks all the way downstream – feeding rivers, lakes and dams, and other wetlands.



## North Pare Block

The North Pare Block is found in Kilimanjaro Region and wholly confined to Mwanza District, with heights ranging from 500 - 2,113m above the sea level, the block forms the northernmost tip of the EAMs on Tanzania's side, bordering the South Pare to the South-East and Taita Hills to the North East. The block is covered by six main forests/and forest reserves of Kindoroko, Minja, Mramba, Kiverenge, Kamwella I, and Kamwella II together covering an area of land approximately 7,407 ha – all being under the Central Government ownership as Forest Reserves. Small other forest patches exist. In terms of the habitats, the forests of the North Pare block range from montane forests to dry montane forests and dry woodlands

and heathlands with species such as *Prunus africana*, *Albizia gummifera*, *Newtonia buchananii*. Generally, this block has quite drier forests unlike other blocks within the Eastern Arc range.

Biodiversity researches conducted in this block revealed the existence of only 3 species of vertebrates that are endemic to the Eastern Arc Mountains, with low rates of endemism in plants. The forests present an opportunity for further researches as many of the forests have not adequately been explored to fully establish their biological diversity, particularly for amphibians, reptiles, and plants species.

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## South Pare Block

Bordering the North Pare to the North-West, the South Pare mountain block is also found in Kilimanjaro Region but confined to Same District, with its highest point reaching an altitude of up to 2463m above the sea level. It is in the South Pare block where the famous Chome Nature Forest Reserve is found, with ten other forest reserves namely - Chambogo, Kiranga-Hengae, Chongweni, Kankoma, Kisiwani, Vumari, Kwizu, Maganda, Kwamwenda and Mwala. On the village lands exist three main Village Forest Reserves of Dido, Mambugi, and Ishereto – together making a forest area of more than 27,168 ha. In terms of the habitats, the forests of South Pare ranges from sub-montane to montane and upper montane, with areas of montane heathlands in Chome Nature Forest Reserve. Common tree species include *Parinari excelsa* in the sub-montane forest and species such as *Octotea usambarensis*, *Albizia gummifera* and *Podocarpus*

*latifolius* in the montane forests.

Existing information indicates that the biodiversity values of the South Pare Mountains are rated moderate with 1 strictly endemic vertebrate animal - the South Pare white-eye (*Zosterops winifredae*) and three other vertebrate species that are confined to the Eastern Arc Mountains. As it is in the case of North Pare, the South Pare block has similarly low rates of plant endemism, with only one known Eastern Arc endemic tree.

Unlike other forests in this block, the Chome Nature Forest Reserve has been well surveyed and categorized as the most species-rich forest in this block and was gazetted as a Forest Reserve during the colonial time in 1951. More studies on amphibians and reptiles are needed to fully establish the potentiality of the South Pare biodiversity.

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## West Usambara Block

The western part of Usambara, mainly in Lushoto District (in Tanga Region) gives rise to West Usambara mountain block, with a smaller portion extending to Korogwe District, rising to an altitude of up to 2200m above the sea level. The West Usambara Mountains contain one Nature Forest Reserve (Magamba) and 20 gazetted Forest Reserves, namely: Mzinga, Baga

- I, Baga -II, Kisima Gonja, Balangai West, Mkusu, Ndelemai, Shagayu, Shume plantation, Mweni Gombero, Kisimagonja, Kikongoloi, Manka, Bombo Makole, Baghoi, Kwebagu/Hebangwe, Kwenyashu, Shambalai, Mtumbi, and Kitara ridge. Outside government-owned forest reserves, surrounding villages manage their forests within their village

lands, including one private forest called Mazumbai owned by Sokoine University of Agriculture. The total area of reserves in Lushoto District is 38,087 ha. On the Korogwe side, 7 Forest Reserves of Bumba Mavumbi, Mafi Hill, Mahenzangulu, Vugiri, Balangai East, Mgombani, Ndolwa and 3 Private (tea estate) forests (Ambangulu, Dindira and Lutindi) exist, making coverage of another 11,045 ha of land under some forms of conservation.

In terms of habitats, the forests of the West Usambara block are diverse and range from sub-montane to upper montane in type. These forests are of a wetter type than those of the Pare Mountains further west.

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## East Usambara Block

The East Usambara Mountains are almost entirely within Muheza District in Tanga region, apart from some smaller parts in the west that fall in Korogwe and Mkinga Districts. The mountains rise to an altitude of 1,506m above the sea level at Mt Nilo.

In Muheza District, the East Usambaras contain two Nature Forest Reserves (Amani and Nilo), 12 Forest Reserves (Bamba, Derema, Kambai, Kwamgumi, Segoma, Semdoe, Mtai, Mkinga, Manga, Mlungui and Longuza Teak plantation), four Village Land Forest Reserves (Kizee, Kizangata, Mfundia and Handei), and two private (tea estates) forests (Magoroto and Kwamtili). The total area covered by these forests is around 31,000 ha. Most of the Nilo Nature Forest Reserve and part of Amani Nature Forest Reserve fall within Korogwe and Mkinga Districts, but the only East Usambara forest reserve that wholly falls within Korogwe is Bombo West with a total area of 3,523 ha.

The forests of the East Usambara Mountains range from lowland areas at an altitude of 300 m on the east side, through sub-montane forests to the montane forests of Nilo. Tree species composition of these forests varies considerably, but species such as *Khaya anthotheca*, *Milicia excelsa* are found in the

Common trees in sub-montane forest are *Newtonia buchananii*, *Parinari excelsa*, *Albizia gummifera* and *Allanblackia stuhlmannii*.

The West Usambara Mountains have high biodiversity value and support 5 strictly endemic vertebrates and another 19 species that are only found in the Eastern Arc. There are also 27 Eastern Arc endemic trees. This high biodiversity value is also found in invertebrates, shrubs and, herbs. Some parts of the West Usambara forests have been well studied over the past 100 years but more studies on amphibians, reptiles and plants species are needed.

lowlands and others such as *Myrianthus holstii*, *Albizia gummifera*, *Allanblackia stuhlmannii* and *Newtonia buchananii* dominate at higher altitudes.

The East Usambara forests are globally recognised for their exceptional biodiversity importance. The mountain forests contain at least 7 strict endemic vertebrates and a further 28 species that are confined to the Eastern Arc or East Usambara lowland forests. There are also 40 Eastern Arc endemic trees. Similarly, high rates of endemism are also seen in invertebrate animals and plants such as shrubs and herbs. The montane forests grade into lowland forests on the eastern margin of the mountain, and these lowland forests also have exceptional biological importance. As it was the case with West Usambara, some parts of the East Usambara forests have been well studied over the past 100 years but more studies on amphibians, reptiles and plants species are needed.

## Nguu Block

The Nguu Mountains are found in Kilindi District in Tanga Region. This mountain block ranges up to 1550m altitude above the sea level. Most areas of forest outside the reserve network or small patches of forest set aside for traditional purposes have been cleared for farmland.

The Nguu Mountains contain 11 Forest Reserves, covering around 30,337 ha, the Reserves are namely: Kilindi, Kwediboma, Mkuli West of River, Mkuli Extension, Mkongo, Mbwegere, Nguru North, Derema, Pumula, Rudewa South and Jungu. Habitat-wise, the forest of these mountains is primarily sub-

montane in character, grading into lowland forests around the mountain bases and along watercourses. Lowland trees include *Milicia excelsa* and *Khaya anthotheca*, and sub-montane forests are dominated by *Newtonia buchananii* with other species such as *Albizia gummifera*.

Existing knowledge indicates that, the biodiversity value of the Nguu Mountains is only moderate, with seven Eastern Arc endemic species occurring. For trees there are six Eastern Arc endemic species recorded. The Nguu block provides an opportunity for further studies.

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## Nguru Block

The Nguru Mountains are located in the Mvomero District of Morogoro Region. There is the main Nguru block and a large isolated outlier at Kanga. These mountains range up to 2,400 m altitude above the sea level in Nguru South. The forest vegetation is estimated to cover up to 31,409 ha, but with highly varying habitats according to altitude. Lowland rain forest occurs between 300-900 m in valleys of the eastern slopes. Submontane forest covers a large area between 900 m and 1400 m in the eastern valleys with fragments on the western slopes at 1400m -1500 m.

The Nguru Block contains the Mkingu Nature Forest Reserve and two central government-managed 'catchment' Forest Reserves of Kanga and Magotwe. Montane forest occurs between 1400 m and 1800 m

with a moss-covered upper montane forest at higher altitudes, and drier montane forests on the western side at 1600-2000 m. Heathland occurs on the upper ridges above 2000 m, with some isolated stands as low as 1200 m where soil conditions do not permit forest growth.

In terms of biodiversity, the Nguru Mountains are rated to have fairly high importance. Current knowledge indicates that there are 15 Eastern Arc endemic species in these mountains. For trees, there are also 25 Eastern Arc endemic species. These totals will increase once findings from various studies undertaken within the Nguru block are described, but this block provides opportunity for further studies.

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## Ukaguru Block

The Ukaguru block is found within the Kilosa District of Morogoro Region. It is an elongate ridge extending up to 2,250 m altitude above the sea level. In this block, the government of Tanzania declared up to 18,168ha of 6 Forest Reserves namely - Ikwamba, Mamboto, Mamboya, Mamiwa Kisara North, Mamiwa Kisara South and Uponera as forest reserves for water catchment protection. There is also a softwood plantation (Ukaguru) in the mountains that occupies an additional 3,600 ha. In terms of habitats, the main

Ukaguru ridge is largely covered by forest with moist forests on the wetter eastern side. Heathlands occur on the summits with upper montane forest. Montane forest and dry sub-montane forest occur on the lower slopes. The drier southwest slopes of the whole ridge are covered by dry evergreen forests, bushes, and wooded grasslands.

In terms of biodiversity, the Ukaguru forests support one strictly endemic animal and a further nine Eastern Arc endemic species. For trees, there are at least four

Eastern Arc endemic species, with a possibility of two other strict endemic amphibians yet to be described. Some of the forests of this range, in particular, those

of Mamiwa-Kisara South are biologically unexplored and might support additional species of interest. Further studies are therefore required for this block

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## Uluguru Block

The Uluguru Mountains are largely found within Morogoro District, Mvomero District, and Morogoro Municipality – all within Morogoro Region. The main Uluguru Mountain is a ridge running approximately North South and rising to 2,630m altitude above the sea level at its highest point. The greater Uluguru area also includes several of isolated massifs surrounding the main block – Kitulangh'alo, Dindili, Mkungwe, Mindu and Nguru ya Ndege.

The Uluguru range contains one Nature Forest Reserve (formed of Uluguru North, Uluguru South, and Bunduki Forest Reserves with a corridor across the Bunduki Gap) that is found in both Morogoro and Mvomero districts and Morogoro Municipality. Besides, there are five Forest Reserves supporting Eastern Arc forest habitats within Morogoro District – these Reserves are Kasanga, Mkangala, Mlaliwila, Ngambaula, Tongeni River. Within Morogoro District, the forests are also found in five outlier mountain block reserves (Mkungwe, Nguru ya Ndege, Dindili, Kitulang'halo and Mindu). In total, these reserves cover 35,700 ha.

Within Mvomero District five more Forest Reserves are found on the main Uluguru ridge (namely, Bunduki I-III, Bunduki IV, Bunduki V, Bunduki VI, and Shikurufumi), covering around 280 ha.

The habitat of the Uluguru block is extremely variable, ranging from drier lowland coastal forest habitats, to transitional rainforests, to sub-montane, montane, and upper montane forest types. It also includes an area of Afromontane grasslands on the Lukwangule plateau. All these habitats are rich in endemic species and are all of the high conservation priority.

In terms of endemic species, the Uluguru Mountains possess at least 14 strictly endemic vertebrate species with at least 3 additional species that have not yet been described. A further 16 Eastern Arc endemic species have also been identified in this mountain. There are also at least 26 Eastern Arc endemic trees. The forests of the main ridge are quite well known biologically, although each new survey continues to find additional species. The outlying blocks are poorly known, with some having almost no biological investigation.

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## Malundwe Block

The Malundwe block is within Mikumi National Park, in Morogoro Region, and is the relatively small (less than 10 square kilometres) area of forests, at an altitude ranging from 800 m to 1250 m above the sea level. The forests of the Malundwe block are less researched, with only 4 known Eastern Arc endemic trees.

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## Rubeho Block

This mountain range is found on both sides of Kilosa District (Morogoro Region) and Mpwapwa District (Dodoma Region). The Rubeho Mountains include a main highland area and various isolated ridges and massifs, such as Mang'alisa, the Kiboriani Mountains, Pala-Ulanga (East), and Wota (West). The highest point within these areas is 2,225 metres above the sea level.

The Rubeho Mountains contain 2 Forest Reserves in Kilosa District (Pala-Ulanga, and Ukwiva) covering an area of 66,316 ha. The Ilole area on the main massif supports an important area of unprotected Eastern Arc forest habitat. There are also 3 further forest reserves in Mpwapwa District (Mafwomero, Mang'alisa and Wota) which makes up to 9,249 ha of forested land.

There is also a proposed Kiboriani Forest Reserve which includes 56,000 ha of woodland with Eastern Arc forest and grassland habitats at higher altitudes.

In term of habitats, the vegetation of the Rubeho Mountains contains a number of different types of forest. In Ukwiva trees include *Agauria salicifolia*, *Aphloia theiformis*, *Bridelia micrantha*, *Catha edulis*, *Diospyros whyteana*, *Halleria lucida*, *Macaranga kilimandscharica*, *Maesa lanceolata*, *Maytenus acuminata*, *Nuxia congesta*,

*Parinari excelsa*, *Polyscias fulva*, *Rapanea melanophloeos* and *Xymalos monospora*.

In terms of biodiversity value, the Rubeho block and outliers are known to support 1 strictly endemic vertebrate animal and 10 Eastern Arc endemic species. Much more remains to be discovered on the amphibians, reptiles and especially plants, a thorough scientific investigation is likely to reveal further new species.

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## Udzungwa Block

This is the largest of the Eastern Arc blocks stretching across four Districts in central Tanzania – a small part is within Kilosa District and a strip of land is within Kilombero District (both in Morogoro Region) and the rest is found in Kilolo and Mufindi Districts of Iringa Region. The Udzungwa Mountains rise to 2,230 m altitude above the sea level and there is a large plateau area above 1,500 m altitude above the sea level.

The Udzungwa contains several reserves in different categories of management, such as the Udzungwa Mountains National Park found in Kilombero and Kilolo Districts and covers 190,000 ha. There is also the Kilombero Nature Forest Reserve (around 178,000 ha) and the Uzungwa Scarp Nature Forest Reserve. In Kilombero District there are also three catchment forest reserves (Iwonde, Nyanganje and Ihang) containing forest. There are also 27 Forest Reserves, Village Forest Reserves and many private forests in Mufindi District. Furthermore, an additional nine Forest Reserves and proposed forest reserves are found in Kilolo District (Mlali, Image, Kilanzi Kitungulu,

Kisinga-Lugalo, New Dabaga, Ulagambi, Kitemele, Kawemba, Kitonga and Kimala), containing a mixture of forest and grassland.

The vegetation of the Udzungwa Mountains is exceptionally variable, ranging from lowland forests, through sub-montane, montane and to upper montane forests. There are also extensive areas of montane grassland of various types, montane wetland areas, and heathlands. At lower altitudes the vegetation grades into various forms of woodlands.

In terms of endemic species, the Udzungwa Mountains support 15 strict endemic vertebrate species (with an additional two species being described), a further 27 Eastern Arc endemic vertebrate species and 36 Eastern Arc endemic trees. Some of the forests are relevantly well known, but a number of other forest areas are still largely unexplored biologically. This includes the large forest block on the Luhomero massif and many of the smaller forest reserves. The National Park is also not completely surveyed.

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## Mahenge Block

The Mahenge massif rises to 1,040m altitude above the sea level. It is entirely located within Ulanga District in Morogoro Region and makes the southernmost isolated outlier of the Eastern Arc Mountains. Covering 2,802.3km<sup>2</sup>. This mountain block is bordered by the Kilombero Valley (the largest freshwater wetland at low altitude in East Africa) to the west, separating this mountain block from the Udzungwas; and by

the Selous Game Reserve to the east and south. The Mahenge Mountains are continuous with the Mbarika Mountains to the east, part of the mountain complex located to the north of Lake Nyasa.

The mountains contain 7 catchment forest reserves covering up to 4,956 ha of land – namely, Ligamba, Mahenge scarp, Mselezi, Muhulu, Myoe, Nawenge,



and Sali. These reserves contain lowland, sub-montane and some montane forest, although most of the forests are small and often heavily degraded. In terms of biodiversity value, the Mahenge massif

has relatively low value on endemic vertebrates, has 2 Eastern Arc endemic vertebrates and 5 Eastern Arc endemic trees. However, not all the forests have been fully surveyed to discover the existing biodiversity.

## 2.3 Biodiversity value

The EAMs forested landscape is a home to thousands of diverse plants and animals unique to this particular ecosystem, presenting an exceptional abundance of species endemic to the area – that is, at least recently, not occurring elsewhere on earth, including over 100 species of mammals, birds, amphibians and reptiles, and hundreds of species of insects and millipedes. Over 500 species of large and small plants are unique to the EAMs, thereby making this ecosystem a global centre of biodiversity.

Globally, the EAMs qualifies as a major part of one of the 34 Biodiversity Hotspots in the world categorized

based on its high endemism and level of threat to the natural vegetation. On birds, the EAMs are known to host restricted-range bird species making them native (endemic) to these areas. In 2003, the Birdlife International – a global partnership of conservation NGOs, categorized the EAMs as part of the Endemic Bird Areas (EBA). In 2010, due to the ecological and cultural significance of the EAMs, the Ministry of Natural Resources and Tourism of Tanzania proposed the EAMs to be considered by the United Nations Educational, Scientific and Cultural Organization (UNESCO) amongst the World Heritage Sites (Box 2.2).



### BOX 2.2. Key Biodiversity Values

- Among the world's top 5: for the diversity of plants, herpetofauna, birds, and mammals of the tropical forests
- Part of one of the World's 34 Biodiversity Hotspots: defined by the Conservation International during 2007 (Conservation International: Mittermeier et al., 1998; 2004)
- Part of Endemic Bird Area (EBA): As categorized by Birdlife International in 2003
- A Global Eco-region: The EAMs are one of the Global 200 eco-regions defined by WWF (Olson and Dinerstein 1998); Includes Amani Nature Forest Reserve – the paradise of nature: Comprised of unique animals and plant species, often referred to as the "last paradise"
- A World Heritage Site: Proposed so by the Ministry of Natural Resources and Tourism of Tanzania, and UNESCO in 2010

## 2.4 Key features on Endemism

A complete list of species endemic to the EAMs is yet to be exhausted given the huge diversity of plants and animals spreading across the ecosystem. From the 1970s the EAMs were already identified as a Afromontane archipelago-like regional centre of endemism (White, 1983) and also listed as a Global 200 Ecoregion of WWF (Olson and Dinerstein 1998), part of a biodiversity hotspot of Conservation International (Mittermeier et al., 1998; 2004) and part of an Endemic Bird Area of BirdLife International (ICBP 1992; Stattersfield et al., 1998). With these properties and many others, the government of Tanzania made efforts to apply for nomination of the EAMs for inclusion into the World Heritage List in 2010.

This wilderness is a home to endemic plants and animals' species found nowhere else in the world, including the presence of rare and threatened species (Box 2.2). The endemism goes far as to the block level where some species of plants and animals are only found in a specific block and not in other blocks. Data compiled during preparations of the application dossier for World Heritage List (URT, 2010) suggested that, for example:

**Plants:** at least 3,473 species (4,234 taxa) compiled in 800 genera in the Eastern Arc Mountains, of which at least 453 species (554 taxa) and around 40 genera are believed endemic, including trees, shrubs and herbs. There are also high rates of endemism in the non-vascular plants, with 32 known endemic bryophytes. Endemic plants are not only found in the forests, but also in the montane grasslands, wetland areas, rocky outcrops, and in the drier 'rainshadow' (west and north) areas. All eight recognized species of African Violets (*Saintpaulia spp.*) are found in the Eastern Arc Mountains – these are threatened species of plants.

**Vertebrates:** comprise several hundred species, of which at least 118 are endemic to the Eastern Arc Mountains.

**Amphibians:** 50 Eastern Arc endemic species concentrated in the reed treefrogs (*Hyperolius*),

forest treefrogs (*Leptopelis*), viviparous toads (*Nectophrynoides*), narrow-mouthed frogs (*family Microhylidae*), and caecilians. The Eastern Arc Mountains are home to 50% of the members of the caecilian family, *Scolecophoridae*, among which the genus *Scolecophorus*, with three species, is endemic. New species of amphibians continue to be discovered in the Eastern Arc Mountains.

**Reptiles:** At least 32 species of reptiles are endemic to the Eastern Arc Mountains, the majority of these being chameleons in the genera *Chamaeleo*, *Rhampholeon* and *Kinyonga*. Reptile endemism is particularly high for an African mountain system as cool and moist habitats are not ideal for exothermic reptiles. New species of reptiles also continue to be discovered in the Eastern Arc Mountains.

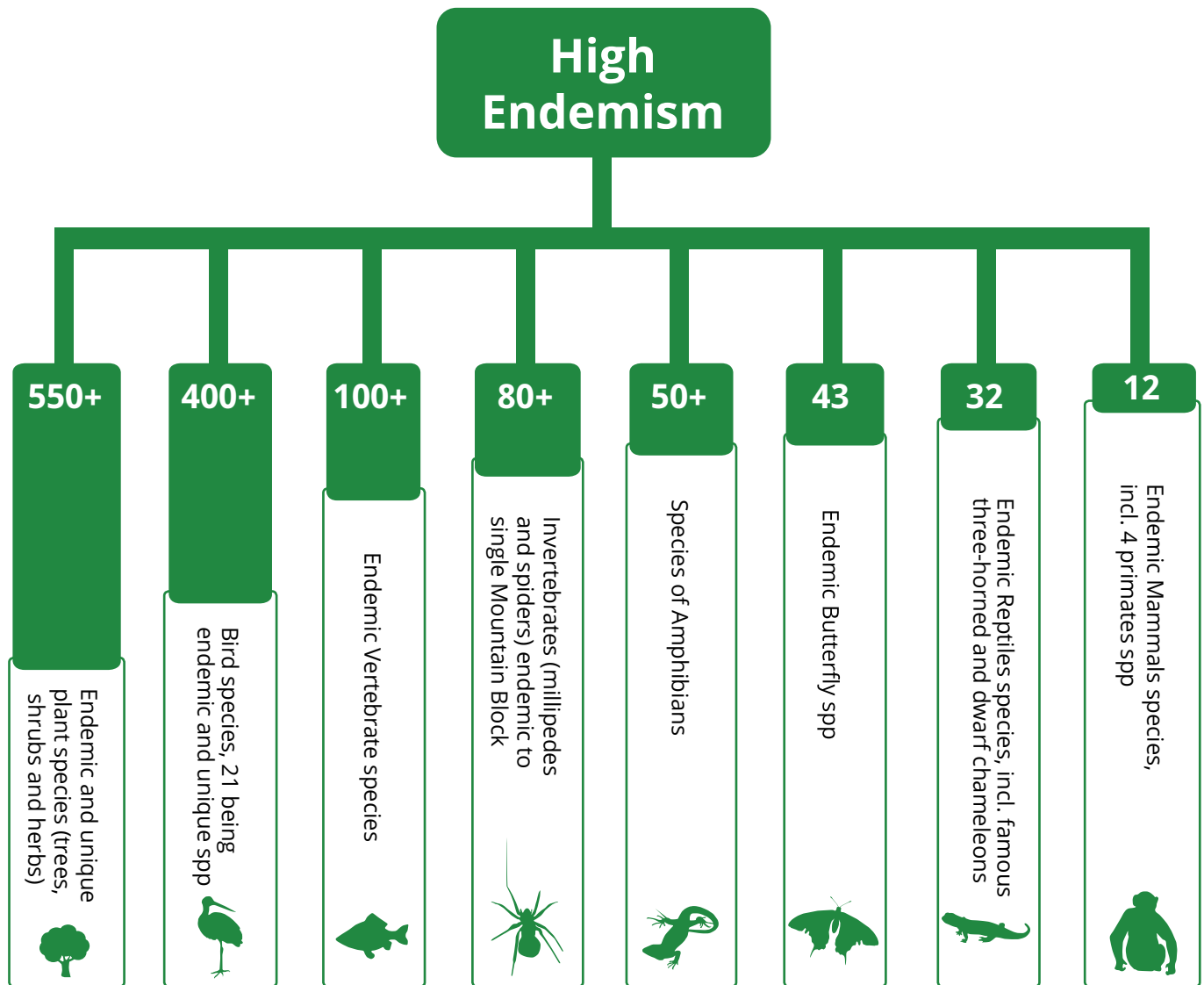
**Birds:** There are 21 Eastern Arc endemic species of birds and four endemic genera (*Xenoperdix*, *Sceptomycter*, *Modulatrix*, *Swynnertonia*). Some bird species have extremely limited distributions, for example the Taita thrush (*Turdus helleri*, CR) and Usambara akalat (*Sheppardia montana*, CR) occur only in a few square kilometres of forest in the Taita Hills and West Usambaras, respectively. In addition, the Uluguru bush-shrike (*Malaconotus alius*, CR) is confined to one nature reserve in the Uluguru Mountains, with less than 100 km<sup>2</sup> of suitable habitat remaining. Some bird species have disjunctive distribution patterns covering parts of the Eastern Arc, the Southern Rift and the Zimbabwe Highlands; for example, the monotypic genus *Swynnertonia* and the Long-billed tailorbird (*Orthotomus moreaui*).

**Mammals:** Eastern Arc mammals total 12 endemic species, including three species of primate, the Sanje mangabey (*Cercocebus sanjei*, EN), Udzungwa red colobus (*Procolobus gordonorum*, EN), and the Mountain dwarf galago (*Galagoides orinus*). There are also newly described species in the Eastern Arc, such as the giant elephant shrew (*Rhynchocyon udzungwensis*, VU), the shrew *Congosorex phillipsorum* (CR) and the near-endemic highland mangabey (*Rungwecebus*

*kipunji*, CR), which is also a new genus of monkey.

**Invertebrate fauna:** The Eastern Arc Mountains also support an **invertebrate fauna** that is exceptionally rich in endemic species, although it remains poorly known. Information on spiders and millipedes indicate that up to 80% of invertebrate species (and many genera) may be strictly endemic to a single mountain.

These patterns seem to be repeated across other invertebrate groups, including butterflies. 78 butterfly species are either endemic (43) or near endemic (35) to the Eastern Arc. Among the dragonflies are two species strictly endemic to the East Usambara.



**FIGURE 2.2:** Key features on Endemism of the Eastern Arc Mountains

## 2.5 Water value

Forests of the EAMs are important water catchment areas – or simply referred to as ‘watersheds’ By being watersheds, the forests collect rainwater and or run-off waters and channel them into rivers, dams, lakes, or into underground water systems – thereby controlling the flow of water into the ecosystem and beyond at all times. Water as a critical environmental service is important to the survival of the existing biodiversity and for human activities downstream. Often people see rivers flowing across, but they do not ask themselves where the water comes from. Many rivers of the eastern Tanzania source their waters from the EAMs. Estimates indicate that around 25% of Tanzanians depend on water supply from the EAMs – be it for agricultural, domestic or industrial uses.

The Eastern Arc Mountains are the catchment areas for many of the important rivers of eastern Tanzania. For example, the Uluguru Mountains give rise to the

Ruvu River that supplies most of its waters to the three regions of Morogoro, Coast and Dar es Salaam before emptying its waters in the Indian Ocean. The Ruvu River is joined by a chief tributary - the Ngerenge River, which rises in the northern part of Uluguru Mountains and flows into Morogoro town. The East Usambaras (in Amani Nature Forest Reserve, Handei Mountains) are the sources of Zigi River that supplies water in Tanga City. The Wami, Kilombero, Little Ruaha and Pangani Rivers also flow from different ranges within the EAMs and supply water for rural activities, large scale agricultural activities, and industries in the lowlands. Towns and cities of Dodoma, Iringa, Tanga, Dar-es-Salaam, Morogoro, Ifakara, Lushoto, Mwangi, Same, Mombo, Korogwe, Soni, Kilosa, Muheza, Kibaha, Mpwapwa, Mvomero, Turiani, Kilindi, Gairo, Mikumi, Chalinze, Handeni and Kilolo rely on water tapped from the EAMs.

## 2.6 Economic value

The value derived by people across the EAMs and beyond is incompatible and invaluable. An aggregation of function-based values of the EAMs ecosystem – direct and indirect use values, non-use values, optional values and existence values makes the total economic value of the EAMs. Environmental economists’ estimates a total economic value of the EAMs ecosystem services of at least USD 237 billion,

with a net present value of around USD 28 billion during 2019 – this was estimated for 8 key categories of ecosystem services supplied by the EAMs ecosystem, such as agricultural products, extracted forest products, standing timber, water resources, biodiversity values, the value of existence, tourism and carbon sequestration (Table 2.1, 2.2 and 2.3).

Table 2.1. Aggregated Total economic value of the EAMs ecosystem services

Category of the ecosystem service	Type of the ecosystem services	Estimated Total Value (USD)	% of total value
<b>Agricultural products</b>	Crops	3.19 billion	1.34%
	Vegetables	106.86 million	<1%
	Fruits	933.3 million	<1%
	Livestock	165.12 million	<1%
<b>Extracted forest products</b>	Natural forests	51.51 million	<1%
	Planted forests	18.83 million	<1%

<b>Standing timber</b>	Natural forests	88.77 billion	37.44%
	Woodlands	58.88 billion	24.84%
	Planted forests	13.49 billion	5.69%
<b>Water resources</b>	Water (domestic, irrigation, livestock & industrial uses)	321.14 million	<1%
	Hydropower	66.67 billion	28.12%
<b>Biodiversity</b>	Biodiversity value	3.52 million	<1%
<b>Value of existence</b>	Bequest value	0.78 million	<1%
<b>Carbon sequestration</b>	Forests	2.55 billion	1.07%
	Woodland	1.94 billion	<1%
<b>Tourism</b>	Tourism	0.021 million	<1%
	<b>Total value</b>	<b>237.07 billion</b>	<b>100%</b>
	<b>Net Present Value (NPV)</b>	<b>28.79 billion</b>	

Table 2.2. Aggregated Total economic value of the EAMs by mountain blocks

<b>Mountain Block</b>	<b>Total economic Value (USD)</b>	<b>% of Total value</b>
Udzungwa	122.18 billion	51%
Uluguru	26.28 billion	11.08%
Rubeho	21.89 billion	9.24%
West Usambara	15.40 billion	6.50%
Ukaguru	12.09 billion	5.10%
Nguru	12.04 billion	5.08%
Nguu	10.33 billion	4.36%
South Pare	7.45 billion	4.14%
East Usambara	7.01 billion	2.96%
North Pare	1.90 billion	0.8%
Mahenge	0.49 billion	0.21%
<b>Total Economic Value</b>	<b>237.07 billion</b>	
<b>Net Present Value</b>	<b>28.79 billion</b>	



Table 2.3. Estimated quantity of water abstracted from the EAMs for various uses

Type of use	Quantity used (m3)
Hydropower generation	220.46billion
Irrigation – plantations	490.88million
Domestic use – urban	93.83million
Domestic use – rural	87.47million
Industrial use	64.93million
Irrigation – household level	31.98million
Livestock use	14.27million
Irrigation – small scale	0.82million
<b>Total quantity used</b>	<b>221.24 billion</b>

**Source (Table 2.1, 2.2 and 2.3):** EAMCEF, 2019. Economic Value of Ecosystem Services from the Eastern Arc Mountains of Tanzania

## Electricity

The EAMs are a source of water responsible for over 90% of Tanzania’s Hydro-Electric Power produced in major power stations – for example, rivers from the Udzungwa Mountains Block inputs its water in Kidatu and Mtera power stations (both within Great Ruaha River) and the Kihansi power station (within Kihansi River). The North and South Pare Mountain Blocks supply water to Pangani Falls and Hale power stations and Nyumba ya Mungu dam. The Julius Nyerere Hydropower Station (JNHS), at Stiegler’s Gorge site depends upon the EAMs for water supply.

The total economic value of the hydropower potential of the EAMs ecosystem is estimated at USD66 billion which is 28% of the total economic value of the entire ecosystem. Hydropower being

almost entirely emission neutral presents the opportunity to mitigate climate change impacts. Adequate financing and proper measures are critical for protection of the EAMs watershed. Drop in water levels in hydropower dams results in inadequate power generation and closure of dams – with serious consequences in the national economy.

Conservation of the EAMs ecosystem has assured a reliable flow of benefits such as increased availability and reliability of affordable, clean and renewable electricity. Proper conservation reduces dam siltation, and associated costs of maintenance of dams and turbines. These efforts need to be sustained.

## Agriculture

The EAMs provide favourable environmental conditions for agricultural activities - the soils, nutrients, water, and weather conditions support the production of both food and cash crops consumed locally and across the country. Large-scale farming of cash crops within the EAMs ecosystem is an important contributor to the national economy for crops such as sisal, tea and sugarcane - the famous Kilombero and Mtibwa Sugar Estates benefit from the soil and climatic attributes of the EAMs.

The total agriculture economic value (including livestock keeping) is estimated to be more than USD 4 billion. The 'Agriculture First' (known in Kiswahili as Kilimo Kwanza) - a policy declaration to accelerate agriculture transformation in Tanzania resulted, among other things, in an international-private partnership earmarked an area covering about one-third of mainland Tanzania (about 287,000 km<sup>2</sup>) as a corridor known as "Southern Agricultural Growth Corridor of Tanzania (SAGCOT)" with a vision to bring up to 350,000 ha into profitable agricultural production through intensive irrigation over a 20-year period. Six clusters identified for the

SAGCOT area - Kilombero, Mbarali, Ihemi, Ludewa, Sumbawanga and Rufiji overlaps in eight of the EAMs mountain blocks - Nguu, Nguru, Uluguru, Ukaguru, Rubeho, Malundwe, Udzungwa and Mahenge. These mountains provide, among others, watershed services feeding the river basins and wetlands for the majority of the land in the SAGCOT area - e.g. the Ruaha/Rufiji river basin with its three main sub-catchments of Great Ruaha, Kilombero and Luwego and wetlands of Kilombero flood plain, Usangu flats and Rufiji Delta spread across the corridor, serving a large part of the corridor. Other important basins within the corridor include the Wami - Ruvu, Lake Rukwa and Lake Nyasa basins.

Conservation of the EAMs is critical for agricultural development, such as through reduction of soil erosion, improved water flows necessary for irrigation activities downstream, and reduced flooding events.

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## Tourism

The EAMs as a non-consumptive tourism destination offers incredible landscape and unique features with the 12 mountain blocks on Tanzania's side, forming 600 kilometres of a broad arc, covering an area of over 23,000 sq. kilometres, with more than 500 sq. kilometres covered by tropical forests harbouring high diversity of plants and animals, all together form an endless story about nature.

The EAMs offers an incredible landscape for walking safaris and game drive, daylight bird watching activities and mid night reptile wondering. The tall and old trees provide wonderful scenery, the wildflower gardens remind one of the stories of Eden, mountain peaks provide a height enough roofing the nature, hot water springs and amazing

waterfalls joins the flow to endless rivers.

Tourism across the EAMs provides a photographic opportunity to enjoy the unique and endemic species of both plants and animals - for example, the Udzungwa Mountains National Park is home to Iringa Red Colobus Monkey and the Sanje Crested Mangabey Monkey. Tree lovers never miss a visit at Amani Nature Forest Reserve which is estimated to have about 2,000 vascular plant species per Hectare.

## 2.7 Social and Cultural values

Abundant medicinal trees, roots, barks and wild fruits of the natural environment are highly appreciated at the local level for their medicinal value. Within the EAMs, quiet areas of the forest, big and old trees, caves and stones are important sacred places for local communities – used for rituals, worshipping and all other spiritual aspects. These cultural values have for many years been important in enhancing conservation of the forests as such sites used for rituals or trees and herbs used for the medicinal purpose are highly protected and not allowed to be cut for other purposes apart from the socially defined value, and sometimes with granted special permission from traditional leaders.

## 2.8 Carbon Sequestration

In addition to providing the watershed services, the EAMs and the forests offer conducive weather conditions for the survival of diverse species of plants and animals, including the provision of micro-habitats for thousands of small organisms. On climate, the EAMs rich forest resources play the roles of carbon sinks, that is absorbing large quantities of carbon dioxide from the atmosphere through the process called photosynthesis – the process that helps the plant to manufacture its own food thereby fixing carbon in its biomass and releasing oxygen to the atmosphere. This climate-important role of absorbing carbon from the atmosphere is referred to as carbon sequestration. The key question here is why such forests are carbon sinks and not carbon emitter/source? This is because most of the forests of the EAMs are protected forests and little emission is happening through threats such as forest fires and selective harvesting for various purposes.

The EAMCEF support on enhancing alternative livelihood activities has helped surrounding communities reduce pressure on protected forests. The forests would be referred to as carbon emitters/sources if they were emitting more carbon than they absorb.

The EAMs forests and woodlands are estimated to contain a total economic value of 509.5 million tons of carbon dioxide (tCO<sub>2</sub>) whose total economic value is around USD 2.5 billion, with a net present value (in 2019) of USD 309.5 million and 387 million tCO<sub>2</sub> whose total economic value is USD 1.9 billion, with a net present value of USD 235 million for woodlands (Table 2.4 and 2.5 respectively).

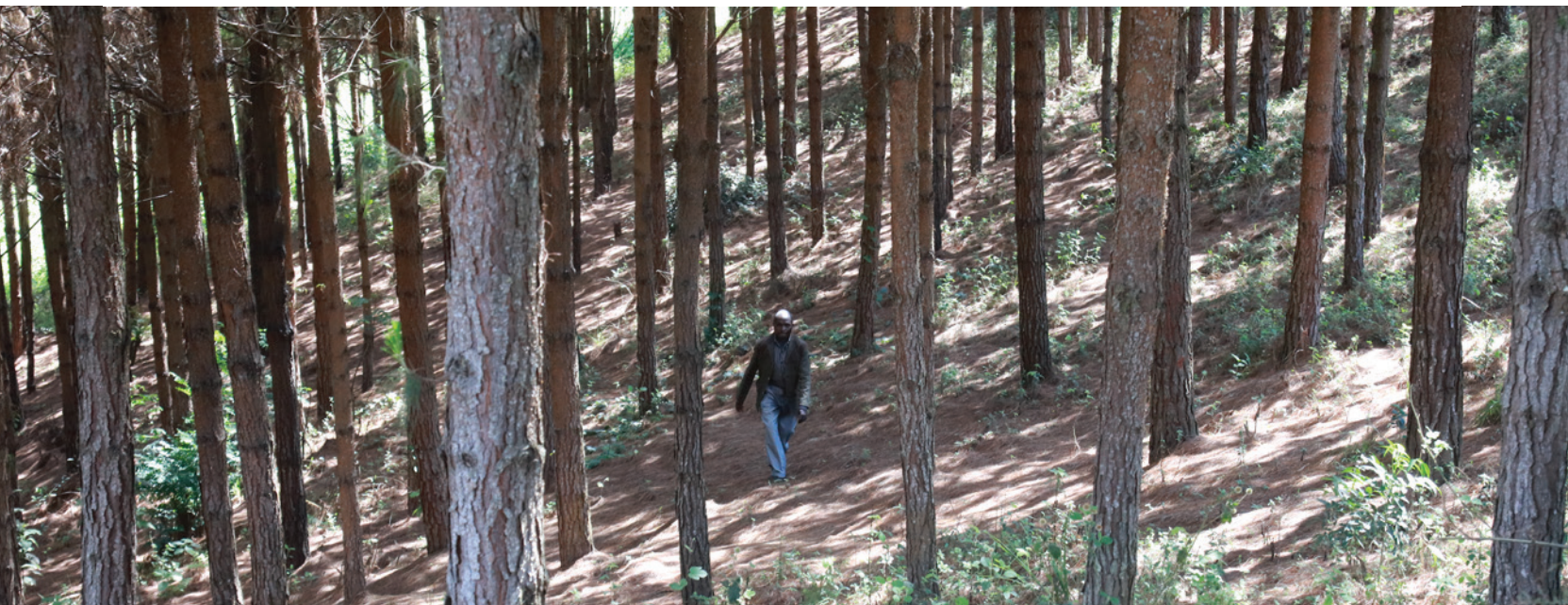




Table 2.4. Economic value of carbon stocks in the EAMs Forests

Name of the Mountain Block	Estimated Total tCO <sub>2</sub>	Total value (USD), price=USD 5 per tCO <sub>2</sub>
East Usambara	30.72 million	153.60 million
West Usambara	44.73 million	223.64 million
South Pare	21.35 million	106.77 million
North Pare	3.62 million	18.11 million
Nguru	40.75 million	203.75 million
Nguu	29.20 million	146.01 million
Uluguru	38.78 million	193.93 million
Ukaguru	22.75 million	113.74 million
Rubeho	63.68 million	318.38 million
Mahenge	2.54 million	12.72 million
Udzungwa	211.41 million	1.06 billion
<b>Total Economic Value</b>	<b>509.54 million</b>	
<b>Net Present Value (NPV)</b>		2.55 billion

Note: tCO<sub>2</sub> was calculated as 3.67 x tC

Table 2.5. Economic value of carbon stocks in the EAMs Woodlands

Name of the Mountain Block	Estimated Total tCO <sub>2</sub>	Total value (USD) at a price of USD 5 per tCO <sub>2</sub>
East Usambara	0.47 million	2.34 million
West Usambara	35.04 million	175.21 million
South Pare	18.32 million	91.59 million
North Pare	6.14 million	30.70 million
Nguru	34.82 million	174.09 million
Nguu	25.94 million	129.67 million
Uluguru	134.41 million	672.06 million
Ukaguru	46.01 million	230.43 million
Rubeho	82.64 million	413.211 million
Mahenge	-	-
Udzungwa	3.20 million	15.99 million
<b>Total Economic Value</b>	<b>387.06 million</b>	
<b>Net Present Value (NPV)</b>		1.935 billion

Note: tCO<sub>2</sub> was calculated as 3.67 x tC

Source (Table 2.4 and 2.5): EAMCEF, 2019. Economic Value of Ecosystem Services from Eastern Arc Mountains of Tanzania

## 2.9 Key threats

Since the beginning of time, people and nature have been inseparable – despite growth in towns and cities, our footprints to the nature are incredibly visible. The importance of the EAMs to the local, national and international communities has been growing over time with increasing population, market forces, industrialization, political dynamics and international negotiations on the role of forests in regulating the global climate. With the fact that local communities surrounding the EAMs derive their day-to-day living needs largely and directly on resources within their vicinities – such as firewood and charcoal for cooking and lighting, timber and poles for building and furniture, need for pasturelands, agricultural lands etc. The current forests of the EAMs are said to represent only 30% of the original forest area, much of the original forests have been converted to other land uses.

**Across mountain blocks, general threats and drivers of deforestation and forest degradation, and biodiversity loss includes illegal logging, firewood and charcoal burning, agriculture expansion into forests, overgrazing, traditional hunting using fire, mining activities, firewood collection, etc.** Estimates indicate that the original forests of the EAMs covered 18,000 square kilometres and have been shrinking over time to 4,750 square kilometres during the second half of the 19th century, then to around 3,450 square kilometres as of 2000, with a deforestation rate of 0.1% per year.

The presence of the EAMCEF in the areas has contributed significantly to addressing major drivers of deforestation and forest degradation and has helped to strengthen management activities and enhanced meaningful involvement of local communities. In terms of carbon dioxide emission, preliminary results from one of the studies done during 2019 by the National Carbon Monitoring Centre (NCMC) indicated variations in carbon storage, sequestration and emission levels between 2015 and 2019 – the report presents an increase of up to 2.8% of total carbon dioxide storage (from 410.7 million tons of CO<sub>2</sub>e in 2015 to 422 million tons of CO<sub>2</sub>e in 2019), and about 30% increase in carbon sequestration (from 9.5 million tons of CO<sub>2</sub>e per year in 2015 to 12.4 million tons of CO<sub>2</sub>e per year in 2019). In terms of emission, preliminary results indicate about 27% decline in carbon dioxide emissions from protected areas within the EAMs (from a decline of 4.4million tons of CO<sub>2</sub>e per year in 2015 to a decline of 3.2million tons of CO<sub>2</sub>e per year in 2019).

More efforts are needed to sustain efforts made to protect this global heritage especially through community-based interventions that would ensure a permanent change of behaviours and livelihood activities.



MRADI HUU WA UFUGAJI  
WA NG'OMBE WA  
MAZIWA  
UMEFADHILIWA NA  
EAMCEF  
KIJIJI CHA IDEGENDA  
WILAYA YA KILOLO

CHAPTER

3

# About the EAMCEF



## 3.1 Establishment

The Eastern Arc Mountains Conservation Endowment Fund (EAMCEF) is a **Trust Fund that was established and functions as a long-term and reliable funding mechanism** to support Community Development, Biodiversity Conservation and Applied Research Projects, which promote biological diversity, ecological functions and sustainable use of natural resources in the Eastern Arc Mountains of Tanzania.

**EAMCEF was officially registered in Tanzania on 6th June 2001**, under the Trustees' Incorporation Act (Cap. 318, R. E. 2002) of the Laws of Tanzania. The Fund was originally conceived as a joint initiative of the Government of the United Republic of Tanzania, the EAMCEF Board of Trustees, the World Bank, and the Global Environment Facility (GEF).

**EAMCEF operates as a Not-for-Profit Conservation Finance Trust Organization and issues project grants to Government Departments (Central and Local Governments), NGOs, CBOs, Local Communities, Research Institutions, Academic Institutions, Private Entities as well as interested individuals.**

Initially, EAMCEF operated as a component of the World Bank financed project entitled 'Tanzania Forest Conservation and Management Project' (TFCMP) under the Ministry of Natural Resources and Tourism (MNRT) whereby a total of USD 2.4 million credit facility was used to finance activities and operations of its 7 years first phase (2002-2009), the establishment phase. The establishment phase concentrated mainly on getting the Endowment Fund Secretariat in place and functional – staff recruitment, office accommodation, procurement of essential equipment and basic supplies/materials, mobilization of additional resources and establishment of operational procedures. Pilot funding for community development, biodiversity conservation and applied research projects was as well undertaken during the first phase. Funding of the second phase (the permanent phase) was initially planned to come mainly from incomes generated from the investment of the endowment capital secured from the GEF commitment of USD 7.0 million as well as additional

resources acquired from other sources through fundraising activities.

**In mid-2011 the EAMCEF secured a significant project grant from the Government of the Kingdom of Norway** via the Royal Norwegian Embassy (RNE) in Dar es Salaam followed by a second phase from mid-2016 to May 2019 that was then extended to December 2020 through a Bridging Phase agreement. The grant funding supported the development of EAMCEF as an effective institution that is well known around the world and able to deliver sustainable funding for the conservation of the Eastern Arc Mountains of Tanzania. It also provided project funding for the improved management of the 8 Nature Forest Reserves and 1 National Park within the Eastern Arc Mountains ecosystem, namely, Amani, Nilo, Chome, Magamba, Mkingu, Uluguru, Uzungwa Scarp and Kilombero Nature Forest Reserves and, Udzungwa Mountains National Park.

**The total Norwegian grant to the EAMCEF for the last 10-year (2011 – 2020) support period amounted to about USD 10.1 million.**

Project support from the RNE has enabled the EAMCEF investment capital to grow from an opening value of USD 7 million (in December 2006) to USD 11million (by June 2020) - therefore, allowing the EAMCEF to realize its sustainability potentials over the next couple of years when the capital reaches the target of USD 30 million. Current efforts to reach the target are in two main lines – one, to mobilize additional resources into the existing capital, and two, mobilize resources to support operations and projects while re-investing revenues obtained from the endowment capital.

The EAMCEF is currently governed by a nine-member Board of Trustees, with a Secretariat managing day to day activities of the Endowment Fund under the leadership of an Executive Director.

**The EAMCEF secretariat is based in Morogoro Municipality, Forest Hill Area, Plot No. 348, Kingalu Road.**



## 3.2 Vision and Mission



### **Our Vision:**

To see that, the Eastern Arc Mountains and the people who depend on them live in harmony as one sustainable ecosystem. The forests and mountains will provide goods and services – from water to electrical power, from food and cash crops to medicines – for the people of Tanzania. And the world community will benefit from a protected biodiversity hotspot and a major carbon sink reducing global warming and mitigating climate change impacts.





## Our Mission:

We catalyse resources to foster conservation of forest biodiversity in the Eastern Arc Mountains of Tanzania through investment in sustainable community development and livelihood improvement, sustained financing for protected areas management and financial support to applied biodiversity and climate change research.

## Our Motto:

Conserving Biodiversity for Sustainable Development





## Long Term Strategic Objectives:

- Supporting sustainable conservation and community development throughout the EAMs region through a responsive investment of US\$1.5million a year.
- Enabling adjacent communities- more than 1 million people to enjoy better livelihoods and so reduce the pressure on the ecosystem.
- Ensuring that the mountains and forests, with more than 900 endemic plant and animal species, are healthy and sustainable ecosystem that helps to reduce the impacts of climate change.
- Enhancing people at local, national and international levels to understand and appreciate the importance of the Eastern Arc Mountains as a unique resource and join the EAMCEF to secure its effective conservation.



### 3.3 Aims and Objectives



**To promote the protection of biological diversity** in the Eastern Arc Mountains, targeting priority areas of significant diversity.



**To promote the mitigation and adaptation** to impacts of climate change in the Eastern Arc Mountains.



**To promote the involvement of the local communities in the conservation and sustainable management** of the natural resources and biodiversity of the Eastern Arc Mountains and to assist them in benefiting from such conservation and sustainable management.



**To ensure benefits**, whether financial, technical or material arising from the Trust's activities, pass to local communities in its areas of operation.



**To provide long-term reliable support for projects and research** which promote the conservation of biological diversity and sustainable use of natural resources in the Eastern Arc Mountains and contribute to the promotion of the economic and social welfare of the communities in the area.



**To promote the collection and dissemination of information** and advice concerning the Eastern Arc Mountains and their global conservation value.



**To engage in fund-raising activities** to obtain resources that shall finance the objectives of the Trust.



**To enter into covenants or agreements**, including but not limited to; joint management agreements, leases; and licenses with other identified stakeholders, including: local communities, central and local governments, the business community, private sector and individuals, over any land and immovable property as may have been acquired by the Trust, provided always that such agreements shall be in the long-term interests of the Trust.



**To provide liaison between government agencies, civil society and the private sector** in conservation and environment matters.



As an insubstantial part of the activities of the Trust and only to the extent permitted by a public charity organization, **to advocate for policies, regulations and laws that are designed to promote sustainable development and conservation.**



**To co-operate** with any person or organization with objectives similar to those of the Trust.

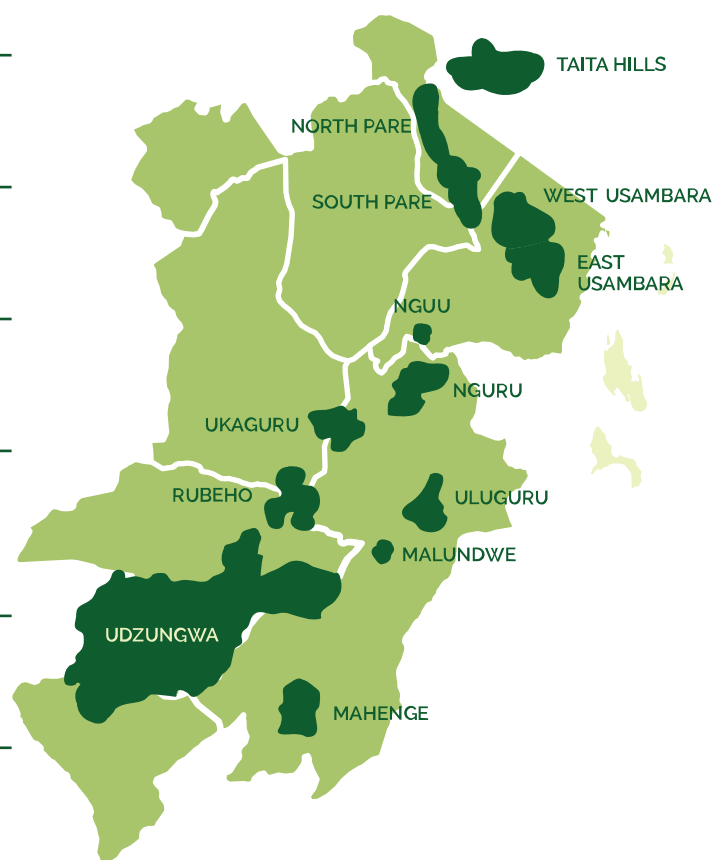


## 3.4 Where we Work

We work to promote conservation, community development and biodiversity conservation researches across the Eastern Arc Mountains of Tanzania. Our field interventions have to date supported the management and conservation of the 8 Nature Forest Reserves and 1 National Park across the Eastern Arc Mountains of Tanzania as well as by involving and supporting the target communities in eleven District Councils adjacent to the priority forest sites (Table 3.1). Current estimates indicate that a population of around 629,145 people live in the targeted sites where the EAMCEF is operating.

**Table 3.1: Areas of work**

Protected Area	Mountain Block	Districts
<b>Amani Nature Forest Reserve (ANFR)</b>	East Usambara Mountains	Korogwe and Muheza
<b>Nilo Nature Forest Reserve (NNFR)</b>	East Usambara Mountains	Korogwe, Mkinga and Muheza
<b>Kilombero Nature Forest Reserve (KNFR)</b>	Udzungwa Mountains	Kilombero and Kilolo
<b>Uzungwa Scarp Nature Forest Reserve (USNFR)</b>	Udzungwa Mountains	Kilombero, Kilolo and Mufindi
<b>Uluguru Nature Forest Reserve (UNFR)</b>	Uluguru Mountains	Mvomero, Morogoro, Morogoro Municipality
<b>Mkingu Nature Forest Reserve (MKNFR)</b>	Nguru Mountains	Mvomero
<b>Magamba Nature Forest Reserve (MNFR)</b>	West Usambara Mountains	Lushoto and Korogwe
<b>Chome Nature Forest Reserve (CNFR)</b>	South Pare Mountains	Same
<b>Udzungwa Mountains National Park (UMNP)</b>	Udzungwa Mountains	Kilombero and Kilolo



## 3.5 Main Thematic Areas

The EAMCEF work is organized around three main portfolio or thematic areas intertwined to bring about environmental conservation, knowledge and reduced poverty of the communities living adjacent to the targeted sites across the Eastern Arc Mountains.

### **Thematic Area 1: Conservation of Protected Areas and Mitigation of Climate Change**

Under this category, our work and support aim at improving the ecological functions of the ecosystem and to strengthen the management capabilities of the responsible institutions – thereby enhancing the resilience of the ecosystem to climate change impacts while maximizing potential mitigation functions. We support Protected Areas (Nature Forest Reserves and National Park) to manage their forest boundaries by installing beacons, planting boundary trees, buffer area management, boundary clearing to allow visibility; to establish and manage nature trails used for walking safaris, forest walk, bird watching etc. This support also helps protected areas to undertake forest surveillance and joint patrols with local communities; rehabilitation of degraded forest areas resulting from illegal mining activities within the reserves. Through this support, we help the management of the reserves to enhance their financial sustainability by supporting ecotourism and marketing – with activities such as campsite establishment and improvement, tourism promotion, infrastructure development through regular maintenance of driveways (Box 3.1).

#### **Box 3.1. Examples of Projects under Conservation of Protected Areas and Mitigation of Climate Change**

- Boundary survey
- Boundary maintenance
- Boundary marking
- Nature trails establishment
- Nature trails maintenance
- Rehabilitation of degraded areas
- Forest surveillance
- Campsite improvement and management
- Infrastructure development
- Campsite establishment
- Ecotourism marketing

### **Thematic Area 2: Community Development and Conservation**

This theme contains projects dedicated to putting local communities at the heart of conservation by supporting alternative economic activities that would accelerate the improvement of rural livelihoods and social welfare of forest adjacent communities. Alternative livelihood activities are keys to reducing total dependency on forest products such as cutting of trees for charcoal and firewood (which results into forest degradation).

The EAMCEF channel grants to support small-scale alternative income-generating activities which link well with forest conservation, such as; beekeeping activities, production of biogas from animal wastes, butterfly farming, soil and water conservation agriculture, awareness activities and conservation education, fish farming practices, adoption of locally-made fuel wood energy-efficient stoves, horticulture farming, land use planning, livestock keeping (dairy goats, dairy cows, pigs and poultry), spice tree farming, sunflower farming for oil production, soya beans farming, mushroom farming and tree planting activities for business (Box 3.2).

### Box 3.2. Examples of projects under Community Development and Conservation

- Beekeeping
- Tree planting
- Improved stoves
- Fruit production
- Fish farming
- Local chicken
- Capacity building
- Horticulture
- Reforestation and rehabilitation
- Agroforestry
- Environmental conservation
- Biogas technology
- Hybrid chicken
- Dairy goat keeping
- Pig production
- Butterfly farming
- Ex-situ conservation
- Soil conservation
- Spice tree farming
- Sunflower farming
- Soya beans farming
- Enterprise development
- Land use planning

### Thematic Area 3: Applied Biodiversity and Climate Change Research

The EAMCEF supports scientific and social-economic researches relevant to the conservation of biodiversity and sustainable use of natural resources in the priority Eastern Arc Mountains. This category support studies such as those on; carbon storage potential of the EAMs, Climate Change Impacts and Mitigation researches, Biodiversity conservation, vegetation recovery, economic researches such as on opportunity costs, policy and regulations, and payment for ecosystem services.

During the 2011-2020 period, over 21 researches were completed, and their results provided evidence for informed decision-making, and shared in-depth understanding of the various issues across the EAMs.





A man in a dark green suit jacket and light blue trousers stands in a pine forest, leaning against a tree trunk with his arms crossed. He is smiling. The forest is filled with tall, thin pine trees and a ground covered in pine needles and some green plants.

### 3.6 Notable Results at a Glance

This section highlights some key results of the work of the EAMCEF on conservation, livelihood improvement, energy efficiency, land management and eco-tourism achieved over the last 10 years (2011-2020). During this period, our project and operations support came from the Royal Norwegian Government. Our implementing partners have been a great resource in ensuring the successful attainment of such results, the cooperation and active participation of the communities we work with have made it possible for the EAMCEF to ensure adequate delivery of resources and technical support.



## Conservation:

Our support in Protected Areas (PA) has helped to strengthen the capacity of responsible authorities to manage PAs against threats from encroachment, destruction, and allowed the rehabilitation of degraded areas and reclaim grabbed lands. Our grant support has enabled agencies mandated to manage the forests such as District Councils, Ministry of Natural Resources and Tourism, Tanzania Forest Services (TFS) Agency and Tanzania National Parks in the Eastern Arc Mountains to improved coordination, communication and rapid response. Notable Outputs that have contributed to these results include:



**311 Ha of degraded areas rehabilitated** by refilling of 403 mining pits and planting of indigenous trees – the discovery of minerals in some protected areas have attracted the attention of local communities across the EAMs, but due to restrictions to performing mining activities within PAs local communities have been encroaching the forests in search of minerals thus degrading forests. The EAMCEF support enables extensive reach through joint patrols.



**1,793 km of boundaries cleared and maintained** in 9 reserves reducing forest encroachment and fire outbreaks – unclear and invisible boundaries have been a source of land conflicts with local communities surrounding the forests. Due to inadequate budget allocation from the government, responsible authorities could not afford the cost of human resources required to clear long boundaries. The EAMCEF support enabled short term employment and compensation of local communities who helped to clear forest boundaries.



**27,100 trees planted on 15,120 kilometers boundary** to make such boundaries visible and create a buffer between protected areas and village lands.



**150 km of boundaries resurveyed** - resurveying of forest boundaries were critical in addressing boundary conflicts with local communities as old boundary marks disappeared/or became invisible. Population change and growth of demands for land resulted into extensive encroachment of protected areas considering that most of the villages are not surveyed and do not have land-use plans. The EAMCEF support facilitated conflict resolutions and resurvey and marking of boundaries with concrete beacons.



**227 ha of narcotics and illegal farms in protected areas destroyed** – due to inadequate financial capacity, only limited forest patrols took place leaving remote areas uncovered and free from encroachment activities. Remote forest areas became fields for agricultural activities. With management support and joint patrols, illegal farms were discovered deep into the forests and destroyed.



**52,738 community members sensitized on conservation** resulting in increased participation of local communities in conservation activities, tourism and ecotourism infrastructure development and improvement.

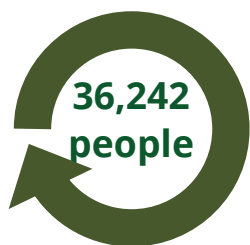




## Community livelihoods:

We have empowered local communities living adjacent to the protected forests through co-designing and introduction of alternative sources of income that helped to improve their status of life. At the local level, agriculture is the main source of household income. However, due to poor technology, lack of agricultural inputs and poor farming practices local communities do not earn more from agricultural activities, leading to food insecurity and low income. Food insecurity pushes the community to expand their farms and shift to virgin and fertile lands mostly found in protected forests of the EAMs – causing massive degradation. The EAMCEF support has helped to empower communities to do away with forest encroachment.

Notable Outputs that have contributed to these results include:



**36,242 community members improved their capacity** on establishment and implementation of alternative livelihood activities (such as aquaculture, livestock and poultry keeping, butterfly farming, tree planting), which in turn helped them earn new incomes and reduced their dependence on forests for tradable products.



**216 households (HH) adopted soil and water conservation techniques** (conservation agriculture) on 863 ha of land leading to a 200-300% increase in agricultural production, higher incomes and enhanced food security. The introduction of conservation agriculture has helped local communities avoid shifting cultivation. Increase in harvests allowed sales of surplus food thereby generating income for household uses.



**Over 3,645 community members benefited from short term employment** as casual labourers in various conservation activities such as boundary clearance and maintenance, and boundary tree planting.



## Improved energy efficiency:

EAMCEF support-built capacity of local communities to construct improved fuel-efficient stoves cutting firewood demands by over 50%. Local communities use fuel wood (charcoal and firewood) as their main source of energy for cooking. A traditional three-stone cook stove for example, uses firewood but due to inefficiencies large volumes of firewood is consumed thereby increasing demands from the forest - this drives forest degradation.

### Notable Outputs that have contributed to these results include:

1,702  
People

EAMCEF trained 1,702 local artisans to construct energy efficient stoves in order to spread wide adoption of this innovation - training of local artisans ensured reliability, affordability within the local settings.

14,187  
HH

Over 14,187 households (HH) adopted use of fuel-efficient stoves leading to over 50% cut in firewood consumption, employment to local artisans and reduced pressure on the forests.





## Land Tenure:

Our support has strengthened land tenure issues and reduced conflicts over land. Lack of clear land boundaries between village lands and protected area lands resulted into greater tension between protected area management and local communities. Unclear boundaries contributed to forest encroachment and degradation. The EAMCEF has been at the forefront of resolving land conflicts.

Notable Outputs that have contributed to these results include:



**112 certificates of customary rights of occupancy provided** under the EAMCEF facilitation, thereby strengthening tenure right among local communities.



**954 land conflicts got resolved** during the last 10 years





## Ecotourism:

The EAMs has large unexploited tourism and ecotourism potentials that for many years have not been fully unlocked. The EAMCEF support on infrastructure development within protected areas contributed to enhanced tourism activities.

Notable Outputs that have contributed to these results include:



**887 km of ecotourism nature trails cleared and maintained** - thereby increasing access to the nature, attracting tourism



**31 campsites established** and renovation of ecotourism information centre supported thereby increasing visibility and number of visitors.



**348 drive routes maintained**



**TZS. 83.2 million earned from tourism, ecotourism and as fines from forest encroachers.**



CHAPTER

4

# Supported Livelihood Activities and their Contribution to Poverty Reduction



## 4.1 Project Selection

We mobilize financial resources and channel the same down to the community level through support on local level projects. Over the last 10 years since 2011, the EAMCEF has been benefiting from a generous project grant support from the Royal Government of Norway. Delivery of the grant support is through project implementation in the priority project sites where the EAMCEF is operating – already mentioned in the previous chapters. The approach of offering grants to many but small interventions versus few but large projects has been debated several times, with both sides putting on table strong arguments. However, the EAMCEF sees some added advantages and preference of issuing many micro-grants to small-medium sized CBOs and NGOs. Considering the vastness of the Eastern Arc Mountains (EAMs), the easiest mechanism to reach the wider community is through existing community-based CBOs and NGOs. Since degradation and encroachment of the EAMs does not only come from one side of the mountain block, addressing the challenges requires a mixed set of site-specific interventions that addressed the immediate and root causes of degradation. Working with many small-medium sized CBOs and NGOs has helped to spread wide the impacts across communities surrounding the EAMs.

It is amazing how small grants can be a game changer, much appreciated at the community level. Small interventions have resulted into business and development projects that changes the lives of the people.

The over-riding principle governing the selection of any project for funding by the Endowment Fund is that, the project activity must result in some demonstrable (direct or indirect) benefit to the conservation of biodiversity in the Eastern Arc Mountains, especially in the designated target areas.

In addition to other principles of relevance, replicability/ demonstration, impact, social and environmental soundness, poverty reduction, contribution to climate change adaptation and mitigation, and the extent to which projects contributes to behavioural change. The selection of projects in the category of community-based conservation and development theme is further guided by a few more criteria; including aspects of linkages to community participation in conservation, sustainability and feasibility of proposed interventions, opportunity costs of conservation, climate change vulnerability as detailed further in Box 4.1

### Box 4.1. Criteria for project selection for community development and conservation

- The degree to which the project will provide for and/or will lead to community management of the local forest resources.
- The importance of the area's conservation value to priority protection forests,
- The degree of sustainability and viability of the proposed activity as measured by such indicators as: Adequacy of management; Operational feasibility; Market potential; Financial soundness; and level of local contribution and commitment; -
- Level of priority within the community, and other factors affecting feasibility.
- The degree to which the community suffers economic losses or hardship as a result of forest management policies.
- The degree to which the target communities suffer from the impacts of climate change
- The degree to which the community is organized.
- The size and economic status of the community, and the access, or lack of access, to alternative sources of funding for the proposed activity.
- Other urgent or special factors affecting conservation.

## 4.2 Types of Grants Offered

The EAMCEF provides three types of grants as part of its overall programme efforts – Micro-grants, single year or discrete project grants, and multi-year programme grants (Table 4.1). Disbursement of funds for project implementation is currently done in two tranches – 50% at the beginning of the projects and another 50% upon liquidation, reporting and satisfactory delivery of the intended outputs/results. Initially, our mode of disbursement was in three tranches of 40%, 30% and 30%, depending on the financial needs of each project, and performance.

**Table 4.1: Types of grants offered by the EAMCEF**

Type of grant	Amount offered	Description
<b>Micro – Grants</b>	TZS. 10 million (eqv. USD 4,348)	The EAMCEF provides a significant amount of its available resources for micro grants to support small-scale efforts within each of the three Thematic Areas.  Microgrants can also be provided to conduct feasibility studies and analyses.  Project duration: 0.5-1 year
<b>Single Year or Discrete Project Grants</b>	TZS. 10 - 100 million per year (eqv. USD 4,348 - 43,478)	The EAMCEF supports discrete, one-time projects whose project life will generally not extend 18 months within the three Thematic Areas.  Generally, grants are provided per annum, not exceeding TZS 100 million.  Project duration: 1-3 year
<b>Multi-Year Programme Grants</b>	TZS. 10 - 100 million per year (eqv. USD 4,348 - 43,478)	The EAMCEF will provide multi-year funding for projects, or programmes, that will require several years to yield results, or which require multiple year funding to ensure sustainability and achievement of objectives. Grants are provided per annum, not exceeding TZS 100 million.  Project duration: 3-5 years

Source: EAMCEF 2020. Guidelines for Preparation of Project Proposals and Procedures for Making Grants





### 4.3 Examples of supported livelihood activities and their contribution to Poverty reduction

In this section, we tried to map out the contribution of various supported activities in enhancing the livelihoods of local communities – especially in improving their level of income. More importantly, these supported activities directly incentivises communities to protect the forests around them and help them to diversify their sources of income or change their livelihood system amidst the changing climate. Many of the supported alternative income-generating activities are not directly emerging from climate change impacts but have the potential to help communities adapt to the climate by diversifying their sources of income in areas where traditional livelihood activities are not productive enough partly due to the changing climate conditions.





### 4.3.1 The Beekeeping story

Situated just on the foot of Udzungwa Mountains, villagers of Msufini Village in Kilombero District enjoy the magnificent view of the forest of Udzungwa Mountains National Park just in their vicinity. In this village, the EAMCEF selected a small group of farmers to demonstrate how beekeeping through modern beehives can be a profitable economic activity that would change the lives of the people, provide them with alternative income that would incentivize them to stop invading protected forests for the same purpose. Ten years earlier prior to the EAMCEF intervention, a group of ten farmers – 6 being males – agreed to form a beekeeping group named ‘Wosia wa Baba’. The group gathered 10 locally-made beehives, normally made from tree logs, and hanged them in the forest – a nearby protected forest owned by the government. Each beehive produced only 5 litres of honey a year. The group, therefore, generated around TZS. 50,000 – 60,000 per year! The group never owned any honey

processing equipment. During the honey harvesting period, beekeepers normally light fire to chase away bees. In the process, the fire is left uncontrolled and spread to nearby trees and even further deeper into the forest. The forest authority in the area prohibited such encroachment activities and put strong measures to prevent people from invading the forests. The group, being among the victims was left without any other option than hanging hives on nearby trees within the village. The group chose a small area and decided to plant trees to serve the purpose, but still, this was not economically viable.

To make beekeeping a profitable business that would withdraw villagers from invading protected forests, the EAMCEF intervened and took advantage of the existing group to introduce modern beekeeping techniques (Box 4.2).



The beekeepers say it all.



**GODFREY DANIEL HORO**  
(Chairperson, Wosia wa Baba  
Beekeeping Group, Msufini Village,  
Kilolo District)

We received 50 modern beehives from the EAMCEF, in 2016 alone each hive produced 15-20 litres of honey – five times the amount produced from traditional beehives! In 2016 alone, we sold 250 litres of honey for TZS. 2,500,000 and used part of the money to lease a two-acre farm where we planted sugarcane. From sugarcane, we earned another TZS. 2,500,000 and used part of it to initiate another business – we bought 10 bicycles and hired them for transport services within the village, from bicycles we got TZS. 5,000,000 within 6 months. Each group member receives a 25% dividend, I used mine to buy a bicycle for my son who used to walk 14km every day for school. With the bicycle, my son can now get back home early and do his assignments... he now gets 70-80% grades than the usual 50-55% in his exams.

Our success as a group has promoted the formulation of 15 other beekeeping groups within the village; villagers are no longer risking their lives in the forests for income.

Our group has made a difference in the village; we are lending money to people in critical needs, especially to members of the Village Community Banks (VICOBA) without charging any interest. Our group saved the lives of 4 villagers who were very sick but unable to afford hospital costs.



BABA



**HIDAYA SAID MATAJIRI**  
(Farmer, Msufini Village, Kilolo District)

I am a widowed woman but no longer frustrated because I use income from beekeeping activities to invest in other productive activities – last year I did not touch any hoe, instead I hired a tractor to plough my farm!



**RECKSON ARON MTAMA**  
(Secretary - Wosia wa Baba Group, Msufini Village, Kilolo District)

Bees [to mean beekeeping] are enough. I remember I almost got bitten by a black mamba [a snake] in search for honey in the forest. I no longer need to go up there [in the forest] again I no longer feel stressed paying school fees for my children. In the past, I was very much graced...I borrowed TZS. 40,000 to pay for school fees but ended up repaying one sack of paddy worthy TZS. 100,000!

**Box 4.2. During 2011-2020, the beekeeping support was extended across the project sites in Korogwe, Mkinga, Lushoto, Same, Morogoro, Kilombero, Mvomero, Kilolo and Mufindi Districts.**

- **19,115** villagers trained on modern beekeeping techniques
- **121** beekeeping groups formed
- **1,523** modern beehives supplied to villagers/groups
- **14,351** litres of honey harvested and 679 kgs of beeswax collected
- **TZS. 79,367,500** revenues generated from sales of honey and beeswax



### 4.3.2 The Tree Planting story

The beautiful landscape of Kilolo District is blessed by the cold weather and rich soil supporting tree growing business (softwood – pine). However, and for many years the key challenge has been the ‘waiting time’. From planting to harvesting and sales of a mature tree one needs to wait for at least 15 years to enjoy the fruits – that’s too much! While waiting for more than a decade, local communities in Idegenda Village, one of the villages in Kilolo District, engages in various on farm and off-farm activities to generate income. Among the off-farm activities, the Uzungwa Scarp Nature Forest Reserve

just at their vicinity has always been the victim – victimized for tree cutting (timber and poles) and other income-generating activities resulting into forest degradation.

To address the problem, the EAMCEF through a participatory approach interrupted the ‘waiting time’ by introducing fast-growing pine trees (7 years) that would act as alternative sources of income to save forests from destruction (Box 4.3). Apart from planting, villagers raise and sell tree seedlings.







#### **MBAWI PRIMARY SCHOOL, KILOLO DISTRICT**

“The tree planting project has helped the school to solve long-standing challenges, especially relating to services offered to pupils. Income from sales of seedlings was used to build a large kitchen, cooking and serving equipment/utensils etc., but most importantly the school installed a solar panel to help pupils who are waiting for their standard seven exams get extra study hours during the night. Teachers believe that it is this solar panel that has contributed to a better performance of pupils – from 60.3% pass (in 2016) to 68.9% pass in 2017”, narrates Ponziano Lung’ali (Environment Teacher, Mbawi Primary School, Kilolo District).

**Box 4.3. During 2011-2020, the tree planting project was implemented across project sites in – Korogwe, Mkinga, Lushoto, Morogoro, Kilombero, Kilolo Districts and Morogoro Municipality**

- **1,220 villagers trained** on tree planting techniques
- **316 tree nurseries** established
- **27,357 Ha of land** established for woodlots
- **TZS. 38,358,860 revenues** generated from selling of **tree seedlings**



## The tree farmers say it all.



**EXAVERY SAMIGARI KISIMBA**  
(Idegenda Village, Kilolo District)

I have been growing trees for the past 30 years but was so surprised to hear from the EAMCEF that there are fast-growing species. Without any delay, I started growing and selling seedlings – made up to TZS. 20,000,000 for three years, and later I planted 20 acres on my farm. I used part of the income from selling seedlings to build a modern house in Iringa Town thereby saving money that I and my family and relatives would have incurred for living in hotels and guest houses. Money from sales of tree seedlings rescued my relationship with my wife...every time we wanted to have privacy we were forced to go somewhere away from home since our house was too small, and with kids... you can imagine how hard it is to enjoy with my wife! sometimes, until midnight.



**WILSON MGATA**  
(Village Chairperson, Idegenda Village, Kilolo District)

I planted 3600 trees on a 6 - acre farm in 2013. In 2-3 years from now, I can happily expect TZS. 60,000,000 from selling matured trees. I am so much impressed by this project; I have already generated TZS. 35,000,000 from selling tree seedlings. I used part of the income to build a commercial house from which I earn TZS. 140,000 per month. I use this income to cover all my household needs, but also built a modern house like those you see in the city centre. In the past, we could see fires burning in the forest, up to two times a week, but now it is not the case anymore as villagers are busy with their trees.





## Dairy Cow

Hearing of a forest conservation project one thinks of key actions such as forest patrols, boundary clearing and forest management plans. Agatha Kipingi and her colleagues forming the dairy cow keeping group in Idegenda Village (Kilolo District) tells their story on how (through) dairy cow keeping supported by the EAMCEF has changed their lives and avoided heavy dependency on forests for household income (Box 4.4).

Our group consisting of 25 people was formed in 2013 during the Village Assembly meeting when the EAMCEF arrived in our village. We received training on dairy cow keeping and the construction of proper shelters for the cows. The EAMCEF gave us 9 cows and 1 bull to start the project, as a group we now [2017] have 23 animals in total.

In my house, we managed to install a small biogas feeder that utilizes animal dung to generate energy for cooking. I bought a stove and constructed a good kitchen. In the past, I used to spend several hours – up to six hours in the forest fetching firewood. With biogas, I use the ‘saved’ hours to attend to my cows and my farm. I no longer go to the forest as it used to be, but I also enjoy my new smoke-free kitchen, and my husband is now comfortable to join me while cooking. The new kitchen has reduced up to 75% firewood consumption thereby reducing pressure on surrounding forests. If all households in Idegenda Village keep cow and switch to biogas... our surrounding forests [The Uzungwa Scarp Nature Forest Reserve] will forever remain intact.”



## The cow keepers say it all



**AGATHA KIPINGI**  
(Idegenda Village, Kilolo District)

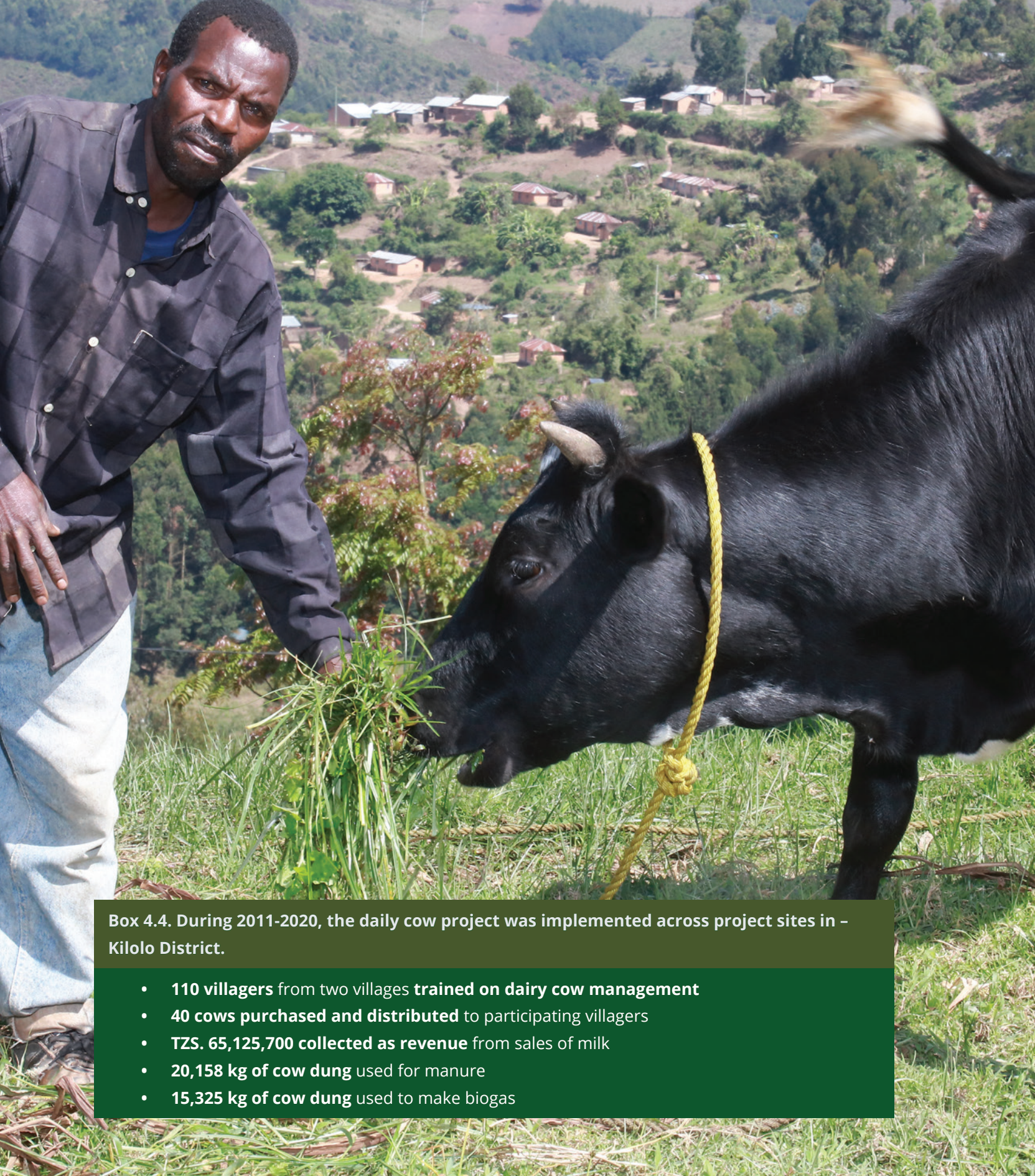
Before I joined the project my family never had access to milk, I now get excess and sell it to my fellow villagers. For the last two years, I managed to make around TZS. 3,000,000. I used my income to buy 2 acres of land and planted 1200 trees - I earned around TZS. 6,000,000 from trees. I used part of the money to clear school fees for my 3 children and install piped water in my house. In the past, I used to fetch firewood from 6am to around 11am and was not able to attend my farm properly. The cows give me biogas and I no longer waste time in the forests, I use my time to attend my cows and my garden. Before I started applying animal manure that I get free from keeping cows, I used to harvest 3 sacks of maize per hectare, but now the harvest has been doubled.



**SIFA MWANDILA**  
(Idegenda Village, Kilolo District)

Our family started cow keeping but also uses animal wastes to generate biogas. We installed a system in the kitchen to make use of the gas for cooking. With Biogas cook stoves my cooking experience has been so enjoyable - no hustle in starting the fire, no smokes, no dirt, clean kitchen... and nowadays I can see my husband comfortably spending time in the kitchen. My neighbours say I am better off just because I no longer face the troubles of the three-stones traditional stove!





Box 4.4. During 2011-2020, the daily cow project was implemented across project sites in – Kilolo District.

- **110 villagers** from two villages **trained on dairy cow management**
- **40 cows purchased and distributed** to participating villagers
- **TZS. 65,125,700 collected as revenue** from sales of milk
- **20,158 kg of cow dung** used for manure
- **15,325 kg of cow dung** used to make biogas





## Pig Keeping

The EAMCEF supported pig keeping in Ukwega Village to prove if communities can generate income from alternative sources other than forests. They would reduce their direct dependency on forests for that purpose, thereby enhancing biodiversity conservation in Kilombero and Uzungwa Scarp Nature Reserves. Pig keeping was selected as the best option that would provide a sustainable solution to accelerate poverty alleviation through the provision of multiple benefits – incomes through sales, as a source of protein, manure for the garden and biogas production. In 2013 the project started to implement the idea by providing conservation education and training on pig husbandry and later provided ‘seed’ pigs in four villages, to 168 villagers. To spread the impact to many villagers, villagers agreed to share one new-born piglet with the

neighbouring household not supported by the project. By the close of phase one of the project support in 2016, the project witnessed improved livelihood status of the supported community, including a significant reduction in the number of people, reported to having encroached the forests.

Pig meat (pork) became the easily available meat in the village butcheries compared to bush meat which was obtained from illegal hunting in the Nature Reserves – through burning of grasses to scare animals, but with detrimental effects on the forests. Income from sales of piglets and/pork has improved household income, while manure has been instrumental in improving home gardens (Box 4.5).





**Box 4.5. During 2011-2020, the pig keeping project was implemented across project sites in - Kilolo District**

- **785 Villagers trained on Pig husbandry**
- **267 households provided with start-up improved breeds of pigs**
- **226 Households received pigs as a multiplier effect of the project**
- **TZS. 37,458,000 earned from selling of pigs/piglets,**
- **TZS. 5,980,000 earned from selling of Pork**
- **3,869 Kgs of pig manure used for home gardens**



## The Pig keepers say it all



**AMARIA DOMINICUS KIMATA**  
(Ukwega Village, Kilolo District)

I used to fight with my husband because our house was very primitive; we never used to sleep if there is rain during the night. We are now very happy to have moved to the new house built by money from sales of pigs – no more fights! I took part of the income from pigs to start a small business here in the village – I make breads and buns and sell them in the village where I earn up to TZS. 65,000 per month.

**FAIDA WILBERT KIHOO**  
(Ukwega Village, Kilolo District)

Through this project [pig husbandry] I can now manage to join Village Community Banks (VICOBA) and small loans – I never had money to do that in the past. Our life used to be very difficult and it was not easy to get money, when I heard news about the project, I decided to join...after joining, my life changed.



**DISMAS WILLIAM KIGAVA**  
(Ukwega Village, Kilolo District)

I was convinced to start pig husbandry when I saw my friend's life was improving every day, I made decisions to join the project a day when I visited him and surprised by 9 new piglets born from one pig. I see myself becoming rich, by 2020 I will be very rich like my friends, I can see a bright future ahead of me and I can confidently encourage others to start keeping pigs.







**TIRNESY ASTANDI KITOSY**

**(Ukwega Village, Kilolo District)**

I sold 9 pigs, got TZS. 700,000, made bricks and constructed a family house to do away with my old, small and uncomfortable one that could not allow enough privacy with my wife. Through income from pigs, I managed to install a solar panel in my house. Solar light gives my wife freedom to work overnight...she cooks [prepares] buns overnight and sell them the next morning. I also provide phone charging services to other villagers and earn an extra income of around TZS. 5,000 per month.



**RITHA ALMAS MGOBA**

**(Ukwega Village, Kilolo District)**

Since I started using manure from pigs, I have seen increased production, such that I was able to sell excess maize and beans and pay school fees for my children. In the past, it was not easy to sell food because the harvests were very little. This project will help many people if continued; forest crimes will end completely since people will find no reasons to invade the forests.





## The Goat keepers say it all

### Goat Keeping

Just a few people in Mkalanga Village believed that goats can be a good source of milk...just like dairy cows, and that the income from goat husbandry can change lives of the poor villagers. Dairy goat husbandry seemed an unusual and strange undertaking. Through sensitization and training meetings villagers were convinced that dairy goat husbandry is a feasible undertaking that they wished to try (Box 4.6). Mr. Seth Chavala, a resident of Mkalanga Village shared his story below:

Our dairy goat husbandry group is called 'Mshikamano', members were selected by the Village Assembly. I am a farmer, but I can clearly say that I used to get very little from agricultural activities than

it is now with goats. I started keeping goats in 2015 through the EAMCEF support, I have an assurance of getting 1.5 Litres daily, out of which I sell one little for TZS. 1,000 and the family consumes the rest. In the past, my family and most people in this village were not able to afford milk as it was obtained somewhere far from here and a bit costly. The income I get from goats is used to cover for household needs, school fees, stationaries, etc. Apart from milk, it was not easier to get farm manure than it is now. We were used to industrial fertilizers which destroyed our land, but now I get manure from goat and I can grow vegetables. I no longer buy industrial fertilizers."

**Box 4.6. In 2011-2020, the goat keeping support project was implemented across project sites in – Mkinga District, Morogoro Municipality, and Kilolo District.**

- **897 villagers trained on dairy goat husbandry**
- **467 villagers supplied with dairy goats**
- **215 households received goat offsprings as multiplier effects of the projects**
- **TZS. 9,278,600 revenue earned from selling of goat and milk**





**IZACK NYAMOGA**  
(Mkalanga Village, Kilolo District)

I use manure from goats to grow avocados, my trees are so healthy. In 2016, I sold avocados and got TZS. 210,000 from 3 trees only. In the past, I could only harvest a few avocados which were not enough for sale. I used the income to buy a Television set and installed solar panel. Since I installed solar panel, my children can study a couple of more hours during the night than it was before with traditional kerosene oil lamp 'kibatari'.



**YUSTA LUHWAGO**  
(Mkalanga Village, Kilolo District)

It wouldn't have been possible for me to afford taking my child to the hospital if it were not for the goat. I don't have health insurance, so I sold one goat, paid hospital charges [...] happy now my child is fine. I started selling vegetables after seeing that the goats can provide enough manure for my garden. Through income from vegetables, I can easily afford household needs. The goats have rescued me from being a beggar and a casual labourer.



**NELIA KIKOTI**  
(Mkalanga Village, Kilolo District)

I sold one goat for TZS. 70,000 and used the money to pay casual labourers to work on my farm, I planted beans and sold the harvest for TZS. 450,000. I used my income from beans to build a bigger house for my family. My old house was too small for family members to fit in. When my goat delivered (now I have 7 goats) I sold one goat and employed some people to help up plant trees on my one-acre farm. I am also getting 3 litres of milk per day, I normally sell two litres and consume the rest. Since then my life has changed a lot, I would rank myself to have moved from level 1 to level 10 - all because of dairy goat husbandry!





## Chicken keeping

Like in many other Forest Reserves, residents of Mkanga Village living adjacent to Mkingu Nature Forest Reserve have continually depended on forests within their vicinity to satisfy their needs for wild meat as the main source of protein. To obtain wild meat, villagers normally go into the forests hunting small

animals – preferably cane rats (known locally as ndezi). Despite being a small animal – 6-10Kg, cane rat’s meat is much preferred due to its tenderness and delicious taste alike that of local chicken. To make the hunting job easy, hunters do not only hunt using dogs but also burn grasses to scare and easily chase cane rats.

It is the burning that results into detrimental forest fires, destroying the valuable forests and associated biodiversity, leaving the forests into patches.

To address the challenge, in 2013 the EAMCEF project grant supported introduction of improved local chicken and brooding techniques by providing trainings to a group of 25 people in each village (Box 4.7). Of the greatest interest at the local level was the introduction of locally made chick brooders (known locally as *Vinengunengu*). A start-up capital of 5 chickens and a cock was handed over to each trainee. The EAMCEF believed that local chicken would replace cane rats and consequently save the forests from fire. Since then, villagers have witnessed

tremendous results in the production of eggs and chicken – the use of *Vinengunengu* has assured raising of up to 248 chicks per chicken per year. Increased production has assured availability of protein (meat and eggs) at household and village levels – thereby reducing forest fire incidences.

It is the sales of chicken and eggs that have transformed the livelihood of participating villagers. Income from sales has been used to cover household needs, but most importantly covered pressing needs like school fees, health services, repair and construction of modern houses and improved toilets.

### Some villagers have used the income from sales of chicken and eggs to:

- Install solar panels and illuminate the households, allowing pupils to earn extra study hours at home thereby improving overall performance.
- Expand agricultural activities by buying more acres of land, employing casual labourers – resulting into increased production and stable food security
- Buy dairy cow and ensure sufficient milk for the household and availability of manure for gardening activities

**Box 4.7. In 2011-2020, the chicken keeping project was implemented across project sites – Korogwe, Same and Mvomero Districts.**

- **1,612 trained** on improved **chicken keeping**
- **2,978 Improved chicken** supplied to villagers
- **527 Households** supplied with **improved chicken**
- **TZS. 19,650,600 Revenue** generated from **sales of eggs**
- **TZS. 40,854,000 Revenue** generated from **sales of chicks**
- **15,870 kg of chicken manure** used for **home gardens**



## The chicken keepers say it all



**BERNADETHA BASIL OISSO**  
(Mkanga Village, Mvomero District)

If it were not the chicken I wouldn't have afforded my heart treatments in Dar es salaam, they [chickens] saved my life. In the past, I could only farm one acre but now I can employ casual labourers and farm up to four acres.







**AMANI B. MTASIWA**  
(Mkanga Village, Mvomero District)

Before joining the project my main source of income was from casual labour – attending other people’s farms, but the income was so small and untimely. To date, through sales of eggs and chicken I have been able to buy my own farm, bought a water pump for my garden and I can now feed my family throughout the year. Through these chickens, I accumulated some money and decided to build an improved one.



**PETER FELIX MBUYA**  
(Mkanga Village, Mvomero District)

In 2017 alone, I earned more than TZS. 700,000 from sales of eggs and chicken, used part of the money to buy a dairy cow...this would have been impossible if it were not for the chickens! Chickens can help me address my financial needs without crying out for help from relatives or neighbours.





#### 4.3.4 The Conservation agriculture story

The EAMCEF believed that, if local communities in Mbomole Village (Muheza District) are food-secured, little degradation happens on forests, and vice versa. Food insecurity drives villagers to invade nearby forests in search for commercial timber, poles and wild meat so they can afford to buy food for the families or pay school fees. In this village, food insecurity is caused by inadequate harvests resulting from poor farming techniques on slopes of the village land. Since slopes cannot retain water for a long time, most crops die, soil nutrients get washed away, soil erosion destroys crops resulting into poor harvests and food insecurity. In the state of food insecurity, the forests become the easiest victim, the free source of income.

The EAMCEF intervened through the introduction of soil and water conservation techniques using bench terraces (Box 4.8).

**Box 4.8. In 2011-2020, the project on conservation agriculture was implemented across project sites in – Muheza District and Morogoro Municipality.**

- **489 villagers trained** on soil and water conservation techniques.
- **216 households adopted** soil and water conservation techniques
- **897 ha of land put under** soil and water conservation techniques





## The farmers say it all

### HASHIM SALEHE POMBEKALI

(Mbomole Village, Muheza District)

Kilimo cha makingamaji [conservation agriculture] was introduced to our farming group called ANGAZIA. We were very happy to see increased yield to suffice household food needs throughout the year. In the past, maize harvests could only feed the families hardly for one month. Before I adopted this technique, I was not able to do mixed farming as some crops require enough moisture to grow.

Nowadays I mix maize with banana, spices and cassava and they grow up very well! My family is now food-secured. I have helped, for free, many villagers to adopt this technique. I feel so happy indeed!





**DAINESS ABRAHAM MLOWE**  
(Mbomole Village, Muheza District)

Before I adopted this technique, farming was just a waste of time, but now it is a profitable undertaking. Before, I used to harvest 10kgs of beans, but in 2016 I harvested 80kgs on the same land area.





**MICHAEL SIMON**

**(Mbomole Village, Muheza District)**

Through this technique, it is now possible to grow vegetables on my farm. In 2016 for example, I harvested up to 500kg of vegetables. After selling, I got TZS. 800,000 and used the money to expand my farm from 1 acre to 4 acres, but also, I dug a water well which I am planning to use it for irrigation.

**JOHN LENGE**

**(Mbomole Village, Muheza District)**

Before I started practicing conservation agriculture my harvest was not more than 2 sacks [200kg], but it's amazing to see 7 sacks of maize coming from the same farm. In 2016, I had plenty of food, I sold the excess and bought cows.

**SOPHIA CYPRIAN**

**(Mbomole Village, Muheza District)**

Through this technique, I have managed to start up another small business...I bought chicken and can now sell eggs. I get enough money to pay for school fees.



### 4.3.5 The Butterfly keeping story

“When butterfly keeping project was first introduced in our village most people were laughing and considered it as a weird undertaking, it is very embarrassing for a grown-up man/woman to walk around catching butterflies” said Mseso E. Elifuraha of Bwambo Village in Same District. Mr. Elifuraha and his colleagues constituting the Butterfly Farming Group are so happy to have proved that the project is a softer and economical way of making alternative income – no hustles!

The EAMCEF introduced butterfly farming to help communities adopt an alternative means of making income as a strategy to reduce heavy-dependence on forests – the Chome Nature Forest Reserve (Box 4.9). Members of the Butterfly Farming Group were trained and visited one of the butterfly keeping sites in Amani Nature Forest Reserve for further learning. Back from the training, the group started planting food plants [flowering plants] that would attract and provide food to butterflies.

#### What do farmers do with butterflies?

In this project, farmers catch female butterflies and place them in a breeding cage containing food plants (flowering plants). The butterfly lays her eggs on the food plant and the farmers carefully harvest the eggs and place them on a clean container. In 14 days, the eggs hatch into a larva – called caterpillars (the most active feeding stage). The farmers transfer the caterpillars to their particular food plant and cover the branches to avoid any loss. In another 14 days the larvae attach themselves to leaves or branches and shed off their skin (pupate) to form a pupa (prular pupae or pupas). It is this pupa that the farmers harvest for sale overseas through a middleman/company based in Amani Nature Forest Reserve. When the pupa reaches overseas, they are used for zoos and live exhibitions as ornaments.

In 2017 butterfly farmers managed to sell up to 865 pupas which earned them TZS. 1,186,530 – this translates to an average price per pupae of TZS. 1,371.7







**Box 4.9. During 2011-2020, the beekeeping support was provided to villages surrounding Chome Nature Forest Reserve in Same District**

- **72 villagers trained** on butterfly farming in Same District
- **396 households practicing** butterfly farming
- **1,447 pupas raised** by 2020
- **2,789,000 TZS generated** from sales of pupas

**NAVONE EMMANUEL E. SINGO**  
(Daughter of Emmanuel E. Singo,  
Bwambo Village, Same District)

I was so ashamed to see my dad catching insects, but later we saw money coming out of it. I am now helping him to take care of the butterfly cage...and I like the job. Before my dad started keeping butterflies, I used to miss classes since fee was not paid on time. I remember staying home for extra 2-3 weeks while my friends were already in school.



## Butterfly keepers say it all



**RIDI ELIAMANI**

(Bwambo Village, Same District)

Butterflies have given light to my house, I got TZS. 90,000 from the sale of pupas and decided to install solar panel for lighting my house. My children were so happy to finally study under light bulbs, they extended their study hours from one hour in the past to, sometimes, until midnight.



**EMMANUEL E. SINGO**

(Bwambo Village, Same District)

My daughter was suspended from school since I could not manage to pay the school fees of TZS. 60,000. but, after selling 189 pupas I earned TZS. 256,840 and cleared the school fee. My daughter was so happy to get back to school since she almost missed her final exams.





**MSESE E. ELIFURAHA**

**(Bwambo Village, Same District)**

In 2017 I sold 330 pupas for TZS. 419,430. I used the money to renovate my house...I replaced the old floor with modern tiles, put modern windows [aluminium profiles]. The project has motivated many villagers and changed their attitude towards the forest, they respect the forest since they know that butterfly comes from the forests, so if they destroy the forests, they will never get butterflies as well as the income.





CHAPTER

5

# Local Level Innovations



## 5.1 Locally made chick brooders – letting mother hen lay eggs six times more a year!

Did you ever imagine how local communities solve their local challenges innovatively? – no high technology, no robots, no artificial intelligence, no IT systems – but only natural resources in their vicinity are enough to solve local challenges. The EAMCEF support witnessed how local communities boost production of local chicken using locally made chick brooders.

Let us first get the feeling of how a standard chick brooder looks like – by definition a chick brooder is simply a box/house where newly hatched chicks are sheltered and provided with favorable temperature and secure them from dangers outside without the aid of a mother hen (as in the natural brooding). So, the brooder contains a source of heat and heat insulators to contain the heat from escaping and bedding materials that retain the heat. Chicks would stay in the brooder from 0-8 weeks until they are able to regulate their body temperatures in relation to that of the surrounding environment. The presence of the brooder releases the mother hen free from the brooding role and allows it to continue laying eggs.

Through the EAMCEF support, local communities surrounding the EAMs adopted chicken keeping as an alternative source of income and source of meat for the household, thereby reducing dependency on tradable forest products and bush meat whose hunting processes resulted into forest fires. Adoption didn't come so easy, it required introduction of new ways of keeping chicken from the business point of view. In order to ensure that as many eggs and as many chicks as possible are produced and survive throughout the year, the EAMCEF introduced the use of locally made chick brooders or '*Vinengunengu* or *kibanda mama*' as famously known at the local level. Having described how a standard chick brooder look the '*vinengunengu* or *kibanda mama*' plays the same

function but are not as prettier as standard brooders. Two designs were available, either a round or a square box. Main walls of the round brooder are made from ceiling board materials, with inner walls covered and insulated with blanket-like material with a door/top lid heavily insulated with double layers of blankets and dry grasses. A square brooder is made of wood materials and insulated likewise with blankets and dry grasses. Bedding materials are also made from dry grasses. Since there is no electricity, no bulbs or heater are used, instead the source of heat comes from the burning wood/charcoal placed underneath the brooder. Hot ashes are also collected and put underneath the brooder.

From the first use of '*vinengunengu* or *kibanda mama*', villagers have witnessed tremendous results in the production of eggs and chicken – once the mother hen lay eggs and hatch them into chicks, the chicks are then transferred to the *vinengunengu* where they stay for 3-4 weeks depending on the six circles of the '*vinengunengu*'. The mother hen then starts laying new eggs in just two weeks since it does not have any chick to take care, then the circle continues, up to six times a year, making an average of up to 248 chicks a year. Prior to introduction of '*vinengunengu*', local communities only witnessed chicken laying eggs only twice a year, with most chicks getting eaten up by angles and other prays. The use of '*vinengunengu*' ensures security of the chicks.





**ROHAN BELINGTON MANGA**  
(Farmer, Mkanga Village, Mvomero District)

For the last three years, chicken [meaning income from sales of chicken] have been paying for my children's school fees, one of the children was able to join college and is now employed. We are very much respected in our village just because of chicken, we are now eligible to get loans from Village Community Banks (VICOBA) for other entrepreneurship activities. I don't expect to go back to the forests for cane rats because there is enough meat [from chicken] available at the community level, especially within my compound.



## 5.2 Energy efficient stoves – cutting firewood consumption by 50%

One of the tricky questions in addressing drivers of forest degradation in Tanzania is on how to deal with growing fuelwood demands especially in local settings where over 98% of the entire population depends on firewood and charcoal for cooking, lighting and heating – all sourced from the natural environment surrounding them – no plantation or woodlots are dedicated for this purpose.

Families would travel miles and miles in search of firewood, spending from 30 minutes to 4 hours depending on availability and distance to where the wood is available. This routine continues over and over and becomes part of life. Nowadays in some villages, young people do collect firewood and bring them close to the village for sale, but the big question has been on affordability. Another question has been on where to find firewood or charcoal – the answer is obvious – any forest or trees nearby. Harvesting of trees for firewood is unfortunately not or poorly regulated, and in protected forest harvesting is not allowed. As a result of this weakness, most forests have suffered severe degradation starting from their edges inwards.

To address the firewood challenge across the Eastern Arc Mountains, the EAMCEF in partnership with local NGOs introduced local solutions that addressed the energy needs by cutting down firewood consumptions and empowered women groups with multiple benefits – that is to make cook stoves work for women and forests. To achieve 50% reduction in firewood consumption innovative and local solutions were put into play. The solutions intervened at the ‘cook stove’ stage where firewood is directly consumed. Traditionally local communities,

until recent, uses a three-stone cookstove, and cooking is done in open-air thereby resulting into rapid consumption of firewood due to uncontrolled movement of air. The proposed solution involved the construction of a mud-and-brick made cookstove consisting of a long chimney that funnels the smoke outside the kitchen. Unlike the traditional three-stone stove, the introduced stove has its one side open for inputting firewood and has ‘plates’ on top (1-3 plates to provide the user with enough space for cooking more than one dish at a time, separately). The design of this ‘new’ stove ensures control of wind into the cookstove. Adoption of this new cooking technology spread widely as local trainers rolled out construction of the same in all interested households, at a low cost. This solution was scaled up to villages of Morogoro Municipality Korogwe, Muheza, Mkinga, Same and Mvomero Districts.

Unlike the traditional cook stove, fuel efficient stoves have additional health benefits – no smokes in the kitchen, all smoke is directed over the roof via a long chimney and hence making the cooking environment clean and safe.





### Fuel-efficient cookstove: An example from Mbakweni Village

Mbakweni Village - one of the villages bordering Chome Nature Forest Reserve, the EAMCEF project trained a women group – called Mkombozi to construct improved cook stoves that would not only replace the traditional three-stones stove, but also reduce by 50% the amount of firewood consumption and reduce health risks associated with smoke. To date, the group has trained other women and constructed 406 improved stoves in different households.

#### Box 5.1. Key data – Korogwe, Muheza, Mkinga, Same, Mvomero Districts and Morogoro Municipality

- **1,702 villagers trained** on construction of fuel-efficient cook stoves
- **14,187 households using fuel efficient cookstoves** in Mvomero, Morogoro Municipality, Same, Mkinga, Muheza and Korogwe Districts.
- **50% reduction** in firewood consumption

MRADI WA MAJIKO BANIFU  
UNA OFADHILINA NA  
EAMCEF  
UNEZINDULIMA NA  
NDG. TRYVE BENDIKS BY  
BALOZI MDOGO WA NORMAY  
TAREHE, 26-09-2016



## A word from beneficiaries

### MARY AGNES

(Mbakweni Village, Same District)

We were exposed to very high health risk as our old cook stoves produced too much smoke, our eyes and hearts were suffering. The stoves made our kitchen so dirty and unattractive. My family used to spend between 24-32 hours a week fetching firewood, such that we were not able to do other activities when back from the forests. We managed to cut more than 50% of firewood consumption using the new stove, cooking is easy, clean, safe and takes much shorter time.

### MARY BARUBUKA

(Mbakweni Village, Same District)

I was incurring a weekly cost of TZS. 10,000 for firewood, but now with the new stove I spend only TZS. 4,000 for firewood per week. I use the savings to improve the family diet.

### NIGHENJJWE KODA

(Mbakweni Village, Same District)

My husband is so happy to see me using Mkombozi stoves [improved cook stoves], he feels comfortable joining me in the kitchen, this was never the case!







### 5.3 Soil and water conservation technique – enhancing resilience in agriculture

When you hear of a farmland, what comes to mind is a plain, fertile field covered with healthy crops. However, the story is different for some communities living adjacent to the Eastern Arc Mountains. For this community, farming is practiced on slopes and hills, but it is tricky and does not yield much. Even in seasons with good rains poor harvests are always the case.

The hills and slopes on village lands surrounding the Eastern Arc Mountains present a key livelihood challenge as farming is less productive but yet a key activity employing majority of the villagers. With poor crop harvests, food insecurity is a common problem and pushes local communities to seek for off-farm income generating activities. But one question, why is farming on slopes/hills challenging? Simple - slopes cannot retain water for a long time as run-off is high, crops die due to lack of moisture, soil nutrients get washed away by running water, soil erosion destroy crops resulting into poor harvests and hence food insecurity at household level.

The introduction of soil and water conservation techniques using bench terraces (known locally as *'Makingamaji'*). Bench terraces help to retain water by reducing the speed of running water to ensure that crops get enough moisture, and controls erosion. Bench terraces are made on slopes by cutting and digging the soil to produce steps or benches. Farmers who have adopted this technique have witnessed great changes – as already described in the previous sections of the book.



CHAPTER

# 6

# Quantification of Investments on Livelihood Activities





## The EAMCEF approach

The EAMCEF approach to forest conservation centred at the community level is aimed at enhancing conservation of the surrounding forests by reducing pressure from communities whose livelihood activities (income-generating activities) depend on the forests around them. Support to community alternative livelihood activities is linked to addressing the main drivers of forest degradation rooted deep in the communities over the years. Supporting alternative livelihood activities is an investment whose return has two main benefits – the community livelihood is improved, and the forest is freed from destructive activities. This complements effort done by the forest owner (the government) to protect the forests. Alternative livelihood activities and effective participation of local communities in forest management activities empower community

members. When communities are empowered, they become independent and able to intensify production on other productive activities other than reaping from forests. On the contrary, heavy patrols as an approach to protect forests and exclude local communities do not ‘truly’ address the main drivers of forest degradation but displace such destructive activities to other less protected forests.

Investment at the local community level has taken different shapes depending on the nature of targeted communities and supported activities – such as training, awareness and extension services; financial and material support, creation of local partnerships and networks, and institutional strengthening through local groups. Some of these investments are beyond financial quantification.

### 6.1 Trainings, awareness and extension services

Capacity building trainings on livelihood activities and conservation awareness-raising have been at the heart of the EAMCEF support. Investing in trainings ensured that local communities have the required technical capacity to undertake and fully own projects co-designed and introduced in their area. Awareness activities created enabling environments for smooth landing of projects and mobilized to support and engagement of local communities – thereby contributing significantly to the success of implemented projects in terms of recorded results.

At the inception stage of each supported project and before selection of specific groups to implement the projects, the EAMCEF’s approach ensured that trainings and awareness sessions are provided to the general public through village meetings, then later intensive training on specific livelihood activities provided to selected community groups. Overall, trainings

have helped to increase **participation of local communities in forest conservation activities, patrols and border maintenance**, resulting into reduced degradation and improved protection of forests. Through the active participation of local communities, forest fire incidences that were threatening the ecosystem disappeared completely, with the exception of a few accidental incidences once a year – in the past over 5 incidences were recorded annually. Investing on local communities **has also increased conservation awareness among primary school children** through awareness raising meetings, tree planting competitions and the establishment of school tree nurseries. Awareness and trainings had a significant **impact on changing local level perceptions and attitudes towards Protected Areas management** and thereby improving collaboration, networking and reduced nature-people conflicts.



For example, during 2011-2020, training and support on modern beekeeping was extended to 5,129 villagers, with equipment support such as 1,523 modern beehives, 25 honey pressing machines, and bee manipulation equipment and packaging containers. Training on butterfly farming was extended to 386 villagers and associated farming inputs were provided. Training on alternative energy sources such as biogas technology was extended to 1,702 villagers and demonstration biogas plants were constructed. Training in use of fuel wood energy efficient stoves through training of 1,702 trainers and construction of 14,187 stoves in households adopting the technology were offered.

The projects supported conservation awareness meetings and provided trainings on soil and water conservation techniques to 489 farmers (with conservation techniques adopted in 897 ha of farmlands). In addition to conservation agriculture,

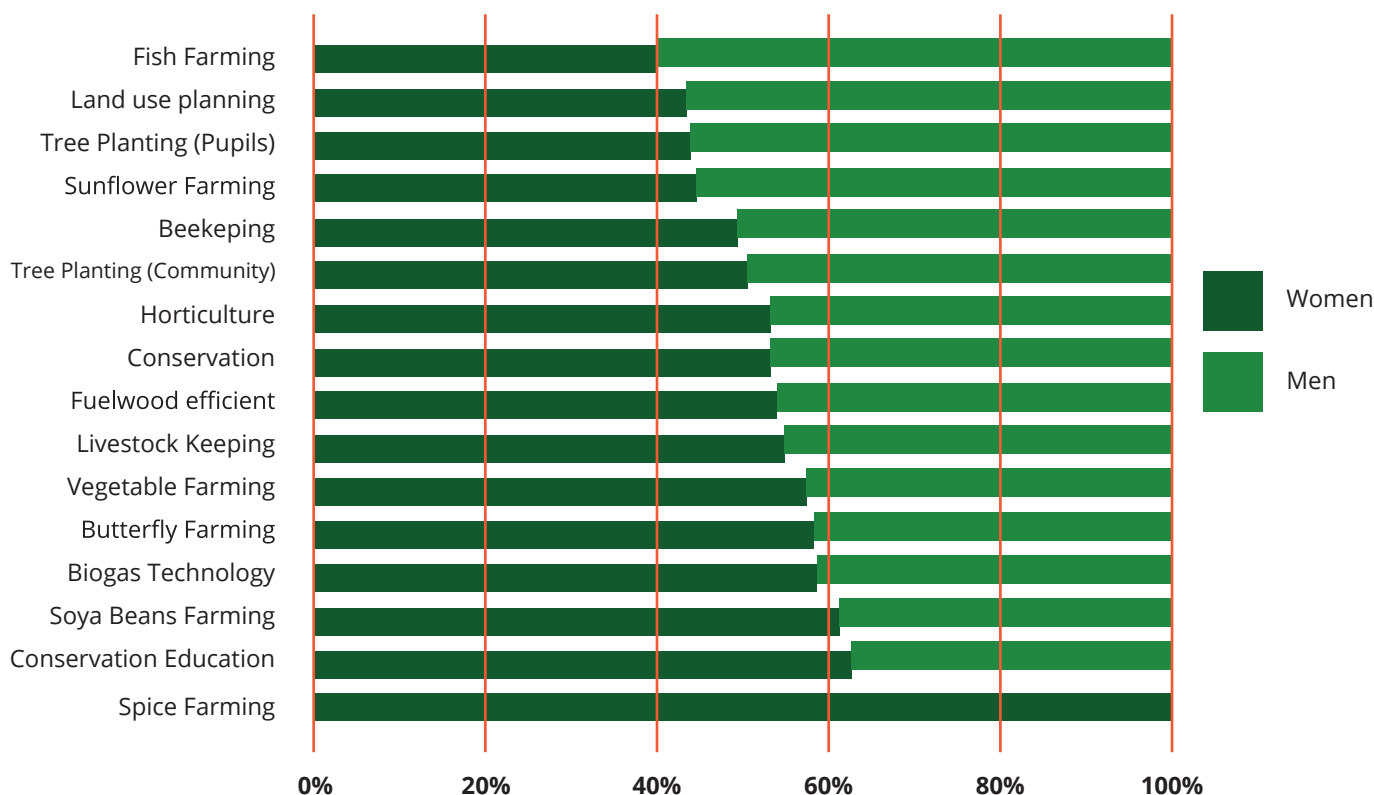
other support and trainings included: horticultural activities, spice tree farming, sunflower farming, and soya beans farming.

**Other training and support that had significant impact on increased revenue at the local level includes:**

Training to 1,638 farmers on fish farming techniques and construction of 114 fishponds, trainings and support to 896 villagers on dairy goat husbandry (with 467 goats provided), 110 villagers trained on dairy cow keeping (with 40 cows provided), 785 villagers trained on pig husbandry (with 267 improved breeds of pigs provided), 1,612 villagers trained on improved chicken keeping (with 2,978 chicken provided).

Participation of both men and women in conservation awareness meetings – public meetings, was generally good, with women dominating in most meetings (Figure 6.1).

**Figure 6.1. Level of participation of men and women in various trainings**





## 6.2 Financial support allocated for community projects

During its early years of establishment, the EAMCEF operated as a component of the World Bank financed project entitled 'Tanzania Forest Conservation and Management Project' (TFCMP) implemented under the Ministry of Natural Resources and Tourism (MNRT) at a credit facility amounting USD 2.4 Mil, dedicated to financing activities and operations crucial for its early establishment phase (2002-2009).

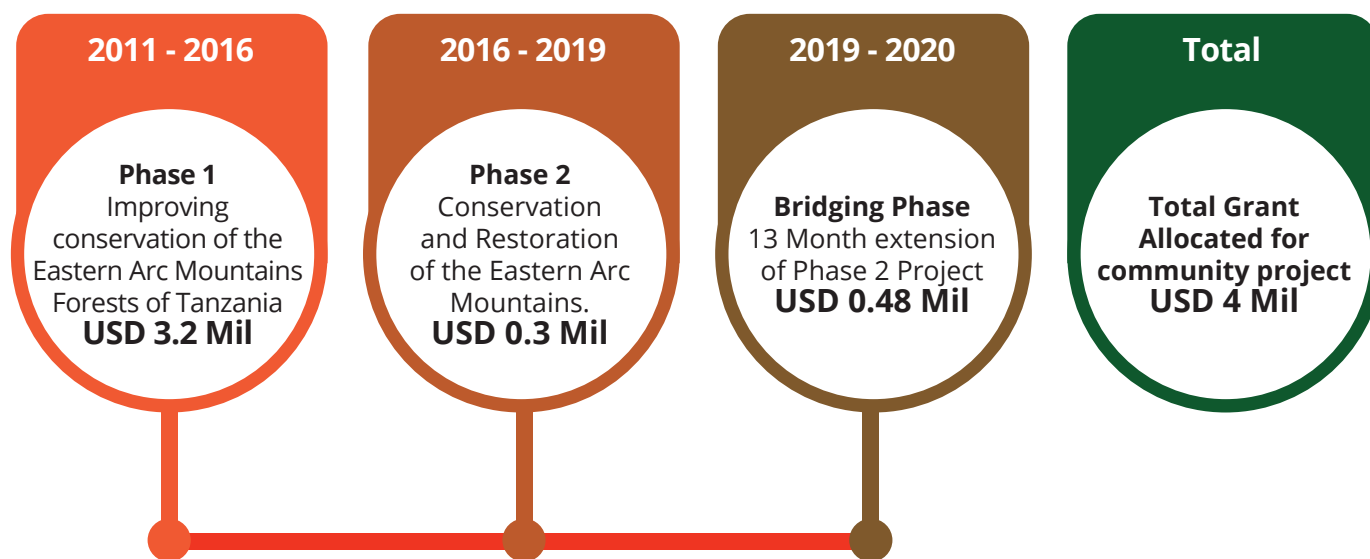
From mid 2011 to 2020 support to the EAMCEF on operations and project activities has largely been funded by the Royal Government of Norway to ensure that the EAMCEF delivers sustainable funding for the conservation of the Eastern Arc Mountains of Tanzania. The total Norwegian grant to the EAMCEF (from 2011-2020) amounts to US\$ 10.1 million.

The grant dedicated to project support is further distributed into three main thematic areas of support - Conservation of Protected Areas and Mitigation of Climate Change, Community Development and Conservation, and Applied Biodiversity and Climate Change Researches.

The total grant support directed to Community-Based Conservation and Development component since 2011-2020 is estimated at USD 4 million.

During the first phase (2011-2016) of Norwegian support through a project entitled 'Improving conservation of the Eastern Arc Mountains Forests of Tanzania', with a total budget of USD 5.9 million. The allocation to community development projects was approximately USD 4 million - which is equivalent to 53.8% of the grant total.

During the second phase (2016-2019) of Norwegian support through a project entitled 'Conservation and Restoration of the Eastern Arc Mountains (CREAM)', the largest amount of funding was disbursed for the community development projects amounted to TZS 702.5 million (USD 0.3 million) - which is equivalent to 50% of the grant total. A 13-month extension of the CREAM project to December 2020 was granted an equivalent of USD 1.1 million - the community support component was allocated USD 0.48 million which is equivalent to 43.6%.







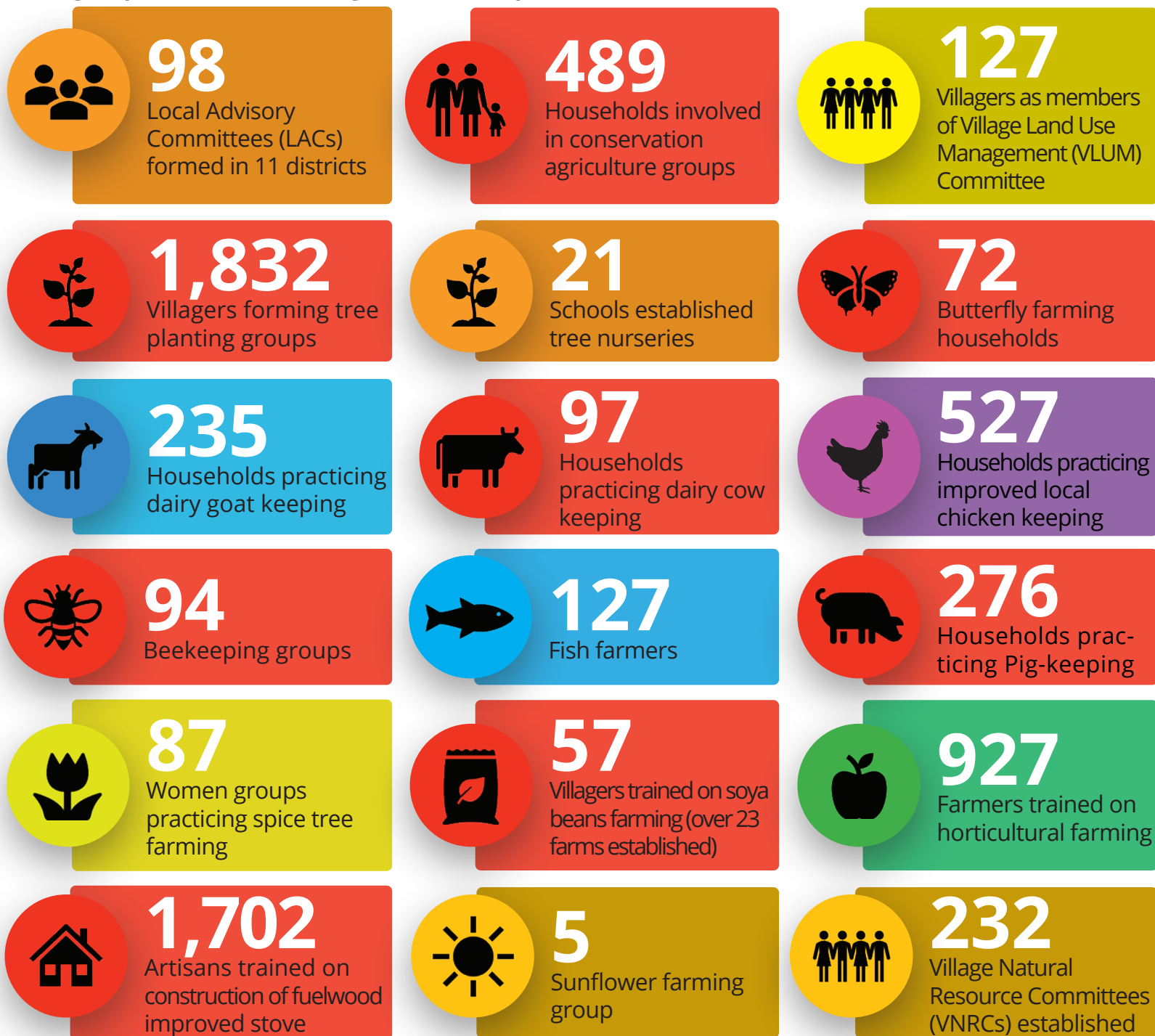
## 6.3 Institutional strengthening

Strengthening of local-level institutions through empowerment and working with community groups and committees has been an important strategy in ensuring long term sustainability of supported activities. The gender-based approach employed by the EAMCEF in the implementation of field activities ensured that both men and women, including the elderly, youth and school children participate and benefit from project activities. The EAMCEF projects have created various groups and committees with specific roles and responsibilities. Creation of groups and capacity building support is an investment that would last for many years and can be functional for continued implementation of related projects than creating parallel structures.

Key groups and committees created are highlighted below:



## Local groups formed and strengthened for impelemmetation of various activities (2011-2020)





## 6.4 Beneficiaries to the supported community activities

### Overview of Beneficiaries



- Project Implementation
- Trainings
- Equipment Support
- Short Term Employments
- Ecotourism Activities
- Income from Supported Projects

Local Communities

1<sup>st</sup>



- Learning from successful projects in their areas
- Training by fellow community members
- Benefits generated from own initiatives
- Joining of groups and VICOBA

Adopters

2<sup>nd</sup>



- Ecosystem Health
- Reduced Degradation
- Tourism Attraction
- Increase carbon sequestration
- Continued flow of ecosystem services downstream

Ecosystem and the General Public

3<sup>rd</sup>

### Primary beneficiaries

The community livelihood theme of the EAMCEF grants directly benefits groups of participating local communities in targeted sites. Participating groups benefit from capacity building trainings, equipment and material support, start-up capital and also benefits from direct use or sales of produce arising from the support. Group members and their families are the primary beneficiaries of the support. For example, a farmer trained on improved chicken keeping is given 5 hens and a cock as start-up capital. Hens lay eggs which are partly consumed by the family and partly hatched into chicks and sold at any stage of growth. Income arising from such sales is used to cover various family priorities such as paying of school fees, food and medical care. The situation is the same for other supported activities.



As a compensation mechanism for the participation of local communities surrounding protected areas, project activities related to forest management are done in close collaboration with local community employed as casual labourers selected through village assemblies. Major activities that employ a large number of villagers included: forest boundary clearance, planting of tree seedlings along forest boundaries, establishment of new directional trenches, participatory forest patrols, rehabilitation of mining pits, establishment and management of nature trails, campsites, establishment and management and maintenance of tourist drive routes, installation of beacons along forest boundaries, and rehabilitation of mining pits. The EAMCEF through its partners paid local communities for participation in the mentioned forest management activities as a cost-effective option than hiring a company for the purpose – despite no estimates were done to compare how much time and money it would have cost to hire private company. The payment to local communities was treated as compensation for time and labour, but also as a benefit arising from Protected Areas management. Compensation was done through cash payments at reasonable rates.

In total, over 3,645 local communities (men and women) have been employed and compensated over TZS. 451 million for providing their labour and time in managing Protected Areas, during the period of 2011-2020. Hiring surrounding communities is not only cost-effective but also important for changing perceptions of local communities especially of those tied to the historical experience of exclusion, with ‘fences and fines’ conservation approaches.





## Secondary beneficiaries

The second group of beneficiaries is the local communities adopting livelihood initiatives in their areas. Through learning and witnessing good results from supported projects community members started slowly to practice the same then later the practices are adopted widely. Trained community members enrolled in the projects play a key role in training other members of the community thereby enhancing adoption. Supported initiative results into spill over effects as people from other villages not covered by the project do learn from project sites near them.



"I was convinced to start pig husbandry when I saw my friend's life changing every day, I made a decision to join the project that day when I visited him and was surprised to see 9 new piglets born from one pig. I see myself becoming rich, by 2020 I will be very rich like my friends. I can see a bright future ahead of me and I can confidently encourage others to start keeping pigs."

**- DISMAS WILLIAM KIGAVA**  
(Farmer, Ukwega Village, Kilolo District)





## Tertiary beneficiaries

The primary objective of supporting alternative livelihood activities at the community level is to ensure that local communities have alternative sources of income and reduce their heavy dependence on forests while securing their participation in forest conservation. Reduced pressure on forests means that the forest and the ecosystem, in general, can continue providing essential services such as water which is important for life and productive activities. As tertiary beneficiaries, communities at the downstream and at the national level who depend on the water services from the EAMs continue to enjoy availability of reliable water supply.

Many rivers of the eastern Tanzania source their waters from the Eastern Arc Mountains - For example, the Uluguru Mountains give rise to the Ruvu River that supplies most of its waters to the three regions of Morogoro, Coast and Dar es Salaam before emptying its waters in the Indian Ocean. The Ruvu River is joined by a chief tributary - The Ngerengere River, which rises in the northern part of Uluguru Mountains and flows in Morogoro city. The East Usambaras (in Amani Nature Forest Reserve and Handei Mountains) are the sources of Zigi River that supplies water into Tanga Region. The Wami, Kilombero, Little Ruaha and Pangani Rivers also flow from different ranges within the Eastern Arc Mountains and supply water for rural activities, large scale agricultural activities, and industries in the lowlands. Estimates indicate that around 25% of Tanzanians depend on water supply from the EAMs. As already explained, the EAMs are a source of water responsible for over 90% of Tanzania's Hydro Electric Power produced in major power stations.

Globally, conservation of the EAMs forests is critical for carbon sequestration services which ultimately regulate the global climate. The EAMs and its diverse plants and animals provide a unique tourism destination and nature wonder to the world. The long-term survival of the EAMs ecosystem depends therefore on effective conservation.







CHAPTER

7

# Awareness Levels Among Local Communities



## 7.1 Awareness about the EAMCEF and the EAMs

The long-term impact of awareness activities about the EAMCEF and the EAMs, in general, would be increasing support from local communities, partnerships and resource mobilization, which in turn will enhance biodiversity conservation and ensure a continued flow of ecosystem services, enhanced forest carbon stocks and community development. Project activities implemented by the EAMCEF through the Norwegian Government's financial support put ecosystem awareness at the forefront of its operations.

At the local level where the EAMCEF and its partners implement projects, awareness activities are a first stage and are designed to create enabling environments for smooth landing of the projects and for mobilizing support and consent of local communities – thereby contributing significantly to the success of implemented projects. The EAMCEF put strong efforts on awareness activities aimed at imparting knowledge about conservation, the ecological, economical and climatic importance of the EAMs ecosystem and at influencing behaviour change towards conservation. Awareness focused also at introducing the EAMCEF in the area and its functional mandates in mobilizing financing resources and providing grants to support conservation of the EAMs, community livelihoods and climate change. Awareness sessions are then followed by group trainings on specific alternative and income generating livelihood activities – focusing on the how and why.

**In line with awareness raising activities incorporated during implementation of thematic activities, the EAMCEF developed and operationalized** a Resource Mobilisation and Communication Strategy which had engaged the wider public and enhanced awareness about and visibility of the EAMCEF and the EAMs in general. Important activities with potential impacts on awareness, included – the establishment of radio programmes with national radio stations, **establishment of online fundraising tool on the EAMCEF website accessible globally, engagement with journalists through field visits in the EAMCEF project sites** has resulted into production of more than 85 newspaper articles, radio and TV news bulletins. Other activities such **as production and dissemination of communication and visibility products and publicity of the EAMCEF through engagement in National Level events** related to environmental conservation resulted into broad media coverage.

**Public resource mobilization of crowd funding events** such as the Fundraising Gala have influenced awareness and support to the EAMCEF through engagement and networking with decision makers, government authorities, agencies and the private sectors.

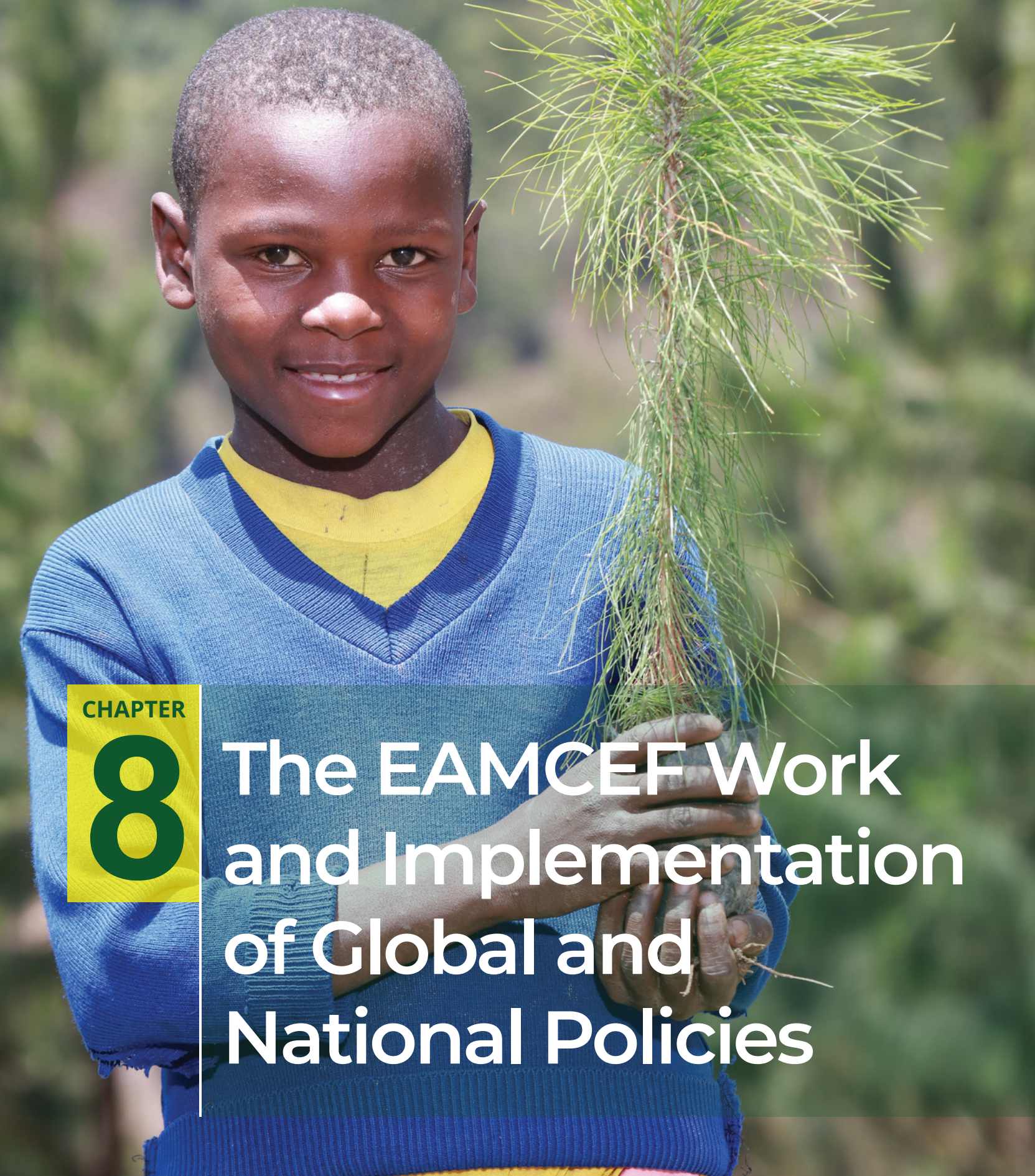
The social media activation e.g. through Twitter has been a great milestone enabling the EAMCEF to reach deeper, quicker and engage with wider audience around the world.



## Key results on awareness during 2011-2020

- 1. Increased conservation awareness among primary school children** has been achieved through awareness raising meetings and tree planting competitions and establishment of school tree nurseries (supported input and establishment of 21 tree nurseries). Over 2,255 school children attended in various conservation meetings organized by the project, 675 children were trained on tree planting and nursery management. Tree seedlings were also offered to parents of the pupils and others sold to generate additional income to schools – up to TZS. 8,400,000 was generated from sales of seedlings.
- 2. The project had significant impact on changing local level perceptions and attitudes towards allocation of lands as Protected Areas** and thereby improving collaboration, networking and reducing conflicts with forest owners – the government.
- 3. Increased participation of local communities in forest conservation activities, patrols and border maintenance**, resulting into reduced degradation and improved protection of Protected Areas. Participation of local communities has eliminated forest fire incidences which were threatening the ecosystem. While in most forests no fire was seen during the project life, only one fire incidence was observed in Uluguru Nature Forest Reserve.
- 4. Improved conservation awareness and networking with adjacent communities achieved** through meetings, joint patrols, creation of community groups for various alternative income generation activities and further through tree planting activities at the community level. Training of villagers on tree nursery management and planting techniques as well as on agroforestry was highly appreciated and has contributed significantly to changing lives of the people through revenue obtained from sale of trees.
- 5. Increased publicity and media coverage of the EAMCEF and the EAMs.** Through awareness raising meetings, implementation of this project component reached over 59,000 villagers across the project sites. Through production of communication products - 52 Radio and 51 TV programmes, and production and distribution of leaflets, stickers, wall and pocket calendars, wheel covers, T-shirts and caps, document bags, newsletters and documentaries, and brochures (3,000 copies), the project managed to reach the public at both the local and national levels. Installation of 272 signboards containing conservation messages has been an effective and innovative strategy to raise awareness about protected area resources and conservation value of the Eastern Arc Mountains. Further efforts were put to reach out through construction and maintenance of four Nature Reserves websites.





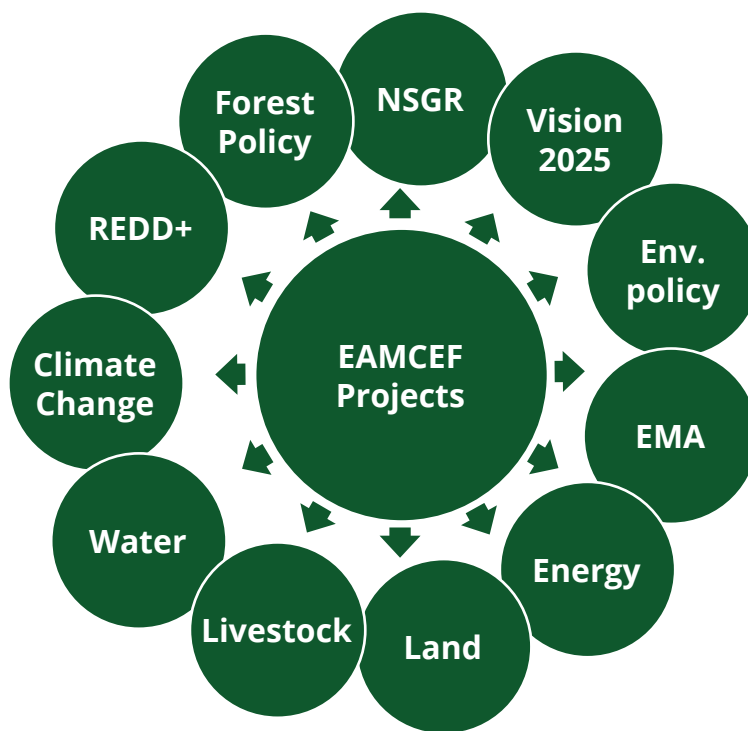
CHAPTER

8

# The EAMCEF Work and Implementation of Global and National Policies



## 8.1 Supporting National Policy Environment



This section provides a highlight of the policy environment and legal framework at the national level that supports and creates enabling environment for various projects implemented through the EAMCEF support. Various policies recognize the invaluable role of the environment and forest ecosystem in relation to continuity of life on earth and hence calling for responsible ministries and other stakeholders to put adequate measures in conserving the environment. Tanzania has evidenced a paradigm shift in management and conservation approaches to environmental natural resources, moving to more participatory approaches as compared to ‘fences and fines’ approaches employed during colonial times and adopted during early years of independence. This gradual shift necessitated review of policies and development of new ones that incorporates ongoing dynamics within and outside Tanzania, including emerging global trends such as those on climate change, carbon trading and global move to reduce carbon emissions.

Tanzania has adequate policy and legal instruments to support and create enabling environment for implementation of related programmes, however; for years, there has been little or no budgetary support from the government to enhance on-ground implementation of stipulated policy instruments.

Projects implemented through the EAMCEF support across the EAMs have shown a good example contributing to the implementation of various national level policy-related priorities, such as those on: National Strategy for Growth and Reduction of Poverty I&II (2010/11-2014/15), Tanzania Vision 2025, Millennium Development Goals (MDGs), Forest Policy (1998), National REDD+ Strategy (2013), National Climate Change Strategy (2012), Wildlife Policy (1998), National Beekeeping Policy (1998), Forest Act (2002), National Environmental Policy (1997),



Environmental Management Act (2004), National Tourism Policy (1999), National Energy Policy (2003), National Employment Policy (2008), Kilimo Kwanza (Agriculture First) Pillars (2009), National Agriculture and Livestock Policy (1997), National Land Policy (1997), Rural Development Strategy (2001), National Fisheries Sector Policy and Strategy Statement (1997), National Research and Development Policy (2010), National Education and Training Policy (2014) and the National Environmental Action Plan, NEAP (2013 – 2018).

Below is a summary of how our work at the community-level link and contribute to the implementation of various policies, locally, on the ground.

### **TANZANIA VISION 2025:**

The Vision 2025 is a national 'guide' to economic and social development of Tanzanians envisioning modern life by 2025. The Vision identifies enabling environment essential to bring transformative changes considering the world dynamics. The Vision is an important guide calling individuals, government sectors and agencies, NGOs and local communities among others to build a development mind-set. The Vision recognizes that "...the fast growth will be pursued while effectively reversing current trends in the loss and degradation of environmental resources (such as forests, fisheries, fresh water, climate, soils, biodiversity) and in the accumulation of hazardous substances".

- The EAMCEF projects incorporate innovative alternative livelihood activities within the communities to help them increase income, reduce poverty while conserving the environment. Alternative livelihood activities such as tree planting (for business), spice tree farming, beekeeping, dairy animal keeping, chicken keeping, fish farming, sunflower farming helped to lift-off local communities from heavy dependence on forests for income.

### **NATIONAL STRATEGY FOR GROWTH AND REDUCTION OF POVERTY I&II (2010/11-2014/15):**

Focusing on poverty reduction as a country agenda, the strategy was aspired by the Tanzania Vision 2025 and was strategically adopted to address various dimensions of poverty and at the same time enhance economic growth through wider engagement of various stakeholders, including the private sector. In terms of human development, the strategy adopts a suitability approach in development through sustainable use of natural resources while avoiding harmful effects on both the environment and people. Projects funded and coordinated by the EAMCEF within the EAMs landscape, includes tackling poverty as a key concern in the field project areas. Income generating activities (IGAs) supported by the EAMCEF plays a key role in enhancing the income base of the communities and reducing rural poverty and contributed significantly to implementation of major strategy and cluster outcomes of both phases of the National Strategy for Growth and Reduction of Poverty Strategy.

- Increased community income from beekeeping activities (and other alternative livelihood activities initiated by the project) helped local communities to improve their lives and directly linked and contributed to implementation of goals and objectives of poverty reduction strategies under the NSGRP II
- Promotion of modern beekeeping as a new income generating stream contributed to NSGRP efforts to address unemployment at the local level and reduces village-to-town mobility. For example, one of the



cluster strategies for NSGRP Goal 3 intended to address unemployment and income poverty in rural areas through promotion of non-farm income generating programmes, of which beekeeping could be a potential source for local employment.

- In relation to climate change, cleaner energy such as bioenergy is recognized as an important area for promotion under the NSGRP. This project has (in selected households) promoted multiple benefits from dairy husbandry by supporting production of biogas from animal wastes; biogas is among clean energies and is used for keeping my participating households.
- Under the strategy, cluster strategies to address climate change and environmental sustainability include among others, “enhancing sustainable forest management for improved governance, livelihoods, forest conditions, resilience of forest ecosystems and trees outside forests and more efficient use of wood resources. Promotion of efficient cooking stoves contributed, at scale, in achieving such broader objectives through intervention at community-level.
- Agricultural growth targets under NSGRP II focuses at modernization and commercialization of small, medium and large-scale agriculture for increased productivity, employment, profitability and incomes, especially in rural areas. Project activities promoted by the EAMCEF, such as on conservation agriculture (through soil and water conservation techniques) helped to build resilience of communities and are important to accelerating agricultural growth. Conservation agriculture link well with Goal 4 of the NSGRP which among others aims at achieving environmental sustainability through cluster strategies on promoting skills among farmers for adoption of new farming practices, improving soil and water conservation measures with good link to climate change adaptation.

### **NATIONAL ENERGY POLICY (2015):**

The policy maps out energy potentials of Tanzania and provides a comprehensive legal and regulatory framework and institutional structure for improving the energy sector, which in turn contributes to socio economic transformation. The mission statement of this policy aims at creating enabling conditions for provision of secure, reliable, affordable, safe, efficient, cost effective and environmentally friendly modern energy services to all. In relation to activities financed by the EAMCEF, the policy takes on board community reliance on traditional use of solid biomass fuel sources, which leads to increased deforestation of the EAMs.

- The EAMCEF projects incorporate innovative alternative livelihood activities within the communities. The EAMCEF supported development of alternative energy sources for the communities by promoting the use of biogas technology and fuel wood energy-efficient stoves. Also, considering that the EAMs are a source of water used for hydroelectric power generation, support on conservation efforts through the EAMCEF project grants are a key contributor to the attainment of energy policy objectives.
- The expectations of the energy policy are among others to encourage efficient production and utilization of



energy resources, including promotion of local capacity on development of biomass energy. The EAMCEF project efforts to promote fuelwood energy efficient stoves builds capacity at the local level and contributes to broader national objectives to improve energy production and consumption for economic and climate purposes.

### **NATIONAL REDD+ STRATEGY (2013):**

The REDD+ strategy is designed to address drivers of deforestation and forest degradation in Tanzania through implementation of strategic activities that can be mainstreamed into various sectors. With the overall goal focusing at contributing to climate change agenda and sustainable human development, the strategy envisages to unlock the forest potential through benefits arising from internationally approved system of forest carbon trading. The strategy identifies major causes of deforestation and forest degradation such as energy needs (charcoal and firewood demand), illegal and unsustainable harvesting of forest products, forest fires, agriculture expansion, settlements, and resettlements, among others. The strategy forms part of the Nationally Appropriate Mitigation Actions (NAMAs) to reduce greenhouse gas emissions as agreed by Parties to the United Nations Framework Convention on Climate Change (UNFCCC). Project activities funded through the EAMCEF addressed deforestation/ degradation drivers and contributed to improved livelihoods of the local communities.

- The EAMCEF support ensured that the EAMs ecosystem continues to provide carbon sequestration and other ecosystem services by addressing main causes of deforestation and forest degradation (such as forest fires, expansion of farmlands into forests).
- The EAMCEF support to Protected Areas management helped to strengthen and expand forest management activities such as patrols, boundary clearance and resurveys, and planting of beacons and buffer trees.

### **NATIONAL ENVIRONMENTAL ACTION PLAN (2013 – 2018).**

At the 1992 Earth Summit held in Rio de Janeiro, Brazil, mainstreaming environmental concerns into development policies, plans and strategies was explicitly agreed upon. Preparation of the National Environmental Action Plan (NEAP) in Tanzania is one of the initial mainstreaming efforts, the first NEAP was prepared in 1994 and was followed by other initiatives, including formulation of the National Environmental Policy (1997), enactment of the Environmental Management Act (EMA) No. 20 of 2004, formulation of sectoral policies/plans and mainstreaming of the environment into poverty reduction strategies.

- In relation to the EAMCEF activities, NEAP calls upon all stakeholders to participate in its implementation to enhance growth and environmental sustainability. Some key environmental challenges that NEAP sets action plan related to those currently addressed by the EAMCEF – such as addressing land degradation, curbing loss of wildlife and biodiversity, addressing deforestation and invasive alien species.



## **NATIONAL CLIMATE CHANGE STRATEGY (2012):**

Considering that Tanzania is vulnerable to the impacts of climate change and that the country has good potentials to participate in climate change agenda through mitigation and adaptation activities, the Vice President's Office (VPO) spearheaded the development of a climate change strategy. The strategy is in line with the National Development Plans and the Vision 2025 and sectoral policies. Objectives of the strategy (e.g. on capacity building, enhancing resilience of ecosystems, awareness and participation in mitigation activities etc.) call for implementation of various activities in different sectors, including the forest sector. The strategy recognizes the invaluable contribution of forests to the national income and the role of forests as carbon sink. Recognizing that climate change cause impact on forests and ecosystems, the strategy sets interventions to ensure protection and conservation of the same through application of best practices for example, in expanding forest cover, conserving soil and water. The EAMCEF-supported activities through promotion of ecotourism and development of soil and water conservation techniques, Land Use Plans, development of ecotourism infrastructure are examples of best practices contributing to the objectives of the national climate change strategy.

- The strategy recognizes the role of conservation of forests for climate change mitigation, and further puts in place strategic interventions to address local deforestation through promotion of alternative livelihood activities for forest dependent communities, of which beekeeping activities under support through the EAMCEF fits very well with stipulated interventions.
- Beekeeping has demonstrated to be one of the important activities in areas where climate change related challenges affect key productive activities, for example in agriculture, where poor rainfall results into increased drought. The NCCS requires communities to be facilitated to undertake activities which can cope with different climatic conditions, as demonstrated by the EAMCEF in this case.
- Butterfly farming as an innovative alternative income generating activity contributes to achieving policy directions and objectives to reduce direct dependency on forest products through generation of alternative income streams in achieving social, biodiversity and climate change objectives stipulated in both the National REDD+ strategy and the Climate change strategy.
- Under the forest sector, the NCCS intends to enhance climate change resilience among others – through promotion on deliberate greening activities such as the use and development of energy efficient technologies of which the EAMCEF support is aligned to. Related to emissions reduction, clean energies [including use of biogas] is earmarked among strategic interventions to low-carbon development path. The EAMCEF supported production and adoption of energy efficient cook stoves that reduced firewood consumption by 50%. Wood fuel is the most exploited energy source, cheap and easily accessible in rural areas – making the EAMCEF project quite relevant in addressing energy issues.
- The strategy recognizes the scarcity and vulnerability of water due to climate change. Soil and water conservation activities under the project contribute directly to implementation of the NCCS actions to promote adaptation in the water sector.



- To enhance climate change resilience in the agriculture sector, conservation agriculture (as appropriate agricultural practice) is among the strategic interventions indicated in the Strategy – the EAMCEF has supported local communities to adopt soil and water conservation techniques (through bench terraces) and helped communities increase yields even during in seasons with poor rains.
- Improved soil and land management is relevant to achieving agriculture and food security goals of the NCCS in the changing climate.
- The EAMCEF awareness activities have proven to be a good entry point to the public. The Strategy recognizes low level of climate change awareness as one of the main challenges pursuant to the United Nations Framework Convention on Climate Change (UNFCCC) agenda. The EAMCEF awareness activities contribute to addressing this challenge at local levels. Hand in hand with tree planting activities, the project helped to raise awareness among local communities on the role of trees in environmental conservation. Public awareness, tree planting and agroforestry are important strategic interventions identified by the REDD+ strategy (2013) and by the Climate Change Strategy (2012) as adaptation and mitigation measures to climate change.
- To enhance productivity in the agriculture sector, the climate change strategy promotes agroforestry systems as among strategic interventions to help mitigate climate change through the agriculture sector. Implementation of agroforestry activities through The EAMCEF support has helped communities generate additional income and stimulated other businesses.

#### **KILIMO KWANZA (AGRICULTURE FIRST) INITIATIVE (ADOPTED IN 2009):**

'Kilimo Kwanza' (Agriculture First) as the national resolve [declaration] to accelerate agriculture transformation in Tanzania was launched as a set of policy instruments and strategic intervention towards addressing various challenges associated with the sector. Through 'Kilimo Kwanza' pillars, the government and public institutions continue to mobilize Tanzanians to support and implement it. The declaration builds on past initiatives to transform the sector and is considered to as the most important pillar in achieving the Tanzania Vision 2025. The sensitization across the country regarding 'Kilimo Kwanza' creates a good entry point for agricultural related interventions. In line with the 'Kilimo Kwanza', The EAMCEF supported agricultural production projects such as improved seeds, spice farming, mushroom farming, vegetable farming, soya beans farming, sunflower farming, conservation agriculture, soil and water conservation, soil fertility improvement, livestock keeping as alternative livelihood activities that draws off communities from heavy dependence on forests.

- Kilimo Kwanza as a central pillar to achieving Tanzania Vision 2025 comprises a holistic set of policy instruments and strategic interventions for accelerating agricultural transformation. Conservation agriculture as a local innovation supported through the EAMCEF is relevant to informing implementation of Kilimo Kwanza through demonstration of activities, which are both environmentally and climatically sound.



- Conservation agriculture activities supported through the EAMCEF helped to increase food production and reduced food insecurity at the household level, in line with the Vision’s goal to achieve food self-sufficiency and food security among Tanzanians.

#### **NATIONAL EMPLOYMENT POLICY (2008):**

This policy complements the strategies envisaged in the Tanzania Development Vision 2025 and the National Strategy for Growth and Reduction of Poverty (NSGRP) through its vision to have a society engaged in decent and productive employment. The policy recognizes employment as a multi-dimensional cutting across national macroeconomics, sectoral and micro policies and programmes, etc. In this case, implementation of projects and programmes that provide employment to local communities, such as projects financed by the EAMCEF have been important in addressing rural unemployment through short-term employment in forest management activities, beekeeping, fish farming, mushroom farming, butterfly farming, etc.

- Improved working environment for District Natural Resource Office through renovation and construction of buildings/rooms provided proper working environment for conservation officers at the local government level. Improved working environment is expected to increase efficiency and staff morale to participate in conservation activities.

#### **ENVIRONMENTAL MANAGEMENT ACT (2004):**

This Act provides for “legal and institutional framework for sustainable management of the environment; to outline principles for management, impact and risk assessments, prevention and control of pollution, waste management, environmental quality standards, public participation, compliance and enforcement; to provide basis for implementation of international instruments on environment; to provide for implementation of the National Environment Policy; to repeal the National Environment Management Act, 1983 and provide for continued existence of the National Environment Management Council; to provide for establishment of the National Environmental Fund and to provide for other related matters”. Through its objective to promote the enhancement, protection, conservation and management of the environment – the EAMCEF work complement the provisions of this Act through enabling environment set by the forest policy and other related policies.

- Project activities on biogas are in line with provisions of Section 64 of EMA related to promotion of conservation of energy, including use of renewable sources of energy.
- The Act in its various provisions insists on the need for ensuring environmental education at all levels. In section 176 (1) for example, the Director of Environment in consultation with relevant ministries is charged with responsibilities of taking appropriate measures for the integration of environmental matters in schools, colleges and higher learning institutions. The EAMCEF project supported awareness raising on the environment, including establishment of tree nurseries and tree planting activities among school children and therefore in line with provisions of the Act.



### **FOREST ACT (2002):**

This Act repealed laws [certain] relating to forests and forest related matters. Apart from other objectives stipulated therein, the Act aims to encourage and facilitate wider stakeholders' participation in planning, management, use and conservation of forest resources and delegates powers to communities and individuals to exercise their rights to use and manage forest resources. Effective implementation of the Act is envisaged to enhance conservation of forest biodiversity, water catchment, and soil fertility as well as greater public awareness of the value of conserving forests. The Act is an important legislation to support the implementation of the forest policy in Tanzania.

- The EAMCEF interventions on enhancing management of Protected Areas and the participation of local communities surrounding the 8 nature reserves and 1 national park, through undertaking of surveillance, addressing of illegal activities such as logging, mining, encroachment for farming of agriculture and narcotic crops contributed to the attainment of key legal provisions stipulated in the Forest Act.

### **NATIONAL WATER POLICY (2002):**

The policy recognizes the role of forest in providing habitat for wildlife, beekeeping, unique natural ecosystem and genetic resources, but more importantly is the role of forests in conservation of water resources. The policy stresses the need to protect water as a vulnerable resource facing pressure from increasing multi-sectoral demands of the rapidly growing population, environmental degradation and growth in economic activities such as extensive irrigated agriculture, industrial production, hydro-power production, mining, livestock keeping, fisheries, environmental sanitation and for wildlife water use. The EAMs forms a great source of water with rivers originating from them supporting about 25% of the country's population. The EAMs are a major source of water for hydropower generation, small and large-scale agriculture (e.g. Paddy/ Rice, Maize, Sugarcane, Forest Plantations, Tea, Coffee, etc.), domestic and industrial use.

- The EAMCEF support strengthens conservation of the EAMs ecosystem through project activities that enhance protection of watershed – ensuring that conservation activities contribute greatly to Tanzania's water security and its overall economic development.

### **RURAL DEVELOPMENT STRATEGY (2001):**

In line with the implementation of the poverty reduction strategy, the rural development strategy provides a strategic framework that facilitates the coordinated implementation of sector policies and strategies concerned with the development of rural communities – through specific strategies related to economic growth, reduced vulnerability, good governance, social justice and provision of basic services to rural communities. The strategy emphasizes economic diversification in rural areas despite heavy dependency on agricultural activities. The EAMCEF project activities have most of its activities in rural areas, helping communities to reduce dependence on forest resources by co-creating alternative livelihood activities, which in turn addresses the rates of unemployment especially for women and youth in rural areas. Income generated from alternative activities is a key in stimulating and accelerating other development projects at households' level.



- The strategy (on fisheries section) recognizes the challenge among rural communities in developing fisheries activities and put in place strategies to include fish farming similar to what the EAMCEF project has done and therefore links well with the national level objectives to improve the sector.

### **NATIONAL RESEARCH AND DEVELOPMENT POLICY (2010)**

Recognizing the role of research in development, this policy emphasizes the need to undertake researches directed towards enhancing understanding and building skills necessary for the benefit of the country. The Policy cuts across government ministries, departments, agencies, private sector, associations, organizations and institutions involved in research activities.

- In line with this policy, the EAMCEF allocates 15% of its grant resources for research studies relevant for addressing climate change challenges as well as improving biodiversity conservation and livelihoods of the communities adjacent to the EAMs.

### **NATIONAL TOURISM POLICY (1999):**

The policy is geared to assist efforts to promote the national economy and livelihoods of the people by encouraging the development of sustainable and quality tourism. The policy sets economic, social, environmental and cultural objectives as well as specific policy strategies in the areas of product development and marketing, ecotourism, cultural aspects of tourism, domestic tourism, international and regional co-operation, land for tourism, infrastructure development, employment and human resource development, community participation, investments and financing, competition and legislation, environmental protection and institutional participation. The EAMCEF project activities such as improving ecotourism infrastructure, employment creation, awareness raising on ecotourism, and revenue generation in protected areas have supported implementation of various policy strategies related to tourism.

- Implementation of the EAMCEF projects value community participation in conservation activities and tourism is aligned to the strategies of the tourism policy which aim at enhancing community participation through education and sensitization programmes, and effective involvement of communities in management of tourism attractions among others.
- Capacity building of local communities to participate in ecotourism activities (as local guides) has created additional income at the village and individual levels.

### **NATIONAL FOREST POLICY (1998):**

The forest policy was formulated without exclusion of any forest type and it covers all forests regardless of their ownership or administration, based on macro-economic, environmental and social frameworks. The main goal of the policy is to ensure that the contribution of the forest sector in the national development is enhanced while conserving and sustainably managing the natural resources. Recognizing that Tanzania is one of the fourteen-biodiversity hotspots in the world, the policy encourages undertaking of programmes to prevent and control causes of loss of biodiversity (including pressure from agricultural expansion, livestock grazing, wildfires and overexploitation of wood resources). The EAMs harbour high level of endemism as well as provides invaluable ecosystem



services. Focused policy areas include forest land management, forest-based industries and products, ecosystem conservation and management, institutions and human resources. Through the forest policy, activities of the EAMCEF projects rest on firm enabling policy environment. In partnership with the Ministry of Natural Resources and Tourism and other public and private sectors, NGOs and CBOs, the EAMCEF has been supporting activities to strengthen conservation of the Eastern Arc Mountains. Such activities include forest boundary management, improvement of ecotourism infrastructure and through combating encroachment activities (e.g. destruction of illegal mines, logging, farms and narcotics).

- The forest policy encourages undertaking of environmentally friendly practices to reduce dependence on wood products through diversified income sources. Butterfly farming is environmentally friendly and has the potential to improve income of participating groups.
- On beekeeping, the policy recognizes various constraints on beekeeping including lack of appropriate equipment and handling facilities of which the EAMCEF projects have demonstrated support to communities (Section 4.2.2), considering inadequate extension and support services from the government.
- Conservation agriculture as supported through the EAMCEF responds directly to implementation of one of the overall objectives of the National Forest Policy set to prevent and control degradation of land and water and other life support systems, this is also in line with objectives of the forest sector.
- Conservation awareness activities contribute widely to achieving forest policy directions to improve conservation and awareness on the value of forest (Cap. 4), and intention to ensure increased awareness and skills amongst the people. The EAMCEF projects worked at the grassroots level, including with pupils.
- Environmental awareness in primary schools has been key in addressing the gap 'environmental gap' currently not sufficiently included in existing primary school curricula. The Forest Policy notes this as a challenge
- Fish farming activities have reduced forest fires and destructive activities and hence contributing to achieving the forest policy objectives to address forest fires and other destructive activities. The EAMCEF contributes to achieving forest policy objectives through enhancing awareness among villagers and through provision of alternative livelihood activities.
- The EAMCEF-supported project activities related to issuance of CCROs have important link to the implementation of both the National Environmental Policy and the Forest Policy, as CCROs are empowering tools providing security of tenure and enhance the value of land resources and enhance land rights. The Forest Policy encourages participation of local communities in forestry activities but recognizes that clearly defined forestland and tree tenure rights are important. Through CCROs issues under the EAMCEF projects, the activity is relevant to enhancing policy objectives of defining tenure rights to local communities.



- Project activities on tree planting are important for environmental conservation and for reducing direct dependence on forest under Protected Areas. Tree planting has contributed to reduced forest encroachment for firewood and timber production .
- This activity has important contribution to the overall goal of the National Policy to conserve and manage forests for present and future generations.
- Agroforestry activities emphasized by the policy have been introduced to the communities through the EAMCEF projects, thereby, generating a new income stream. The policy direction is to establish legal framework for promotion of private and community ownership of forests and tree resources has been established through the Forest Act (2002).
- On awareness raising activities, the project has been relevant in line with policy provisions, especially recognizing the challenge of financial and human resources to deliver conservation messages. The Policy Statement (35) provides for increased awareness and skills among the people and Policy Statement (36) intends to harmonize extension messages delivered by different natural resource management sectors.

#### **WILDLIFE POLICY OF TANZANIA (1998):**

This policy is an important tool guiding the protection and conservation of wildlife resources in Tanzania and its associated biological diversity. The policy was developed and envisioned to address national challenges such as; conservation of areas with great biodiversity, support and expansion of Protected Area networks, integration of wildlife conservation with rural development, improve income from wildlife resources, enhancing the recognition of intrinsic value of wildlife to the rural people, as well as creating enabling environment for international co-operation in wildlife conservation. Implementation of the Wildlife policy calls for participation of various stakeholders and the public sector. The Norwegian support through the EAMCEF to undertake projects to enhance conservation and protection of biological resources in Protected Areas is a good example of international co-operation highly advocated by the Wildlife Policy.

- The policy recognizes the importance of the EAMs in terms of diversity and endemism, and therefore efforts to conserve this ecosystem through projects implemented by the EAMCEF (e.g. awareness and tree planting in this case) contribute to enhancing existence of both flora and fauna.

#### **NATIONAL BEEKEEPING POLICY (1998):**

In line with the forest and environmental policies, the beekeeping policy is put in place to help the beekeeping sector manage the bee and bee fodder resources for sustainable socio-economic development while enhancing environmental conservation. The policy provides enabling environment for participation of all stakeholders by providing key policy statements around the areas of: establishment and sustainable management of bee reserves, apiary management, beekeeping-based industries and products, ecotourism, beekeeping for ecosystem conservation and management, and beekeeping in cross-sectoral areas (including public land, national parks and game reserves, forest reserves and plantations). Recognizing the challenge of inadequate beekeeping extension services, the policy calls for increased awareness and skills among



the people through harmonized messages. The policy provides room for coordination and cooperation between the beekeeping sector and other stakeholders and calls for financing and investments to unlock the beekeeping potential. The EAMCEF projects supported beekeeping activities among local community groups as an environmentally friendly strategy to increase income and promote community support to conservation initiatives.

- Project support on beekeeping is in line with the main goal of the Beekeeping Policy of enhancing sustainable contribution of the sector to socio-economic development and environmental conservation. Through sales of beekeeping products, participating community groups benefit from generated income while at the same time conserving the surrounding environment.
- Project's support on modern beekeeping equipment is important in realizing value addition and environmentally friendly practices encouraged in the Beekeeping Policy. Through project support, the challenges of technology and extension services, which hindered development of beekeeping sector, is partly addressed through participating groups.
- Project activities also link with key policy areas identified by the Beekeeping Policy, and hence policy statement, especially on policy areas related to "beekeeping for ecosystem conservation and management, beekeeping-based industries and products and apiary management".
- Project activities on beekeeping links well and are relevant to implementation of the National Beekeeping Act, which makes provisions for the orderly conduct of beekeeping, including improvement of beekeeping products.
- Beekeeping activities promoted, and the support given by the project are in line with and contribute to attainment of main objectives of the Act, specifically on improving local level capacity to manage and develop beekeeping sector, quality improvement and employment at local level (Part II (3)).

#### **NATIONAL ENVIRONMENTAL POLICY (1997):**

This policy provides a broad definition of what environment means in Tanzania and recognizes that the past, present and future lives of all Tanzanians is intimately connected to the environment. To bring into attention and promote stakeholders' involvement, the policy points out key environmental problems that require urgent attention, including land degradation, environmental pollution, loss of wildlife habitats and biodiversity, and deforestation. Since the environmental issues are crosscutting, the policy provides a framework for making fundamental changes for various sectors to mainstream environmental agenda. The policy therefore sets sector and cross-sectoral policy objectives to address major environmental problems. Public awareness and promotion of individual and community participation in environmental actions are considered key for promoting understanding of the poverty-environment nexus. The EAMCEF's conservation and community participation agenda support these policies and are being implemented through various projects. Implementation of The EAMCEF activities advocates for a balanced relationship between the surrounding communities and the biodiversity resources.



- Increased local community awareness on tree planting and its role in environmental conservation: Link well with objectives of the National Environmental policy objectives to promote tree planting for environmental conservation and contributes to achieving forest conservation objectives and enhances biodiversity conservation.
- Promoted agroforestry activities maximizing land productivity and enhancing multiple benefits: Agroforestry activities and tree planting to control erosion are important at the local level especially in addressing soil erosion and reduces run-off. This contributes to the policy objective of soil conservation.
- Project activities related to issuance of CCROs have important link to the implementation of both the National Environmental Policy and the Forest Policy, as CCROs are empowering tools providing security of tenure and enhance the value of land resources and enhance land rights. At the objective level, the Environmental policy intends to “ensure sustainability, security and equitable use of resources...” the policy recognizes the need to ensure land security for the people for the long-term objectives of environmental protection through integrated land use planning.
- Environmental education and tree planting link and contribute directly to the implementation of the National Environmental policy objective on raising public awareness and understanding of the essential linkages between environment and development, and to promote individual and community participation in environmental actions.
- Project activities under conservation agriculture component respond to the overall objective of the national environmental policy regarding prevention and control of land degradation and water.

#### **NATIONAL AGRICULTURE AND LIVESTOCK POLICY (1997):**

General objectives of this policy are aligned to provide space for ensuring food security, increased income from agricultural activities, technological development and to promote environmental conservation through integrated and sustainable management of environmental natural resources such as land, soil, water and vegetation. This is consistent with the approach taken by the EAMCEF supported projects which seeks to support soil and water conservation agricultural approaches among participating communities while at the same time promoting environmental conservation and addressing poverty.

- Project activities link well with National Agriculture and Livestock Policy objectives, especially on policy objectives related to increased food production/productivity, integrated management of land and water and use of conservation agriculture to increase land productivity .
- Farming activities link directly and contribute to implementation of various national policies and strategies, such as; the National Strategy for Growth and Poverty Reduction (through income generation, job creation and livelihood improvement), Agricultural and Livestock Policy, 1997 (through enhancing food security at household level, improved animal husbandry).



### **NATIONAL LAND POLICY (1997):**

The land policy provides a means to govern land tenure, land use management and administration to promote and ensure security of land tenure system and optimize sustainable use of land resources for socio-economic development of the country. In relation to the EAMCEF project activities, the policy calls for creation of mechanisms to protect sensitive areas such as water catchment areas, mountains, forests, national parks, rivers, river basins and banks, seasonal migration routes of wildlife, national heritage and areas of biodiversity – these areas do not exclude the Eastern Arc Mountains of which the EAMCEF in collaboration with national and local governments, local communities, and NGOs and CBOs undertake initiatives to protect valuable resources including land use planning.

- The objectives of the National Land Policy are well reflected in the implementation of sustainable land management projects, especially on protecting land from degradation related to agriculture development while ensuring that land productivity is increased to promote economic development. Tree planting and agroforestry activities supported through the EAMCEF projects are important in achieving this objective within the EAMs.
- Issuance of Certificate of Customary Rights of Occupancy (CCROs) has been in line with the National Land policy objective to recognize, clarify and secure existing rights on land for small holders. The EAMCEF projects have proven to be a good example in implementing national policy and in ensuring that land is put to its most productive use according to its suitability. This promoted local development and protection of land resources from degradation.

### **NATIONAL FISHERIES SECTOR POLICY AND STRATEGY (1997):**

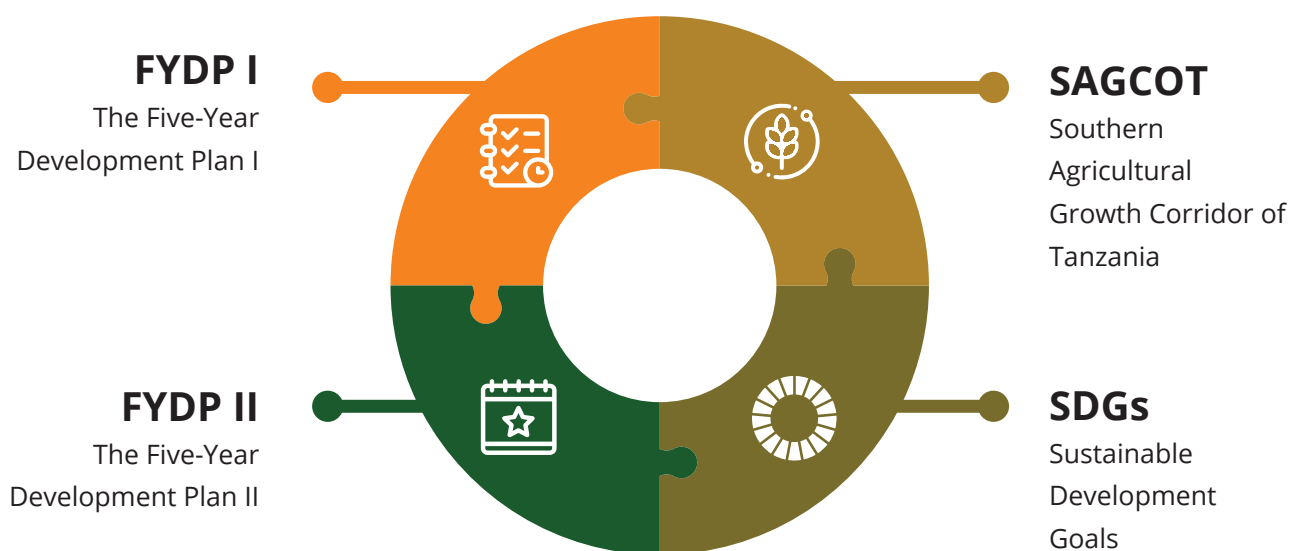
In order to attain the goal of the National Fisheries policy of promoting conservation, development and sustainable management of fisheries resources, the policy sets broad objectives for various stakeholders to participate and cooperate in; for example, efficient use of available resources for fish production, enhance knowledge and training on fisheries, biodiversity conservation of aquatic ecosystems, promotion of small scale and semi-intensive aquaculture systems, community participation in planning and management of fishery resources, sustainable utilization of ecological capacity of water based areas as a means of generating income and diet. Associated policy statements create conducive environment for implementation of various activities at the local level. The policy goes further by clarifying roles and responsibilities of the participating institutions. Through the EAMCEF supported projects, communities have gained knowledge on aquaculture and enhanced their nutritional level as well as alternative income base.

- Improving training and education, improved knowledge on the fisheries resource base, and aquaculture development are among the areas of concern to the fisheries sector development identified in the policy and strategy. These areas of concern have partly been touched by the EAMCEF projects indicating that the project activities of fisheries were relevant both at the national and local levels in contributing to policy implementation and local development.
- Apart from income generation, fish farming activities supported by the EAMCEF have improved nutritional status as a source of protein to communities.



## 8.2 Contribution and Link with Broader National Agenda and SDGs

Key results of the EAMCEF - supported projects across the Eastern Arc Mountains contribute to and links well with broader national development agenda and the Global Goals. This section summarizes how some results already felt at the community level can be a major contributor to the achievements of the Tanzania's Five-Year Development Plan 2016-2020 (FYDP II) and the industrialization agenda, the SAGCOT Initiative and the linkages to the Objectives of Sustainable Development Goals (SDGs).



### 8.2.1 Contribution and link to National Development Plans

Phase One of the EAMCEF project (2011-2016) under the Norwegian support coincided well with implementation of the Tanzania's first five-year development plan (FYDP I) implemented during financial year 2011/12 - 2015/16. In this case, contribution of results of the project can easily be linked to contribute to the implementation of FYDP I, while at the same time potential for achievement of FYDP II spanning from financial year 2016/17 – 2020/21.

Following adoption of the Tanzania's Development Vision 2025 – which aim to transform the country into a middle-income country by 2025 (now a lower-middle income status has been achieved since July 2020), the Government opted for a new planning framework that would help achieve the Vision by targeting implementation of strategic priorities through a series of three Five-Year Development Plans i.e. FYDP I, II, and III. The first two Plans encouraged collective and individual efforts in transforming the country as per Vision 2025.

Relevant to the implementation of the FYDP I, the EAMCEF projects have direct contribution on key interventions, such as on climate compatible agriculture, fisheries, forest, livestock, and tourism.

Table 8.12 and 8.13 below map out the EAMCEF's project contribution to the achievements of strategic interventions set out in FYDP I and potential contribution to FYDP II, respectively.



**Table 8.12: The EAMCEF's Contribution to FYDP I (2011/12 - 2015/16)**

FYDP I - Interventions	Specific contribution/link to the EAMCEF-supported projects
<b>Interventions on climate compatible Agriculture</b>	
<p>Integrated soil fertility management</p> <p>Strengthening farmers organizations/ associations and farmer groups</p>	<ul style="list-style-type: none"> <li>• The project introduced Conservation Agriculture – a type of farming that conserves water by reducing runoff, controls soil erosion and retain soil nutrients.</li> <li>• The project trained 329 villagers on soil and water conservation techniques in Muheza District and Morogoro Municipality – thereby promoting high adoption.</li> <li>• The technique has increased crop production per acre by 2-3 folds, potential for food security and income.</li> </ul>
<p>Promote cultivation of high-quality crops including spices [...] fruits, vegetables [...]</p>	<ul style="list-style-type: none"> <li>• The project promoted horticulture farming through training of 711 villagers in Mkinga District, Morogoro Municipality and Mufindi District. Input support was supplied to 517 villagers. Support and training were also provided to vegetable farming groups.</li> <li>• On spice farming, in Muheza District the project trained 55 women and established 3 spice tree nurseries, planted on pieces of land of up to 27ha.</li> <li>• Sales of spice seedlings generated revenues of TZS. 9,700,000 and helped farmers meet their daily needs.</li> </ul>
<b>Intervention on Fisheries</b>	
<p>Enhance aquatic development</p>	<ul style="list-style-type: none"> <li>• Fish farming was introduced in Kilolo District as one of the alternative-income generating activities and source of protein through training of 322 villagers.</li> <li>• Input support was provided to participating communities whereby 97 ponds were constructed, with harvest of up to 12,155 fishes.</li> <li>• Sales of fish generated more than TZS. 7 million.</li> </ul>



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## Interventions on Forestry

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- Sustainable management of forest resources
- The project supported forest conservation projects in 9 Protected Areas through grant support to facilitate day-to-day operations – e.g. boundary clearance, boundary survey and marking, forest patrols, establishment of nature trails and drive routes.
  - Forest management went hand in hand with addressing drivers of deforestation and forest degradation through high participatory approaches and support to alternative income generating activities.
  - In general, forest management activities and restoration of degraded areas have allowed forest regeneration of up to 1,000ha.
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- Sustainable management of bee resources
- The project supported beekeeping activities as an alternative source of income in each target forest through training of 1,570 villagers on modern beekeeping techniques, and formed 82 groups in total.
  - The project support includes supply of 1,274 modern beehives, 37 honey processing machines and other sets of equipment.
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## Interventions on Livestock (intervention targets)

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- Number of improved dairy cattle increased
- The project supported livestock keeping – Dairy goat in Morogoro Municipality and in Mkinga and Kilolo Districts.
  - Training was extended to 314 villagers and 226 dairy goats supplied.
  - Similarly, dairy cow keeping (and pig husbandry) was introduced in Kilolo District through training of 50 villagers and provision of 20 cows from the project.
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- Increased milk production
- Through dairy cow and goat keeping, local communities have managed to ensure availability of excess milk for household consumption and get extra income from sales of milk and meat.
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Increased egg production

- The EAMCEF-supported poultry keeping (improved chicken keeping) has been an important activity to communities in Korogwe, Same and Mvomero Districts. The project trained 873 villagers and 2,061 supplied chicken to 439 households.
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### **Interventions on Tourism**

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- Identify and improve tourism attraction sites and products
  - Enhance sustainable conservation and management of cultural sites
  - Institutional capacity development for wildlife management
  - Conservation and preservation and promotion of cultural heritage resources
  - Community involvement and participation in cultural heritage conservation and promotion of training of staff
- Strengthened capacity of 9 Protected Areas management through support on forest boundary marking, clearance and survey/resurvey, forest patrols and combating of illegal activities.
  - Specifically, on Tourism, the project supported establishment and maintenance of nature trails and drive routes of up to 90km in Kilombero Nature Forest Reserve (KNFR), 115km in Amani Nature Forest Reserve, 72 in Nilo Nature Forest Reserve, over 50km in both Magamba and Chome Nature Forest Reserves, and over 300km in Udzungwa Mountains National Park – totalling to over 700km of nature trails, and 177km of drive routes important for tourism operations.
  - The project supported establishment and maintenance of up to 31 campsites in the mentioned Protected Areas, but also supported publicity of Protected Areas through TV and Radio programmes and production of communication materials, as well as establishment/maintenance of websites.
  - Support to Protected Areas boosted amount of revenue collected annually.
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**Table 8.13. The EAMCEF's project achievements potential contribution to achievement of Tanzania's FYDP II**

FYDP II – Relevant Strategic intervention area	Specific contribution/link to the EAMCEF-supported projects during 2016-2020 implementation period
<p><b>Objective v:</b> accelerate broad-based and inclusive economic growth that reduce poverty substantially [...] through increased productive capacities and job creation especially for youth and disadvantaged groups</p>	<ul style="list-style-type: none"> <li>• At the objective level, the EAMCEF projects aim at addressing forest conservation hand in hand with improving livelihood of the surrounding communities.</li> <li>• The project helped surrounding communities obtain additional income from alternative livelihood activities, through job creation especially on forest management – employing youth, both men and women.</li> </ul>
<p><b>Objective vi:</b> improve quality of life and human wellbeing</p>	<ul style="list-style-type: none"> <li>• Income obtained from participation in various the EAMCEF-supported projects has helped participating communities to improve their quality of life – e.g. through construction of modern houses, use of clean energy/biogas, construction of classrooms and teachers' offices.</li> </ul>
<p><b>Objective viii:</b> intensify and strengthen the role of local actors in planning and implementation</p>	<ul style="list-style-type: none"> <li>• The institutional, legal and governance structure of the project strengthened local level capacity to design, implement and monitor projects.</li> <li>• Recruitment of project implementers required approval of the concept at various levels of local/District administration, but also enhanced partnerships and collaboration between government institutions and NGOs/CBOs.</li> <li>• Creation of various community groups – such as beekeeping, butterfly farming, local advisory committees, conservation agriculture, fish farmers, and fuel-efficient stove artisans contributed significantly to improved capacity of local actors.</li> </ul>
<p><b>Objective ix:</b> ensure global and regional agreements (e.g. Africa Agenda 2063 and SDGs) are adequately mainstreamed into national development planning and implementation frameworks for the benefits of the country.</p>	<ul style="list-style-type: none"> <li>• The EAMCEF's project implementation arrangement created (and creates) enabling environment for mainstreaming, for example, SDGs in the District-level implementation frameworks. Various project implemented are accommodated in respective District plans, and District staff are involved in the design, provide technical advice and participate in monitoring. The project contributes to attainment of several SDGs - Goals - 1, 2, 5, 6, 7, 13, and 15</li> </ul>

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## At strategic intervention level:

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### 4.2.1(f) Manufacturing sub-sector

– propose to attain the target by implementation of various industrial activities, including promotion of Coal as an alternative to biomass-based fuel for industrial and household energy consumption, to preserve forests

- On household energy, the project introduced use of energy efficient stoves and biogas technology to reduce consumption of firewood. The project trained 1,702 local artisans (ToTs) on construction of energy efficient stoves, up to 14,187 households switched to stoves.
- On biogas, 94 community members were trained on construction of biogas plants, cutting more than 50% of firewood consumption per week.

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### 4.2.4 Agriculture –

iii. Skills promotion along the value chains

- The project supported trainings of 489 farmers on soil and water conservation techniques – resulted into increased crop production into 2-3 folds.

viii. Promotion of producer groups

- On agriculture groups, the project intervention strengthened conservation agriculture groups, spice farming groups, soya beans and sunflower groups, improved seeds groups, horticulture groups and vegetable farming groups.

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### 4.2.6 Natural resource management, environment and climate change

Key targets by 2020 includes increased natural forest cover by 130,000 Ha; 100 Million trees planted country wide,  
i. a) conservation of natural resources  
i. c) protecting, restoring and promoting sustainable use of terrestrial ecosystems, sustainably managing forests [...] and halting and reversing land degradation and biodiversity loss

- The project supported forest conservation projects in 9 Protected Areas through grant support to facilitate day-to-day operations – e.g. boundary clearance, boundary survey and marking, forest patrols, establishment of nature trails and drive routes.
- Forest management went hand in hand with addressing drivers of deforestation and forest degradation through high participatory approaches and support to alternative income generating activities.
- In general, forest management activities and restoration of degraded areas have allowed forest regeneration of up to 311 ha.



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#### 4.2.7 Tourism

- i). aggressive promotion and marketing of Tanzania as a unique tourism destination
- ii). diversifying of tourism products (southern circuit, identification of new areas, heritage tourism)
- iii). infrastructure improvement (e.g. roads)
- iv). improving training and skills development
- v). encouraging local tourism
- vi). Improve enabling environment for tourism sector

Related to tourism, the EAMCEF projects have managed to achieve the following:

- Strengthen capacity of 9 Protected Areas management through support on forest boundary clearance and survey/resurvey, forest patrols and combating of illegal activities,
- Specifically, on Tourism, the project supported establishment and maintenance of nature trails and drive routes of up to targeted protected area sites – totalling to over 887 km of nature trails, and 348 km of drive routes important for tourism activities
- The project supported establishment and maintenance of up to 31 campsites in the mentioned Protected Areas, but also supported publicity of Protected Areas through TV and Radio programmes and production of communication material, as well as establishment/maintenance of websites.
- Support to Protected Areas boosted amount of revenue collected annually.

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#### 4.3.4 water supply and sanitation services

Key targets by 2020: access to safe water in rural areas (85%), regional centres and Dar es salaam (95%) [...]

- i). conservation and protection of water resources, water sources

- The overall conservation of the EAMs ensures continued preservation of catchment areas and flow of water within the ecosystem and surrounding areas.
- The EAMs are the catchment forests for most rivers serving the downstream user in neighbouring Regions/towns, including the main city of Dar es Salaam – supporting domestic and industrial supply of water for up to 25% of Tanzania’s populations in towns of the following Regions: Iringa, Morogoro, Tanga, Kilimanjaro, Dodoma and Coast. Major rivers fed by the EAMs watershed services include the Great Ruaha, Kihansi, Kilombero, Wami, Pangani, Rufiji and Ruvu Rivers.



During preparation of this book, the government was in the process of developing the Third Five Year Development Plan (FYDP III) – 2021/22 – 2025/26, the National Climate Change Response Strategy (2021 - 2026) and the Nationally Determined Contributions (NDC). These contains some key interventions related to the EAMCEF’s mandate and objectives - thus looking forward to contributing to its achievements.

## 8.2.2 Contribution and link to the SAGCOT Initiative

A series of initiatives have been tested to transform the agriculture sector in Tanzania – the most recent being the Kilimo Kwanza (Agriculture First) initiative adopted in 2009. Kilimo Kwanza as the national resolve [declaration] to accelerate agriculture transformation in Tanzania was launched as a set of policy instruments and strategic intervention towards addressing a multitude of challenges associated with the agriculture sector, while at the same time considered to as the most important pillar in achieving the Tanzania Vision 2025. A year later, in May 2010, during the World Economic Forum on Africa, an international-private partnership called **Kilimo Kwanza Growth Corridors** was launched as an effort to mobilize partnerships and private investments that would rapidly help achieve the goals of Kilimo Kwanza, but also address the question of multiple benefits – being, food security, poverty reduction and reduced vulnerability to climate change.

To kick-start the mobilization of partnerships and private investments, an area covering about one-third of mainland Tanzania (about 287,000 Square Kilometres) was earmarked to form a Kilimo Kwanza Growth Corridor called “Southern Agricultural Growth Corridor of Tanzania (SAGCOT)”. An investment Blueprint for development of SAGCOT was developed in 2011 as a roadmap showing the necessary requirement that would leverage the agriculture potential of the Southern Corridor, but also highlights the investment opportunities within the corridor. The vision is to bring up to 350,000Ha into profitable agricultural production through intensive irrigation. To do this, a cluster approach was adopted, and six clusters were identified – Kilombero, Mbarali, Ihemi, Ludewa, Sumbawanga and Rufiji. The Blueprint recognizes that “long term benefits from agricultural growth will be undermined if the ecosystem and natural resources are not well managed”. While SAGCOT is thought to improve land use, soil and water management practices in the cluster through promoting agroforestry, soil fertility management, water harvesting, moisture conservation and low tillage farming – no detailed plan was put in place!

To further refine the SAGCOT strategy to ensure that development on the corridor is environmentally sustainable, socially equitable and economically feasible the Blueprint was backed up with another strategic write up – the Green Print of 2012. The Green Print lays strategies for implementing Agriculture Green Growth (AGG) – improving productivity while at the same time ensuring natural resource conservation, reduce pressure on surrounding forests, water resources and biodiversity. Chapter Four of the Green Print presents specific practices – being a shopping list of investments and programmes that need to be adopted and promoted to mainstream AGG.

### Linking the EAMs and the SAGCOT

The EAMS stretches from Southern Tanzania to the South east of Kenya, covering an area of 23,000 square Kilometres of mountains blocks– formed by the known mountains of North and South Pare, West and East Usambara, Nguu, Nguru, Ukaguru, Uluguru, Malundwe, Rubeho, Udzungwa and Mahenge in Tanzania as well as Taita Hills in Kenya. **The SAGCOT area overlaps in eight of these mountain blocks** – Nguu, Nguru, Uluguru, Ukaguru, Rubeho, Malundwe, Udzungwa and Mahenge Highlands (Fig. 8.1). These mountains provide, among others, watershed services feeding the river basins and wetlands for majority of the land in the SAGCOT area



– e.g. the Ruaha/Rufiji river basin with its three main sub-catchments of Great Ruaha, Kilombero and Luwego and wetlands of Kilombero flood plain, Usangu flats and Rufiji Delta spreading across the corridor, serving large part of the corridor. Other important rivers within the corridor include the Wami/Ruvu basin, Lake Rukwa Basin and Lake Nyasa.

Countrywide, including the SAGCOT area the EAMs are a source of water responsible for over 90% of the Tanzania's Hydro Electric Power produced in major power stations – for example, rivers from the Udzungwa Mountains Block inputs its water in Kidatu and Mtera power stations (both within Great Ruaha River) and the Kihansi power station (Within Kihansi River). The North and South Pare and West Usambara Mountains Blocks supply water to Pangani Falls and Hale power stations and Nyumba ya Mungu Dam.

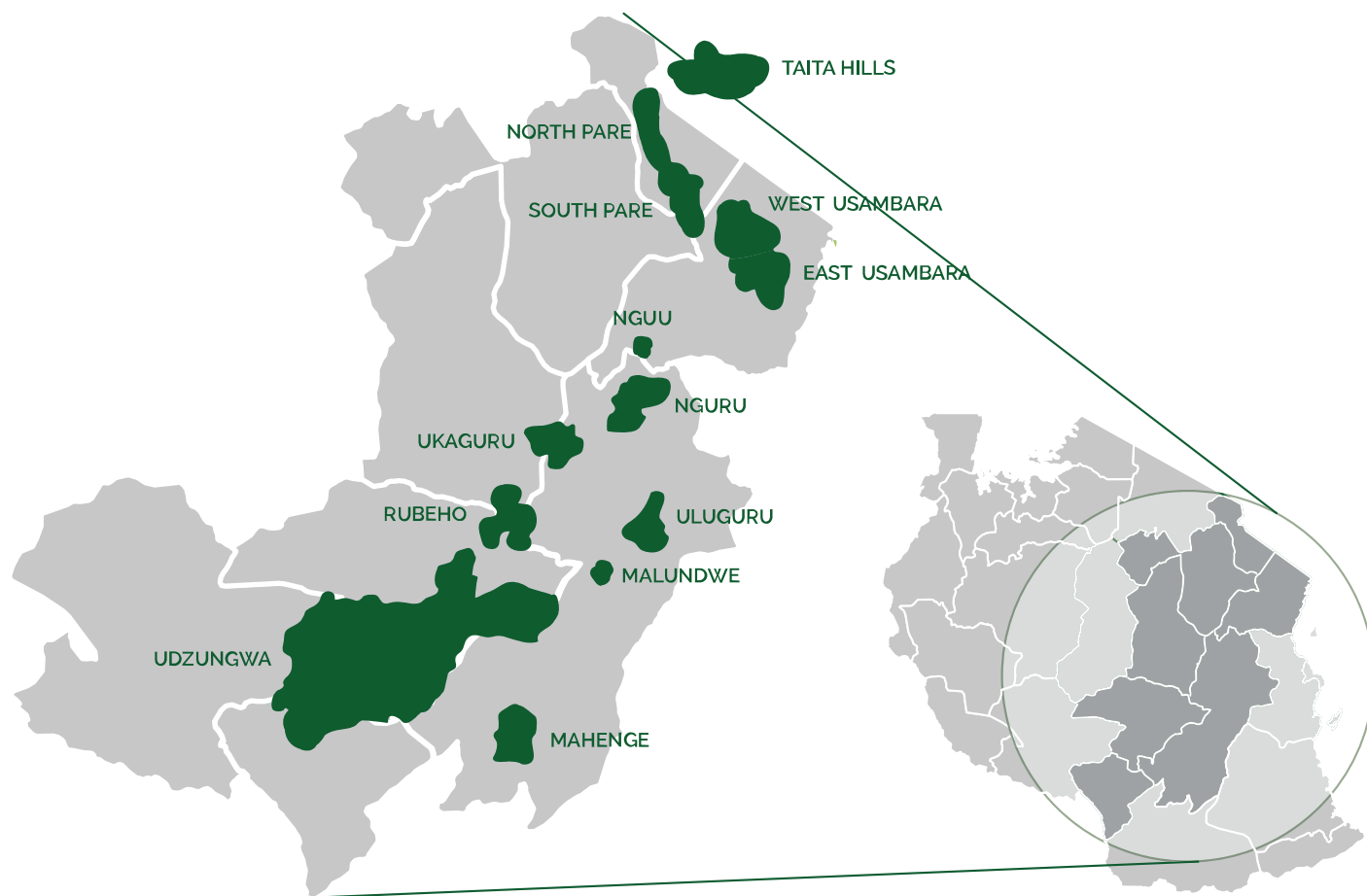
In addition to the current power stations, the Tanzania Power System Master Plan (2016) lists building of the long-proposed hydropower dam – the Julius Nyerere Hydropower Station (JNHS), at Stiegler's Gorge by 2035. The dam site at Stiegler's Gorge receives water from the Great Ruaha River and is expected to host turbines that will produce up to 2100MW of electricity.

## **Synergy and complementarity**

The SAGCOT Green Print identifies investment in forests, water and bioenergy as one of the key strategies to achieve Agriculture Green Growth (AGG) as such resources underlie the Corridor's long-term sustainability. Proposed strategies include an enterprise approach to community forestry, options for payment for ecosystem services, bioenergy, and improved water management to ensure efficient use and efficient allocation of water among key actors as well as enhance water availability through effective watershed management.

At the landscape level, since 2001 the Eastern Arc Mountains Conservation Endowment Fund (EAMCEF) was established [by the Government] as a Trust Fund that would channel fund for ensuring long term conservation of the EAMs ecosystem. The EAMCEF protects the EAMs for water catchment, biodiversity and soil conservation. The EAMCEF interventions in conserving the EAMs ensure long-term sustainability of the SAGCOT corridor thereby complementing the Green Print aspirations. Since the EAMCEF is already in place and has demonstrated capacity to lead implementation of large conservation projects through wide involvement of local communities, a sort strategic cooperation with SAGCOT initiative would be the key in reaching the Green Print aspirations.

Depending on the nature of partnership, the EAMCEF and private sectors investing in the SAGCOT area can engage in joint resource mobilization for implementation of projects that would ensure sustainable ecosystem management. Additionally, a comprehensive Payment for Ecosystem Services (PES) mechanism, involving the private sectors and other stakeholders within the SAGCOT area, can be developed to 'compensate' upstream communities and Protected Areas management participating in the conservation of the EAMs.



**8 of the EAMs blocks are within the SAGCOT area**

**Figure 8.1. Indicative location of SAGCOT area, covering about one-third of Mainland Tanzania, overlapping within 8 EAMs Blocks**



## 8.2.3 Contribution and link to SDGs



The phase out of Millennium Development Goals (MDGs) gave rise to new development agenda – the 2030 Agenda for Sustainable Development, decided by the Heads of State and Government and High-level Representatives at United Nations Headquarters in New York, at the Sustainable Development Summit, in September 25<sup>th</sup> -27<sup>th</sup>, 2015. The Agenda consisted of a set of 17 Goals – called Sustainable Development Goals (SDGs) and 169 Targets that would end poverty, fight inequalities, promote peace and justice, and tackle climate change by 2030. The new Goals and Targets were agreed to come into effect on 1st January 2016. The Goals are characterized as integrated and indivisible with three-balanced dimensions of sustainable development – economic, social and environmental (United Nations, A/RES/70/1).

## Sustainable Development Goals

**Goal 1: No Poverty:** “End poverty in all its forms everywhere.”

**Goal 2: Zero Hunger:** “End hunger, achieve food security and improved nutrition and promote sustainable agriculture.”

**Goal 3: Good Health and Well-Being:** “Ensure healthy lives and promote well-being for all at all ages.”

**Goal 4: Quality Education:** “Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all”

**Goal 5: Gender Equality:** “Achieve gender equality and empower all women and girls.”

**Goal 6: Clean Water and Sanitation:** “Ensure availability and sustainable management of water and sanitation for all.”

**Goal 7: Affordable and Clean Energy:** “Ensure access to affordable, reliable, sustainable and modern energy for all.”

**Goal 8: Decent Work and Economic Growth:** “Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.”

**Goal 9: Industry, Innovation, and Infrastructure:** “Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.”

**Goal 10: Reduced Inequalities:** “Reduce income inequality within and among countries.”

**Goal 11: Sustainable Cities and Communities:** “Make cities and human settlements inclusive, safe, resilient and sustainable.”

**Goal 12: Responsible Consumption and Production:** “Ensure sustainable consumption and production patterns.”

**Goal 13: Climate Change:** “Take urgent action to combat climate change and its impacts by regulating emissions and promoting developments in renewable energy.”

**Goal 14: Life Below Water:** “Conserve and sustainably use the oceans, seas and marine resources for sustainable development.”

**Goal 15: Life on Land:** “Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.”

**Goal 16: Peace, Justice and Strong Institutions:** “Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.”

**Goal 17: Partnerships for the Goals:** “Strengthen the means of implementation and revitalize the global partnership for sustainable development.”




Since the Goals are global in nature and universally applicable, each Government was required to localize the Goals by setting own national targets considering national circumstances and priorities, but also incorporating the Goals into national planning machinery, at policies and strategies levels while insuring that ‘no one will be left behind’. In Tanzania, for example, the Five-Year Development Plan II (FYDP II) already integrated several SDGs such as Goal 1, 2, 3, 4, 5, 7, 9 and 17.

Results of the EAMCEF supported projects link well and contributes to the attainment of SDGs Targets within the EAMs and at the national level scales. The section below provides the linkages to the Targets of the related Goals - 1, 2, 5, 6, 7, 13, and 15.

**Table 8.14. Goal 1 – No Poverty versus the EAMCEF Projects**


SDG Goals and Targets (Related to the EAMCEF projects achievements)	The EAMCEF Projects – Link and contribution to SDGs
 <p>Target 1.1: by 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than \$1.25 a day.</p> <hr/> <p>Target 1.2: by 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definition.</p> <hr/> <p>Target 1.4: by 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources... ownership and control over land... natural resources, appropriate new technologies...</p>	<ul style="list-style-type: none"> <li>• The overall work of the EAMCEF activities is not only to conserve the forest mountain ecosystem, but also to improve lives of the surrounding communities through support to alternative income generating activities (IGAs).</li> <li>• The EAMCEF provided project grants for community-based conservation and development projects focused at improving rural livelihoods and welfare of forest adjacent communities.</li> <li>• Through IGAs, communities have managed to increase household income, improve quality of life, double food production and thereby reduce poverty.</li> <li>• Also, income realized from casual labour for undertaking forest management operations had contributed to increased individual income.</li> <li>• The project promoted equal participation of men and women of all ages, including the youth and disadvantaged people in all project activities, but also hand in hand with land use planning activities the project facilitated issuance of Certificates of Customary Rights of Occupancy (CCROs) to over 12 villagers – thereby strengthening and securing bundles of rights to land and land resources.</li> </ul>

**Table 8.15. Goal 2 – Zero Hunger versus the EAMCEF Projects**


SDG Goals and Targets (Related to the EAMCEF projects achievements)	The EAMCEF Projects – Link and contribution to SDGs
	<ul style="list-style-type: none"> <li>• The project intervention, especially through establishment of conservation agriculture has resulted into increase in crop production due to water and soil conservation measures – thereby ensuring availability of food all year long.</li> <li>• Other agricultural activities supported by the project – such as improved seeds, spice farming, sunflower and soya beans, fish farming and tree planting – have increased the income of small-scale food producers, resulting into multiple benefits.</li> <li>• Introduction of local chicken and dairy livestock keeping has been important in improving the quality of diet.</li> <li>• Non-farm employment opportunities such as participation of local communities in ecotourism activities and Protected Area management (e.g. boundary clearing, patrols and construction of trenches) are important sources of seasonal income to surrounding communities.</li> </ul>
<p>Target 2.1: by 2030, end hunger and ensure food access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year.</p>	
<p>Target 2.3: by 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to... non-farm employment.</p>	<ul style="list-style-type: none"> <li>• Introduction of conservation agriculture (CA) technique in the project area has been a game changer especially for local communities living in highlands and steep slopes of Muheza District, Morogoro Municipality and Morogoro District.</li> <li>• The project trained 489 villagers (both men and women) on soil and water conservation techniques, putting up to 897 ha of land under CA, with production increase of up to three times.</li> </ul>
<p>Target 2.4: by 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystem that strengthen capacity for adaptation to climate change, extreme weather... and that progressively improve land and soil quality.</p>	




**Table 8.16. Goal 5 – Gender Equality versus the EAMCEF Projects**

SDG Goals and Targets (Related to EAMCEF projects achievements)	EAMCEF Projects – Link and contribution to SDGs
	<ul style="list-style-type: none"> <li>• The project, in its implementation of community projects ensured an overall engagement of 48% of women including girls. On other cases, the project supported 100% women groups such as for stove construction, spice tree farming and mushroom farming.</li> <li>• The project also supported disabled and people living with HIV/ AIDS in Mufindi District.</li> <li>• The project supported participation and benefit sharing in project implementation by people of different ages and categories including women, girls, the elderly and vulnerable groups.</li> <li>• The project facilitated the creation and proper functioning of the Local Advisory Committees (LACs) in each target district comprising of politicians (Councillors) and technical personnel that include women representatives.</li> <li>• Short-term gender-based employment opportunities especially in Protected Areas management activities ensured a balanced inclusion of men and women, over 3,645 villagers benefited from the employment opportunities.</li> </ul>
<p>Target 5.1: end all forms of discrimination against all women and girls everywhere</p>	
<p>Target 5.5: ensure women’s full and effective participation and equal opportunities for leadership at all levels and decision-making in political, economic and public life</p>	

**Table 8.17. Goal 6 – Clean Water and Sanitation versus the EAMCEF Projects**


SDG Goals and Targets (Related to the EAMCEF projects achievements)	The EAMCEF Projects – Link and contribution to SDGs
	<ul style="list-style-type: none"> <li>• The EAMs are the catchment forests for most rivers serving the downstream users in neighbouring and remote areas, including the main city of Dar es salaam – supporting domestic and industrial supply of water for up to 25% of Tanzania’s populations in towns of the following Regions; Iringa, Morogoro, Tanga, Kilimanjaro, Dodoma, Dar es Salaam, and Coast. Major rivers fed by the EAMs watershed services include the Great Ruaha, Kihansi, Pangani and Hale, Wami, Kilombero, Rufiji and Ruvu Rivers.</li> </ul>
<p>Target 6.1: by 2030, achieve universal and equitable access to safe and affordable drinking water for all</p>	
<p>Target 6.6: by 2030, protect and restore water related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.</p>	

**Table 8.18. Goal 7 – Affordable and Clean Energy versus the EAMCEF Projects**


SDG Goals and Targets (Related to the EAMCEF projects achievements)	The EAMCEF Projects – Link and contribution to SDGs
	<ul style="list-style-type: none"> <li>The project supported introduction of modern energy services through introduction of biogas technology for domestic cook stoves – saving up to 50% amount of firewood sourced from neighbouring forests. The project trained 1,702 villagers and masons in Kilolo District, Iringa Region and supported installation of biogas plants in selected households.</li> </ul>
<p>Target 7.1: By 2030, ensure universal access to affordable, reliable and modern energy services.</p>	<ul style="list-style-type: none"> <li>Indirectly, since most of the dams used for hydropower plants are fed by waters originating in the EAMs, conservation of the forests ensures continued availability of water and thereby renewable electricity. Up to 90% of Tanzania’s hydroelectric power is produced from major dams at Kidatu, Mtera, Kihansi, Nyumba ya Mungu, Pangani and Hale – all of which receives water originating from the EAMs.</li> </ul>
<p>Target 7.2: by 2030, increase substantially the share of renewable energy in the global energy mix.</p>	
<p>Target 7.3: by 2030, double the global rate of improvement in energy efficiency</p>	<ul style="list-style-type: none"> <li>In terms of energy efficiency, the project introduced energy efficient stoves and biogas technology to reduce consumption of firewood. The project trained 1,702 local artisans (ToTs) on construction of energy efficient stoves, up to 14,187 households are now using such stoves – considerable reducing by more than 50% the amount of firewood, hence saving the forests.</li> </ul>
<p>Target 7.3: by 2030, double the global rate of improvement in energy efficiency Target 7: by 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries...</p>	



**Table 8.19. Goal 13-climate change versus the EAMCEF projects**

SDG Goals and Targets (Related to the EAMCEF projects achievements)	The EAMCEF Projects – Link and contribution to SDGs
	<ul style="list-style-type: none"> <li>Awareness activities within the EAMCEF projects involve conservation education, including aspects of climate change adaptation through climate compatible activities, such as conservation agriculture, tree planting, etc.</li> </ul>
<p>Target 13.3: improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.</p>	<ul style="list-style-type: none"> <li>The EAMCEF supported forest-climate change-related researches on carbon storage potentials of the forests, and indicators of climate change.</li> </ul>

**Table 8.20. Goal 15 – Life on Land versus The EAMCEF Projects**

SDG Goals and Targets (Related to the EAMCEF projects achievements)	The EAMCEF Projects – Link and contribution to SDGs
	<ul style="list-style-type: none"> <li>Goal 15 is basically the heart of the EAMCEF project. The goal of the project being ‘enhanced conservation of the forests within the proposed EAMs World Heritage Site in Tanzania’ entails a set of actions linked to SDGs Target 15.1, 15.2, 15.4, 15.5, 15.6, and 15.7.</li> </ul>
<p>Target 15.1: by 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland water ecosystems and their services, in particular forests, wetlands, mountains and drylands...</p>	<p>The EAMCEF projects managed to achieve the following, in this case:</p> <ul style="list-style-type: none"> <li>Supported preparation of forest management plans</li> </ul>
<p>Target 15.2: by 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and sustainably increase afforestation and reforestation globally.</p>	<ul style="list-style-type: none"> <li>Regular maintenance of forest boundaries of up to 1,793 km over the last 10 years.</li> <li>Enhanced forest cover through replanting of degraded areas, fire controls and rehabilitation of mining areas illegally dug in the forests.</li> </ul>
<p>Target 15.4: by 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development.</p>	

Target 15.5: take urgent and significant actions to reduce the degradation of natural habitats, halt the loss of biodiversity, and by 2020, protect and prevent the extinction of threatened species.

- Strengthened forest patrols and reduced forest encroachment for farming, hunting, and mining activities.

Target 15.6: promote fair and equitable sharing of benefits arising from the utilization of genetic resources and promote access to such resources, as internationally agreed.

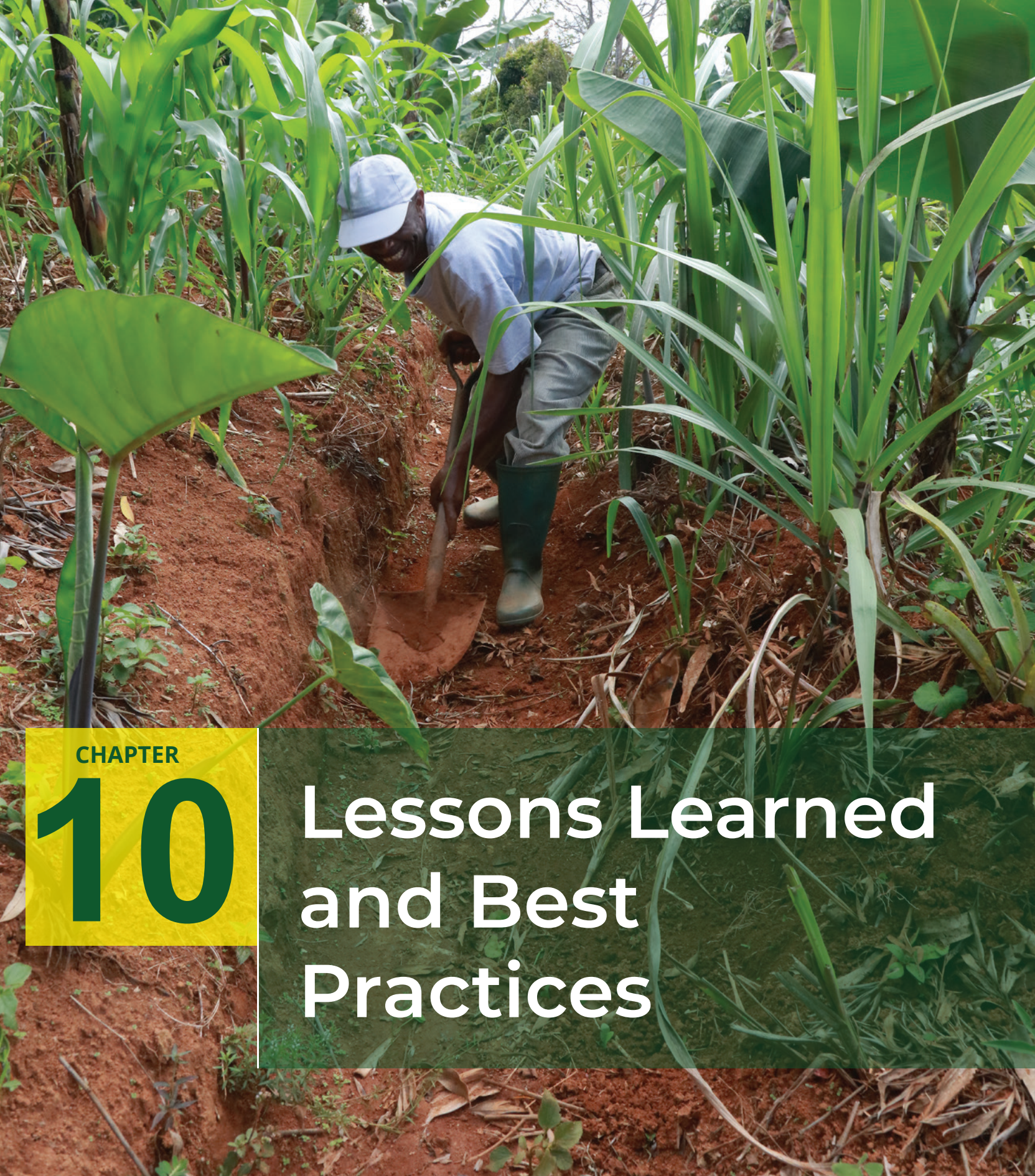
- Benefits arising from tourism and ecotourism activities, and from sales of confiscated products and equipment are shared to surrounding communities.
- Provision of short term and paid employment opportunities to local communities through joint patrols

Target 15.7: take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products

- Intensive forest patrols to fight against illegal activities, including filing of cases in court.







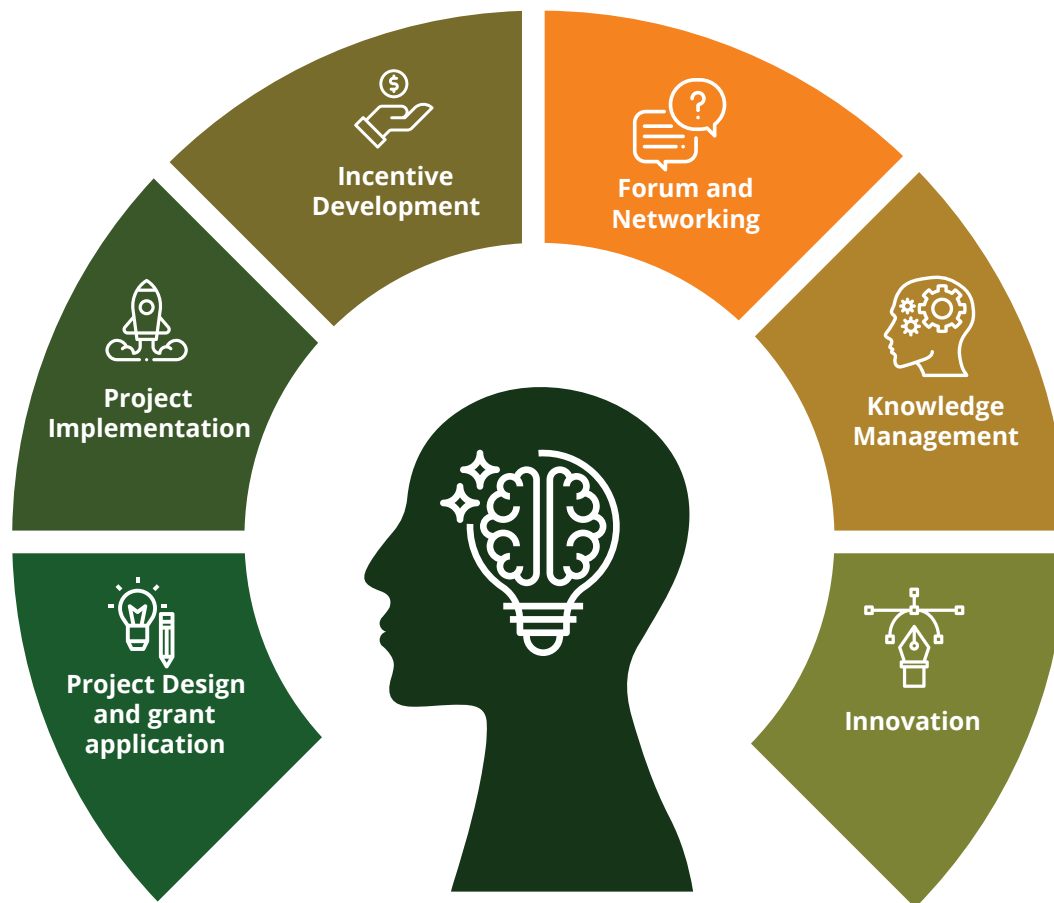
CHAPTER

# 10

## Lessons Learned and Best Practices



This section presents major lessons learned during implementation of the EAMCEF supported projects, specifically in connection with the 10 years funding support provided by the Royal Government of Norway and linked to the goals and objectives of the provided support. Lessons are drawn across thematic area and presented, shared to inform implementation of related projects and policies at the national level.



## Project Design and grant application

- Co-design approach work well for local communities** – upon receipt of funds, the EAMCEF issues a call for proposals for various stakeholder groups to apply for grants to support implementation of projects. Over time, we have been improving our guidelines to help applicants submit more explicit proposals addressing priority areas. We extended calls for proposals to Government Departments (Central and Local Governments), Non-Governmental Organizations (NGOs), Community Based Organizations (CBOs), Local Communities, Research Institutions, Academic Institutions and Private Entities. Such calls were in English language, not understood by local communities but yet extended to them with an expectation of responses. We noted that local communities have great project ideas that can help to address local challenges but do not have the technical capacity to produce proposal write-ups as per the EAMCEF guidelines. We learnt that local communities and surrounding CBOs and NGOs use co-design approaches to come up with project submissions. These CBOs and NGOs facilitate implementation once projects are approved. We then realized that there



is a need for us to prepare special call for proposals in a language that local communities and facilitating CBOs/NGOs could easily comprehend – we then made our calls in both English and Kiswahili languages.

- **Pre-approval of applications by local authorities ensures relevance** – we added a criterion that, non-research community development and conservation projects are funded as elements of Strategic Plans of the concerned districts and management plans of the concerned forests, which means, all project proposals must comply with development priorities of the target districts and management plans of the target forests. Before any submission is made, proposals of this nature had to get approval/recommendations from Regional Administration and Local Governments (RALG). Our aim is to ensure that submitted proposals complement government efforts and funding gap. We came to realize that once a certain project is selected and funded for implementation the landing becomes easy and receives adequate support in terms of extension services from the RALG staff as implementation of such particular project is part and parcel of the RALG's plans and is accounted for.

## Project Implementation

- **Meaningful engagement of local communities and awareness raising are key ingredients enhancing behavioural change towards environmental conservation:** Although awareness on conservation has been emphasized since 1997 when the National Environment Management policy was prepared, other policy documents have also emphasized its importance. This is because of the role of awareness of stakeholders in enabling their participation in the protection of ecosystems such as the EAMs. Awareness raising targeting communities across the EAMs has resulted into the reduction in biodiversity loss from incidences of forest fires which were resulting from traditional hunting practices, charcoal making, cutting of timber and poles for construction and sales, hunting and encroachment of forested land for agriculture activities. Adoption of alternative livelihood activities involved effective participation of targeted beneficiaries from the initial stages of project development – projects were not just dropped from the sky but rather co-developed by local communities and local facilitators.
- **The learning-by-doing approach fast-tracked uptake** of introduced interventions at the local level. At the inception of most community projects community meetings and awareness activities were prioritized before formulation or selection of task groups that would implement the project on the ground. Selected groups receive necessary trainings and started implementation, but most learning and improvement came later while implementation had already kick started.
- **Small grants can make a big difference at the local level** – our approach to supporting many small projects have ensured wide-spread adoption of promoted interventions across the EAMs ecosystem and incentivised local communities to participate in conservation activities. For example, we offer micro grants not exceeding TZS 10 Million (about USD 4,348) for 6 months to 1-year projects but this amount makes

huge change at the community level (as already explained in Chapter 4). For example, introduction of tree nurseries and tree planting activities for commercial soft woods has helped participating communities generate significant income and used that income to establish other businesses such as guest houses, expand irrigation activities through diesel-powered water pumps. In one of the schools, sales of tree seedlings have helped the school to improve meals for students and saved time spent commuting home for lunch.

- **Local level innovation for local challenges – simple and affordable**– one of the projects on improved chicken keeping introduced in a village required use of chick brooders. We were very much worried that chick brooders are expensive and require electricity while the village setting is not anywhere close to the mini or main electricity grid. However, we learnt that local communities have equivalent local solutions as they introduced locally made chick brooders using simple available material within their environment – these local brooders are known in Swahili language as ‘vinengunengu or vibanda mama’ and serve the same purpose as the modern brooders. It is important to capture this local innovation during project design and find ways to improve and scale-up.
- **Grant disbursement:** When we started, our grant disbursement modality was in three main trenches of 40%, 30% and 30% depending on the financial needs of respective projects. Three trenches had a reporting implication to grant recipient, in addition to increasing transaction costs for both the EAMCEF and the recipient. With three trenches, recipient organizations had to report on performance four times a year. Also, for small grants (e.g., micro grants), three trenches limited the scope of implementation and thereby slowing realization of tangible results. We made a management decision to reduce the reporting burden by opting for 2-trench disbursement of 50% each, with changes (increased) in grant sizes. A 50% disbursement at the beginning of the project ensures that key activities are initiated and front-loaded to accelerate achievement of intended results.

## Incentive development

- **Local communities appreciate more direct tangible benefits and incentivises them to fully participate in conservation activities.** In many protected forests, especially those protected for their watershed values the question of benefit sharing has always been challenging. Local communities appreciate more direct tangible benefits, especially through operationalization of Joint Management Agreement with the government (JMA). Even in areas where JMA are signed, modalities of benefit sharing between the two parties are not clearly defined or fully operational. Our project grants extended to support implementation of management plans for various protected areas were designed to provide short term employments to surrounding local communities for activities such as boundary clearance, boundary marking, tree planting and digging of trenches. Participating local communities reported that the income obtained as compensation to their time and labour has been very much appreciated and has been considered to as ‘benefits obtained from living near protected areas’ and incentivized their participation in other activities such as joint patrols and fire management.



- **EAMCEF could be a possible Fund for channelling payments for Ecosystem Services:** Payment for Ecosystem Services (PES) has been advocated for to support conservation activities. PES advocates for paying for the ecosystem services such as water, biodiversity, carbon, energy, and flood control by organizations, institutions and companies, which benefit from the services. One challenge is the mechanism through which payments can be managed from the payer to owners of the ecosystems where services are being generated e.g. forest authorities which tirelessly work to protect the forests. The EAMCEF grant funding approach provides a model, which can be customized to meet PES attributes and has proved to deliver both social and economic benefits to communities who in turn provide the management roles to the ecosystem.

## Forum and networking

Our broad network of project implementers and key stakeholders is spread widely. However, missed out the opportunity to learn and share as a group, also as the EAMs key stakeholders – the whole of the grant beneficiaries and implementers across the EAMs. We noticed that there is a lot to share and learn among grant beneficiaries, donor groups and decision-makers formal forum at local and national levels. This idea came late and was not incorporated into programme design. We have been sharing experience at district level through Local Advisory Committee, however a national-level platform would have helped our lessons to reach deeper and possibly influence policy and decision making at the national level – thus making our work more significant. Moving forward, we look into options to establish/or link with existing forum in an integrated manner.

## Knowledge management

We could have improved knowledge management by taking advantage of the smartphone's widespread accessibility. When we started the first year of the Norwegian-funded project in 2011, it was extremely rare to find a person owning a smartphone in the middle of a village. Today, smartphones are scattered widely given the affordability. We relied mostly on field monitoring missions to gather lessons but with the availability of smartphones we could have combined our physical monitoring with photos and videos recorded by project beneficiaries on site, during implementation of activities. This approach would have immediately helped to capture lessons as they emerge. Approaches such as participatory community videos where local communities record their day-to-day activities, help to capture valuable experiences.

# Our Key Partners





# The success of the EAMCEF work has been contributed by a number of partners we have worked with;

## Main funders:

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### The Government of the Kingdom of Norway

The Government of the Kingdom of Norway has been funding EAMCEF operations and project interventions over the last 10 years (2011-2020)

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### World Bank and the Global Environment Facility (GEF)

Between 2002 and 2009, EAMCEF was fully funded by the World Bank (WB) and the Global Environment Facility (GEF) through the Government of Tanzania

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## Investments Management Consultants/Financial advisors and Banks:

- UBS
  - CRDB Bank PLC
  - ABSA
  - Exim Bank
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## Implementing Partners:

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### Government Ministries:

Ministry of Natural Resources and Tourism – Forestry and Beekeeping Division  
Vice President’s Office- Division of Environment (DoE)

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### Government Agencies:

National Environment Management Council (NEMC)  
Tanzania Forest Services (TFS) Agency  
Tanzania National Parks (TANAPA)

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### Research and Academic Institutions

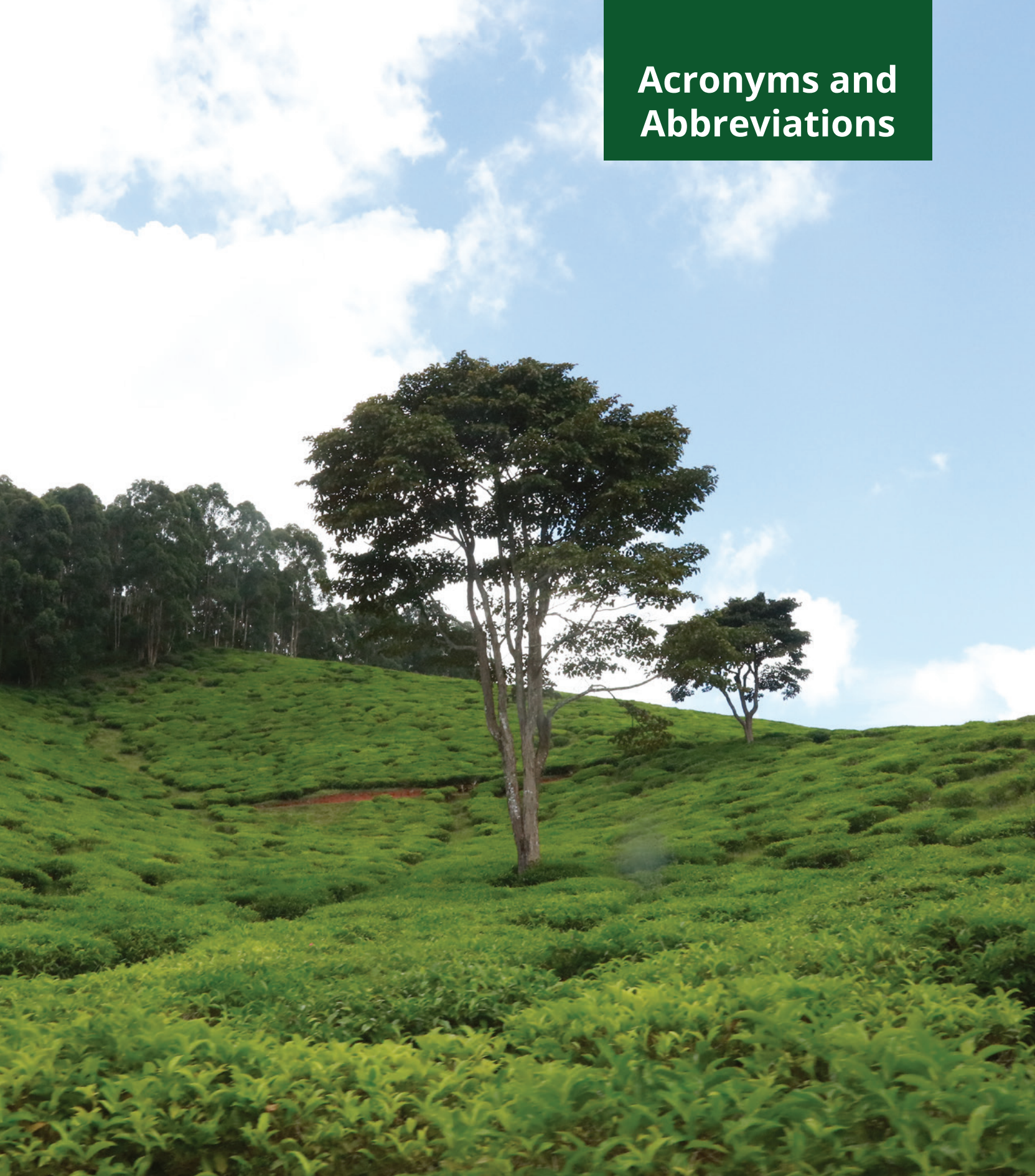
Sokoine University of Agriculture (SUA)  
Tanzania Agricultural Research Institute (TARI)  
Tanzania Forestry Research Institute (TAFORI)  
Tanzania Wildlife Research Institute (TAWIRI)  
Mzumbe University (MU)  
University of Dar-es-Salaam (UDSM)

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<b>Local Authorities (Target Districts) and local communities in project sites:</b>	<p>Korogwe District Council  Kilombero District Council  Kilolo District Council  Lushoto District Council  Muheza District Council  Mkinga District Council  Mvomero District Council  Morogoro District Council  Morogoro Municipal Council  Mufindi District Council  Same District Council</p>
<b>Non-Government, and Community-Based Organizations</b>	<p>Care-Tanzania  ENEPA Green Consultancy  Emerge-Tanzania  Chama cha Mazingira na Maendeleo ya Uma Tanzania (CMMUT)  Friends in Development (FIDE)  Livelihood Development Tanzania (LIDET)  Mtandao wa Jamii wa Usimamizi wa Mimitu Tanzania (MJUMITA)  Morogoro Environmental Conservation Action (MECA) Group  NAKYA Group  Same Community-Based Organization (SCBO)  Same Mwanga Environmental Conservation Advisory Organization (SMECAO)  Society for Women and AIDS in Africa (SWAA)  Tanzania Forest Conservation Group (TFCG)  Tanga Energy Development Association Trust (TEDA)  Tanzania Association of Foresters (TAF)  Umoja wa Wahifadhi Mazingira Kihuhwi Zigi (UWAMAKIZI)  Victory Youth Support Organization (VIYOSO)  World Wildlife Fund (WWF)</p>
<b>Private Companies</b>	<p>SONGAS  Unilever  Various consulting companies and consultants</p>



# Acronyms and Abbreviations



<b>ANFR</b>	Amani Nature Forest Reserve
<b>AGG</b>	Agriculture Green Growth
<b>BEST</b>	Biomass Energy Strategy
<b>CA</b>	Conservation Agriculture
<b>Cap.</b>	Chapter
<b>CBOs</b>	Community-Based Organizations
<b>CCRO</b>	Certificate of Customary Rights of Occupancy
<b>CNFR</b>	Chome Nature Forest Reserve
<b>CO2e</b>	Carbon dioxide Equivalent
<b>CREAM</b>	Conservation and Restoration of the Eastern Arc Mountains
<b>DED</b>	District Executive Director
<b>EAMCEF</b>	Eastern Arc Mountains Conservation Endowment Fund
<b>EAMs</b>	Eastern Arc Mountains
<b>EBA</b>	Endemic Bird Area
<b>EMA</b>	Environmental Management Act
<b>FYDP</b>	Tanzania's Five-Year Development Plan
<b>GEF</b>	Global Environment Facility
<b>Ha</b>	Hectare – Unit of area
<b>IGAs</b>	Income Generating Activities
<b>IUCN</b>	The International Union for Conservation of Nature

<b>JFM</b>	Joint Forest Management
<b>JNHS</b>	The Julius Nyerere Hydropower Station
<b>KM/km</b>	Kilometer
<b>KNFR</b>	Kilombero Nature Forest Reserve
<b>LACs</b>	Local Advisory Committees
<b>LUP</b>	Land Use Plan
<b>MDGs</b>	Millennium Development Goals
<b>MkNFR</b>	Mkingu Nature Forest Reserve
<b>MNFR</b>	Magamba Nature Forest Reserve
<b>MNRT</b>	Ministry of Natural Resources and Tourism
<b>NAMA</b>	Nationally Appropriate Mitigation Actions
<b>NCCS</b>	National Climate Change Strategy
<b>NEAP</b>	National Environmental Action Plan
<b>NDC</b>	Nationally Determined Contributions
<b>NGOs</b>	Non-Governmental Organizations
<b>NNFR</b>	Nilo Nature Forest Reserve
<b>NSGRP</b>	National Strategy for Growth and Reduction of Poverty
<b>NOK</b>	Norwegian Krone
<b>NR</b>	Nature Reserve
<b>PAs</b>	Protected Areas



<b>PES</b>	Payment for Ecosystem Services
<b>PFM</b>	Participatory Forest Management
<b>REDD+</b>	Reduced Emissions from Deforestation and Forest Degradation, including conservation of forest carbon stocks, sustainable management of forest and enhancement of forest carbon stocks
<b>RNE</b>	The Royal Norwegian Embassy
<b>SAGCOT</b>	Southern Agricultural Growth Corridor of Tanzania
<b>SDGs</b>	Sustainable Development Goals
<b>TANAPA</b>	Tanzania National Parks Authority
<b>tC</b>	Tons of carbon
<b>tCO2</b>	Tons of carbondioxide
<b>NPV</b>	Net Present Value
<b>TFS</b>	Tanzania Forest Services Agency
<b>TFCMP</b>	Tanzania Forest Conservation and Management Project

<b>ToT</b>	Training of Trainers
<b>TZS</b>	Tanzanian Shillings
<b>UMNP</b>	Udzungwa Mountains National Park
<b>UNESCO</b>	The United Nations Education, Science and Cultural Organization
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>UNFR</b>	Uluguru Nature Forest Reserve
<b>URT</b>	United Republic of Tanzania
<b>USNFR</b>	Uzungwa Scarp Nature Forest Reserve
<b>USD</b>	United States Dollar
<b>VLUM</b>	Village Land Use Management
<b>VNRC</b>	Village Natural Resource Committee
<b>VICOBA</b>	Village Community Banks
<b>VPO</b>	The Vice President's Office, Tanzania

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