



Measures for Combating Desertification: Case Studies from Horn of Africa



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September 2019



AI-C D

**African Initiative for Combating Desertification
to Strengthen Resilience to Climate Change
in the Sahel and Horn of Africa**

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Captions for cover photographs:

Top row left to right

- Small Bara desert in Djibouti
- Construction of soil and water conservation structures in Eritrea
- Bonga Participatory Forest Management area in Ethiopia

Middle row

- Melia tree growing on-farm in Kenya

Bottom row left to right

- Integrated crop production on a farm in Somalia
- Destruction of crops by floods in South Sudan
- Mechanical fixation of sand dunes in Sudan

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PREAMBLE

Desertification, land degradation and drought (DLDD) are the main challenges to environmental sustainability and socio-economic development in Africa. Therefore, DLDD is a great threat to sustainable development in Africa. Desertification continues to spread with great intensity in Africa and is currently estimated to affect about 42% of the continent. Since farming in African is essentially a low-input system, marked with inappropriate farming systems especially in drylands, land degradation and desertification is widespread, resulting in low productive land, loss of biodiversity and animal habitation. Inappropriate farming systems include; poor land use planning and land management, absence of soil amendment and conservation practices, vegetation degradation due to overharvesting of forests and woodlands, and overgrazing. Overgrazing in the drylands of Africa for example, has led to; soil deterioration through soil compaction and erosion, the emergence of grasses of low-nutrient value, and increase of invasive plant species hence leading to the low land productivity and decreased carrying capacity.

In Sub-Saharan Africa, over 80% of the population rely on biomass energy for cooking and heating requirements. This high dependence on biomass energy has resulted in a high rate of indiscriminate tree felling and deforestation, therefore, exposing large areas of land to desertification. Climate change is set to increase the area susceptible to drought, land degradation and desertification in Sub-Sahara Africa. It is predicted that the driest regions of the world will become even drier, indicative of a greater risk to frequent drought occurrence in many arid, semi-arid and dry sub-humid areas of Africa.

Weak community participation in natural resource management, poor dissemination strategies, and inadequate information on good practices for combating desertification have hindered effective rehabilitation of degraded lands in Africa. Evidently, Africa cannot meet DLDD without investment in combating desertification. Collaboration with development partners should therefore be highly prioritized. Though it is appreciated that Africa has innovations and technologies that can be shared across the continent, such information needs to be well packaged and shared to enhance usage and adoption.

This Book is therefore, a compendium of policies and strategies, institutional framework and case studies on good practices that have been applied in the Horn of Africa (HoA) to address challenges associated with land degradation and desertification. The Book will be useful across Sub-Sahara Africa by; policy makers, institutions involved in natural resource management, extension agents, and land users such as farmers and pastoralists.

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ACRONYMS

AAAID	Arab Authority for Agricultural Investment and Development
AfDB	African Development Bank
AI-CD	African Initiative for Combating Desertification to Strengthen Resilience to Climate Change in the Sahel and Horn of Africa
ANR	Agriculture and Natural Resources
AOAD	Arab Organization for Agricultural Development
CAADP	Comprehensive Africa Agriculture Development Programme
CIDPs	County Integrated Development Plans
CRGE	Climate Resilient Green Economy
DLDD	Desertification, Land Degradation and Drought
DNWU	Djiboutian National Women Union
DRSLP	Drought Resilience and Sustainable Livelihood Programme
DRSRS	Directorate of Resource Surveys and Remote Sensing
EDE	Ending Drought Emergencies
ESD	Education for Sustainable Development
EU	European Union
FAO	Food and Agricultural Organization
FFEM	French Facility for Global Environment
FWA	Forest and Wildlife Authority
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GOSS	Government of South Sudan
HAC	Humanitarian Aid Commission
HoA	Horn of Africa
IDB	Islamic Development Bank
IDDRSI	IGAD Drought Disaster Resilience and Sustainability Initiative
IFAD	International Fund for Agricultural Development
IGAD	Inter-governmental Authority on Development
INGO	International Non-Governmental Organization
IUCN	International Union for Conservation of Nature
JICA	Japan International Cooperation Agency
KEFRI	Kenya Forestry Research Institute
KFS	Kenya Forest Service

KSG	Kenya School of Government
LDN TSP	Land Degradation Neutrality Target Setting Programme
LDN	Land Degradation Neutrality
MAFS	Ministry of Agriculture and Food Security
MoEF	Ministry of Environment and Forestry
MoA	Ministry of Agriculture
MoHDM	Ministry of Humanitarian Affairs and Disaster Management
NAP	National Action Plan
NAPA	National Adaptation Plan of Action
NAPCCA	National Action Plan for Climate Change Adaptation
NCCD	National Council for Combating Desertification
NDVI	Normalized Vegetation Differential Index
NGO	Non-Governmental Organization
NRM	Natural Resources Management
PFM	Participatory Forest Management
PNIASAN	Programme National d’Investissement Agricole et de Sécurité Alimentaire et Nutritionnel
RRC	Relief and Rehabilitation Commission
SDGs	Sustainable Development Goals
SECS	Sudanese Environment Conservation Society
SERD	Superior Education, Research Center
SLM	Sustainable Land Management
SMCFS	Small and Medium Commercial Farmers Strategy
SNAIP	Sudan National Agriculture Investment Programme
SNAP	Sudan National Action Plan
SRC	Sudanese Red Crescent
SWA	Sudanese Women Association
TC	Technical Consortium
UN	United Nations
UNCBD	United Nations Convention on Biological Diversity
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
UNESCO	United Nations Educational Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
WDGD	World Day to Combat Desertification

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CHAPTER ONE

INTRODUCTION

1.1 Background

Land is a major asset for many communities in Africa who rely on it for their livelihood and socio-economic needs. However, the current high population growth, over-exploitation of forests and woodlands, poverty, unsustainable land use practices, overgrazing, as well as wildfires continue to exert pressure on land, leading to its degradation.

Land degradation, can be defined as reduction in capacity of land to provide goods and ecosystem services (FAO, 2011). Where land degradation occurs in arid, semi-arid and dry sub-humid areas, the land suffers desertification. Land degradation and desertification remain a major barrier to achieving sustainable development especially in Africa, where 33.3% of the land area is desert and dry. Africa is highly affected by both desertification and land degradation, where 74% of agricultural landscapes is degraded. Land degradation manifests itself through; reduced agricultural productivity, degraded forests and rangelands, severe soil erosion, water scarcity, loss of vegetation cover and biodiversity, and poverty. Consequently, land degradation and desertification constitutes major causes of human migration, conflicts over the use of declining natural resources, food insecurity, and loss of biodiversity.

Due to the fragile nature of the drylands as a result of high soil erodibility and erosivity, and low vegetation cover, landscape degradation in the drylands is harder to reverse compared to other ecosystems. To manage drylands sustainably, there is need to develop policies and strategies, natural resource management systems that avoid continued loss of productive land in the drylands of Africa, as well as developing and implementing initiatives geared towards combating desertification. Combating desertification includes activities that form part of integrated sustainable development aimed at: Prevention/reduction of land degradation, rehabilitation of partly degraded land and reclamation of decertified land (Global Land Outlook, 2017) as well as activities that mitigate effects of drought. For Africa to shorten the timeframe required for ecosystem rehabilitation and to achieve Sustainable Development Goals (SDGs), there is need for accelerated sharing of existing natural resource management knowledge, good practices and technologies. One programme that has been developed to achieve this is the African Initiative for Combating Desertification to Strengthen Resilience to Climate Change in the Sahel and Horn of Africa (AI-CD).

1.2 African Initiative for Combating Desertification Implementation

The African Initiative for Combating Desertification to Strengthen Resilience to Climate Change in the Sahel and Horn of Africa (AI-CD) has been developed against the background that; the Sahel and Horn of Africa regions face mounting development challenges and environmental deterioration, and that much of the region is dry, highly degraded and suffers from frequent and severe droughts. It has also been recognized

that climate change is likely to accelerate desertification in these regions. Therefore, addressing desertification and strengthening resilience to climate change is key to making nations of the region achieve sustainable development. AI-CD is therefore, a framework of African countries in collaboration with development partners to fight desertification. Seven (7) HoA and eight (8) Sahel countries are participating in AI-CD (Figure 1).

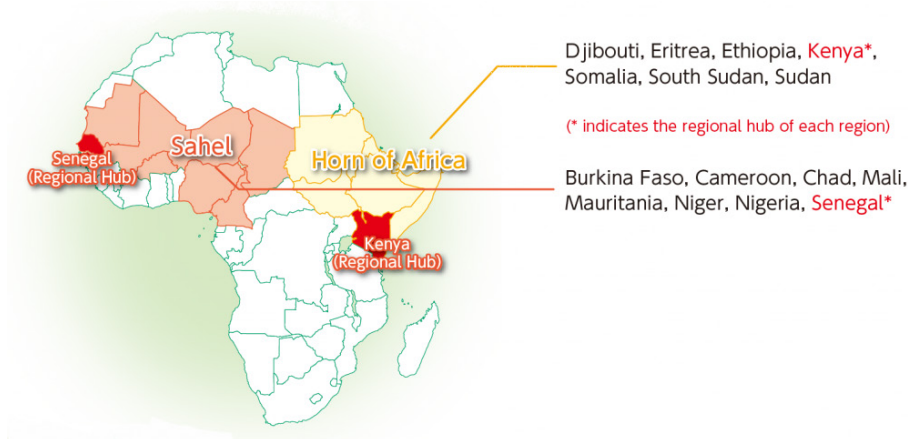


Figure 1. AI-CD participating countries (adopted from AI-CD web site)

The main objective of the AI-CD is therefore, to contribute to making nations and communities resilient to climate change by promoting measures for combating desertification in the Sahel and Horn of Africa. This objective will be achieved through three outputs, namely; Building networks, Knowledge sharing, and Improving access to finance. The actions under each output are as follows:

- a) **Building networks:** A robust network among participating countries and development partners is built for combating desertification and strengthening resilience to climate change in the Sahel and Horn of Africa, and contributing to raising global awareness of desertification.
- b) **Knowledge-sharing:** Knowledge and experiences on combating desertification are shared to enhance the effectiveness of development efforts in the region.
- c) **Improving access to finance:** Access to available international development finance is improved to promote measures for combating desertification in the region.

These outputs can be strengthened through mainstreaming activities on combating desertification through three pillars, namely; Policy and strategies, Institutional building and Implementation at local level.

This Book is a compendium of experiences from HoA countries on what has been practiced to achieve outputs and pillars of AI-CD.

CHAPTER TWO

ACHIEVEMENTS IN APPLICATION OF POLICIES AND INSTITUTIONAL BUILDING STRATEGIES IN HORN OF AFRICA

2.1 Policies and Strategies

2.1.1 High level political commitment

For successful implementation of initiatives and activities towards combating desertification, the implementing agencies within a given country require great support from policy makers. Within the Horn of Africa, the political support for various countries is at different levels and in different dimensions. The highest level of commitment was mainly through the countries ratifying various international conventions related to the environment particularly United Nations Convention for Combating Desertification (UNCCD), and United Nations Framework Convention on Climate Change (UNFCCC). At national level the HoA countries have developed various environmental policies and strategies as a commitment to combat desertification. Below is a summary of the high level political commitments made per country:

Djibouti - High Level political commitment

Combating desertification in Djibouti is incorporated in the national development plans and strategies. The plans and strategies include; National Action Plan for fighting desertification (NAP's), National Action Plan for Climate Change Adaptation (PANA), and Code de l'Environnement. The Ministry of Agriculture (MoA) is the lead implementer of NAP, while the Ministry of Environment leads the implementation of PANA. The MoA is working closely with key national institutions such as the Ministry of Environment, Research and Superior Education, Research Center (CERD), Ministries of Education, Health, Energy and Communication, as well as Non-Governmental Organizations (NGOs) in developing the national plans, strategies and policies. Djibouti also has a Programme and action plan on biodiversity and climate change

Eritrea - High Level political commitment

The Government of Eritrea has released various proclamations, national policies, strategic plans, guidelines and activities geared towards proper use of land and land rehabilitation programmes. These include: The Greening Campaign, Small and Medium Commercial Farmers Strategy, Multinational Environment Agreements, and National Initiative Students Summer Campaign Programmes.

(i) The Greening Campaign

The Greening Campaign was started through government effort to rehabilitate degraded land and reforest Eritrea. The Campaign was launched by H.E. Isaias Afwerki, President of the State of Eritrea on 15th May 2006 at a National Conference. At the Conference, H.E. President Isaias Afwerki declared that “All national events in Eritrea should be accompanied by tree planting. Tree planting should not be left only to volunteers, rather it should be mandatory with clear action plans”. Consequently, 15th May is marked as the National Greening Day in Eritrea.

After launching the Greening Campaign in 2006, a National Committee was established to organize and monitor the campaign in all regions of the country. The Committee set a series of guidelines to manage and monitor annual achievements of the Greening Campaign against measurable targets.

(ii) Small and Medium Commercial Farmers Strategy

Recently, the Ministry of Agriculture developed Small and Medium Commercial Farmers Strategy (SMCFS), which was designed to transform their farming methods and practices within the country to climate-smart agriculture. The SMCFS has two intervention mechanisms: Technological Support and Creating Enabling Environment. The strategic pillars for Technological Support are mainly geared towards soil, water, and energy saving systems. The Technological Support pillars entail; transformation from surface or furrow irrigation to pressurized irrigation systems; change from use of fossil fuel energy to renewable energy resources mainly solar energy; shifting from mono-culture to poly-culture (integrated agricultural system); partial transformation from outdoors to protected cultivation systems; and promoting agricultural mechanization. The pillars for Creating Enabling Environment entail improving access to land and tenure security. Implementation of this pillar will motivate farmers to invest more in their land, thereby reducing land degradation and improving farm productivity. The SMCFS also has various pillars that will enable farmers make best use of their land sustainably and boost their productivity, hence contributing to the country’s food and nutrition security.

(iii) Multinational Environment Agreements and National Initiatives

Policy measures adopted by the Government of Eritrea include ratification of the three most important environmental conventions namely: Convention on Biological Diversity (CBD), United Nations Framework Convention on Climate Change (UNFCCC) and UNCCD, thereby confirming its strong commitment to environmental issues. Eritrea has developed national policies, strategies and programmes towards its obligations under these conventions. The strategies include: National Strategy for Sustainable Development; National Biodiversity Strategy; National Adaptation Programme of Action (NAPA); National Action Programme (NAP); and the National Agricultural Development Strategy and Policy. These documents provide policy direction on how to develop and manage agriculture without adversely impacting the environment.

(iv) Sustainable Land Management (SLM) and Land Degradation Neutrality (LDN)

Various sectoral policies promulgated by the Eritrean Government are in line with the objectives of Sustainable Land Management (SLM) and Land Degradation Neutrality (LDN). The environmental objectives and strategies of different policies at national and sector level give an indication of the magnitude of support they render to SLM and LDN interventions. In accordance with this approach, some cross-sectoral laws such as the Environment Law (2017), the Forest and Wildlife Law (2016), and sector specific laws have been promulgated by the Government of Eritrea to address environmental and SLM issues. All the three environmental-related conventions ratified by Eritrea, national policies, strategies and programmes, as well as sectoral laws have targets on land use that are relevant to LDN.

(v) Students Summer Campaign Programme

In order to restore natural vegetation, the government of Eritrea launched summer work programme in 1994. The programme involves deploying students in different parts of the country to participate in afforestation programmes that include tree planting, water and soil conservation.

Ethiopia - High Level political commitment

Ethiopia is a signatory to the United Nations Convention to Combat Desertification (UNCCD) and has developed Land Degradation Neutrality (LDN) targets. The UNCCD has been endorsed by the Ethiopian Parliament and the mandate to implement the LDN targets is under the Ministry of Environment, Forestry and Climate Change.

At national level, Ethiopia has a Forest Policy and a Climate Resilient Green Economic Strategy, which address issues of combatting desertification.

Kenya - High Level political commitment

The concept of Land Degradation Neutrality (LDN) was developed in 2012 at the UN Conference on Sustainable Development (Rio+20). The recently adopted post-2015 United Nations Sustainable Development Goals (SDGs) incorporate land degradation under Goal 15 on the “Protection and promotion of sustainable use of terrestrial ecosystems, halt desertification, land degradation and biodiversity loss”, while Target 15.3 aims to “achieve a land degradation neutral world”.

Kenya is a signatory to the United Nations Convention to Combat Desertification (UNCCD) which was ratified in 1997. As per the Constitution of Kenya, 2010 Chapter 1 Article 2, any treaty or convention ratified by Kenya shall form part of the law of Kenya

under this Constitution. Therefore, the provisions under UNCDD are part of Kenya laws. One of the main commitments of the Parties to the Convention is to develop National Action Plans (NAPs). NAP serves as a guiding framework for implementation of the Convention at national level. Kenya developed the National Action Programme (NAP) through a consultative and participatory process that involved all the stakeholders. Currently, Kenya has developed its third National Action Plan (NAP) for implementation during the period 2014 - 2024. The NAP takes cognizance of LDN, and it has integrated LDN objectives in its targets aimed at reducing land degradation. Other High-level Political Commitment initiatives that support desertification, land degradation and drought include:

- Enactment of the Forest Conservation and Management Act, 2016, which provides for the development and sustainable management, including conservation and rational utilization of all forest resources for the socio-economic development of the country.
- A National Climate Change Action Plan (2018 - 2022) that promotes reclamation of degraded lands.
- The Ministry of Environment and Forestry has developed a National Strategy for achieving and maintaining over 10% tree cover by 2022
- Kenya has initiated Green Schools Programme, which aims at involving all the country's public schools in setting aside land for growing of trees in their compounds. The Programme aims to assist in greening the country as well as inculcating tree growing culture among children.
- The Ministry of Environment and Forestry and Ministry of Lands and Physical Planning have formulated a comprehensive land use and land tenure policy and reform programmes that have facilitated effective actions on combating desertification in the country's drylands.
- The Judiciary has established the Environment and Land Division Court that has clear mechanisms to facilitated effective administration of laws and regulations governing land and the environment.
- The enactment and utilization of structures under the Environment Management and Coordination Act (EMCA) of 1999 advocates for involvement of all key stakeholders particularly local communities in decision making on environmental matters.
- Every year, Kenya holds a National Tree Planting Campaign as one of the strategies to increase tree cover.
- The Ministry of Environment and Forestry is the focal point to the Multilateral Environmental Agreements. This has strengthened synergies among conventions ratified by Kenya, such as United Nations Convention on Biological Diversity (UNCBD), United Nations Framework Convention on Climate Change (UNFCCC) and United Nations Convention to Combat Desertification (UNCCD) by implementing the decisions and reporting processes.

The broad-based policy instruments have been supplemented by numerous sectoral instruments that have been developed to facilitate achievement of land degradation neutrality (LDN) such as National Water Policy, Forest Policy, Population Growth Management Policy, National Food Strategy, Wildlife Management Policy, and National Policy on Northern Kenya and other Arid Lands.

Somalia - High Level political commitment

Somalia government has enacted laws that protect land threatened by desertification, and provides for the creation of reserves where flora and fauna are protected from exploitation. Activities that cause damage to vegetation or negatively affect all form of life are prohibited. The laws also provide a legal basis for establishing a system of cost-benefit incentives to encourage land protection and rehabilitation by the land-users.

Combating desertification in Somalia involves development of policies and measures to reduce inequalities in ownership of/or access to productive assets (capital, rural infrastructure and land) and reciprocal inputs and care by beneficiaries. Land tenure systems and governing laws define access and enforceable land rights, which regulate management of land resources contributing to reducing desertification. This is of importance to small-scale farmers by ensuring favourable conditions to; manage natural resources sustainably through water retention, pollution mitigation, soil and coastal protection to help prevent environmental degradation and contribute to their economic development.

South Sudan - High Level political commitment

(i) United Nations Convention to Combat Desertification (UNCCD)

To address land degradation and desertification, South Sudan assented to the United Nations Convention for Combating Desertification (UNCCD) on 17th February 2014 and effected on 18th May 2014. The Ministry of Environment and Forestry (MoEF), a lead government institution on environment, in collaboration with Ministry of Agriculture and Food Security (MAFS), with technical support from United Nations Environment Programme (UNEP) Juba Office, are spearheading implementation of South Sudan strategies for combating land degradation and desertification. Under the leadership of MoEF and technical support of United Nations Environment Programme (UNEP), South Sudan held multilateral discussions on adaptation measures within the United Nations Framework Convention on Climate Change (UNFCCC). South Sudan then formulated its National Adaptation Plan of Action (NAPA), which identified five priority areas for effective climate change adaptation. The priority areas include: Agriculture, Environment, Water Resources, Disaster Reduction and Policy and Institutional Legal Framework.

(ii) African Initiative for Combating Desertification (AI-CD)

In 2016 in Nairobi-Kenya, South Sudan embarked on the AI-CD, whose aim is to build resilience of communities to combat desertification, as well as networking, knowledge sharing and improving access to finance. The country was cited as the first African nation to demonstrate commitment to implementation of AI-CD.²

(iii) Interim Constitution of South Sudan, 2011

The Interim Constitution of South Sudan, 2011, vested principles to guide the country's operations to: protect the environment and biodiversity; safeguard interests of future generations; and ensure restoration of land and resources affected by development and management. *For example, Chapter III: Article 173(2) states: "Petroleum and gas development and management shall be guided by the following principles ... (i) Protecting the environment and biodiversity; (m) safeguarding interests of future generations; and (o) ensuring restoration of land and resources affected by development and management".*

(iv) State of Environment and Outlook Report, 2018.

The MoEF with technical support of UNEP Juba Office has issued South Sudan First State of Environment and Outlook Report, 2018.

(v) National Land Degradation Neutrality Targets

The Republic of South Sudan has voluntarily developed Governmental high-level note of measures to achieve the national Land Degradation Neutrality (LDN) targets by 2030 in order to align it to the 2030 Agenda for Sustainable Development (SDG target 15.3).³

The LDN targets are as follows:

- LDN at the national scale; LDN is achieved by 2030 as compared to 2015 (no net loss);
- LDN is achieved by 2030 as compared to 2015 and an additional 10% of the national territory has improved (net gain);
- LDN at the sub-national scale (if applicable/done), is achieved by 2030 as compared to 2015
- LDN is achieved in each of the former 10 states of South Sudan by 2030 as compared to 2015 (no net loss);
- LDN is achieved in the semi-arid areas, northern borders of South Sudan, and around main towns in South Sudan as well as on Dongotono, Didinga, and Imatong mountains by 2030 as compared to 2015 and an additional 25% of the territory has improved (net gain).

² Khamis: JICA's Juba Office representative, personal communication

³ T. Francis Lado (PhD): 20th January 2019.

The prospect is to formulate a wide range of policy measures including transformative projects and programmes. Specific targets to avoid, minimize and reverse land degradation will entail: Improvement of productivity in 21,950.6 km² and 2,194.4 km² Soil Organic Carbon (SOC) stocks in lands of South Sudan by 2030 as compared to 2015; Rehabilitation of 27,019.6 km² of degraded and abandoned land of South Sudan by 2030; Halting the conversion of forests and wetlands to other land cover classes by 2030; Increase in forest cover to 20% by 2030 as compared to 2015, and Reducing the rate of soil sealing (conversion to artificial land cover) by 100% by 2030 as compared to 2015.

Sudan - High Level political commitment

(i) The Sudan Twenty-Five Year National Strategy

The 25-year Sudan Development Strategy (2007 – 2031), highlights the importance of addressing sustainable development through a holistic approach, such as integrated ecosystem management. This approach has been adopted in order to address priority challenges of; desertification and drought, degradation of land and coastal zones, deforestation, climate change, rural and urban land use, urban growth, and loss of biological diversity. Integrated planning and management of land resources requires cross-sectoral aspects of decision-making for sustainable use and development of natural resources including; soils, minerals, water and biota. This broad integrated approach of land resources, which is essential for life-support systems and the productive capacity of the environment, is the basis of the Sustainable Development Goals (SDGs) Target 15.3.

(ii) Relief and Rehabilitation Commission (RRC)

The high-level commitment to addressing desertification issues was recognized following the three events of drought disasters during the 1960s, 1970s and 1980s. In 1986, the Government of Sudan established Relief and Rehabilitation Commission (RRC), chaired by the First Vice-President to help victims of drought events. The Commission facilitated provision of basic services including; health, nutrition and shelter for communities displaced by drought and desertification. The RRC was later expanded to assist all displaced communities including those affected by conflict and insecurity. The Commission was transformed to the Humanitarian Aid Commission (HAC) in 1995. The HAC was further strengthened through establishment of the Ministry of Humanitarian Affairs. The Commission now has representatives from different technical line ministries that are engaged in or related to provision of services in; agriculture, forestry, livestock, water, health, nutrition, education, urban planning and municipalities, which are also affected by climatic factors.

The Government of Sudan also established a Weather Watch Group in 1987 that was transformed into the Early Warning Unit. The Unit coordinates seasonal rainfall, crop forecast, and food security situation.

(iii) Sudan National Action Plan, 2006

The Government of Sudan formulated the Sudan National Action Plan (SNAP) for combating desertification in 2006, through engagement of different sectors to address desertification challenges in the country. The Plan included formulating sectoral priority actions needed for vulnerable areas and regions affected by desertification. The government also established the National Council for Combating Desertification (NCCD) in 2009 and passed a law for desertification control. The NCCD was operationalized in 2015 and a Secretary General appointed to oversee formulation of policies and strategies, and coordination of different programmes and interventions in the country on combating desertification.

(iv) IGAD and CAADP Priorities

The national priorities in the Agriculture sector is articulated in the different government documents, which are aligned to Inter-Governmental Authority on Development (IGAD) regional priorities. The priorities are also in line with the Comprehensive Africa Agriculture Development Programme (CAADP) Framework. CAADP overall framework is essential for harmonizing national policies with those at regional level. Improved coordination of interventions as articulated in government development documents is essential to; ensure effectiveness, build institutional capacity for efficient service delivery, and ensure sustainability. The improved coordination approach was applied in formulation of the Sudan National Agricultural Investment Programme (Sudan NAIP).

IGAD also worked with Sudan and other Member States, to launch a “Drought Disaster Resilience and Sustainability Initiative”, also known as “Ending Drought Emergencies (EDE)”. The initiative aimed at “improving livelihoods and enhancing resilience of drought-prone communities in the Horn of Africa (HoA)”. The Initiative led to the preparation of a Common Programming Framework at country and regional levels with the support of the Technical Consortium (TC) established from the development partners in the region. IGAD and its Member States, and partners have also launched a Regional Platform for Drought Resilience and Sustainability to; build inclusivity and synergies, and provide effective collective action.

2.1.2 Mainstreaming of combating desertification into policies

In recognition of the importance of desertification, land degradation and drought at the national level, countries within the Horn of Africa have incorporated proposed initiatives into their various policy documents and national action plans related to forestry, agriculture, land and general planning including disaster management. In aligning to the Agenda for Sustainable Development Goals (SDGs), Target 15.3 has been integrated. The countries have also integrated LDN targets into their selected national priorities.

Djibouti - Mainstreaming of combating desertification into policies

To meet Sustainable Development Goals (SDGs) Target 15.3, the MoA integrated the fight against desertification and land degradation issues in the Agriculture Development Plan [Programme National d'Investissement Agricole et de Sécurité Alimentaire et Nutritionnel (PNIASAN)].

Eritrea - Mainstreaming of combating desertification into policies

Mainstreaming of LDN into National Policies

A major developmental challenge faced by Eritrea is land management. Consequently, the Government of Eritrea is investing much of its domestic resources in agriculture and Sustainable Land Management (SLM) related activities. Notably, the Government is using social mobilization as an innovative approach to address one of its most compelling developmental challenges through SLM practices. Implementation of the social mobilization strategy is creating positive behavioural change and proving to be an excellent approach to increase and galvanize public support for implementation of the United Nations Convention to Combat Desertification (UNCCD).

The Government adopted Land Degradation Neutrality Target Setting Programme (LDN TSP) voluntarily as it forms part of its continued efforts for sustainable land management. The Government of Eritrea is also committed to environmental conservation efforts, which promote sustainable development in the country. The Government is also committed to promoting interventions on sustainable development in line with various global and regional frameworks.

In Eritrea, formidable work has been done on land protection. However, to make it sustainable, integrated activities are required. Hence, LDN-TSP will contribute to realization of the national, regional and international commitments.

The LDN targets in Eritrea aim to achieve a balance between ongoing land degradation and future efforts to rehabilitate degraded land. The LDN-TSP aims at reaching a neutral status (no net loss of healthy and productive land) by balancing potential gains and losses in terms of ecosystem services and functions that are provided by land resources. Eritrea has set LDN targets at national level as well as Zoba (sub-national) level with the aim to achieve LDN for the entire country. Zoba level LDN targets have also been set for achieving a neutral (no net loss) or improved (net gain) state, allowing Eritrea to focus on areas that have been identified as major degradation “hot spots” and/or are considered to be a high-value priority in achieving LDN. Zoba level administration also gives priority to activities for land cover, land use, land productivity and soil organic carbon in the regions.

Specific targets to avoid, minimize and reverse land degradation have also been defined with reference to specific land cover classes. This is because degradation drivers and processes are usually linked to certain land cover classes and can be addressed by setting targets that are explicit.

Eritrea has adopted the proposed time horizon for achieving LDN targets as the year 2030. This is aligned to the 2030 Agenda for Sustainable Development Goals (SDG Target 15.3). Relevant stakeholders have also been involved in the LDN target setting process, through the LDN national working groups in order to encourage ownership. Effort has been made to ensure that all targets set are measurable according to the LDN indicator framework endorsed at national and global levels. All targets were validated by the national LDN working groups and endorsed by the Government of Eritrea.

LDN Targets at the national scale are as follows:

- LDN is achieved by 2030 as compared to 2015 (no net loss);
- LDN is achieved by 2030 as compared to 2015 and an additional 10% of the national territory has improved (net gain);
- LDN (dissemination of improved Adhanet stoves) is achieved by 2021 as compared to 2015.

Ethiopia - Mainstreaming of combating desertification into policies

Ethiopia has mainstreamed the fight against land degradation, desertification and drought in the country policies, strategies and plans particularly in to both Growth and Transformation Plans I and II.

Ethiopia has committed to rehabilitate 15 million hectares as a national commitment of the Bonn Challenge and additional 7 million ha in New York declaration, hence a national commitment to 22 m ha. The Bonn Challenge decisions have been mainstreamed in the Growth and Transformation Plans I and II and the Country has so far rehabilitated 12 million hectares of land. Ethiopia has also developed a National Drought Plan for implementation.

Kenya - Mainstreaming of combating desertification into policies

Kenya has mainstreamed National Action Plans (NAP) into various national strategies and programmes. Other relevant initiatives include;

- Development of the LDN report and target setting strategy to meet the voluntary set targets such as increasing the land cover up to 15% by 2020.

- Development of strategies that have incorporated issues of increasing tree cover and soil health improvement.
- Development of early warning systems for providing real time data for monitoring the state of environment for remedial purpose. This includes the use of remote sensing to produce land cover maps every month and provision of Normalized Vegetation Differential Index (NDVI) data to monitor and evaluate land degradation.
- Increasing land cover through increased reforestation and reducing land conversion to agriculture and settlement by providing alternative livelihood.
- Development of a gender mainstreaming kit specifying appropriate activities for women, men and children in consultation with the relevant communities. This includes development of indicators for monitoring gender balance in the management and utilization of natural resources, including formulation of a gender strategy that can be used to address gender issues in existing programmes to combat desertification.

Somalia - Mainstreaming of combating desertification into policies

This is undertaken through legislation and policy analysis and adopting conducive legislation and policies for effective biodiversity management. The policies developed that contribute to combating desertification include; National Land Policy, National Forestry Policy, and National Environmental Policy under the Office of the Prime Minister and Ministry of Livestock, Forestry and Range.

South Sudan - Mainstreaming of combating desertification into policies

South Sudan started awareness creation and mainstreaming of the policies of UNCCD at all levels of its government immediately after assent to the Convention in 2014. Within the States, capacity of respective community leaders has been built to strengthen their understanding and implementation of regulations that protect forests from unsustainable utilization. One such regulation in relation to trees states: “cut one and plant five”⁴. In addition, awards and contracts for utilization of forest resources are restricted to the states based on division of labour between the national Government of South Sudan (GOSS) and State Department of Forestry⁵. On division of labour and for the sake of rational utilization, the states administer timber contracts meant for commercial purposes according to the Forestry Policy Framework 2007, as is being effected in Central, Western

⁴ Forestry sector policy 2012-2017

⁵ GOSS, SSDP. 2011-2013. p.90:

and Eastern Equatorial States of South Sudan. The awards and contracts include: issuing permits for forest products such as charcoal, fuelwood, bamboo and grass. Contracts are also awarded to assess, fell and pollard trees in residential areas, as well as avenue trees competing with overhead and underground utilities such as electricity lines and roads. This can be observed in Central, Western, and Eastern Equatorial States. The regulations have existed in Sudan since the British Colonial Era⁶.

To integrate LDN into selected national priorities, the Government of the Republic of South Sudan has undertaken institutional and legislative framework measures to manage land and environmental degradation. The measures include: (i) Passing and signing all environment related bills into law, (ii) Establishment of several bodies to govern natural resources management, (iii) Incorporation of environmental education in school curricula, (iv) Conducting outreach or awareness campaigns, (v) Review of existing legal frameworks, (vi) Incorporation of LDN targets, and transformative projects and programmes into national policies or development plans, (vii) Enhancement of capacity for environmental governance, (viii) Enforcement of environmental law (ix) Generation of environmental data through investing in research, (x) Human resource capacity building, and (xi) Development of state-level legislation. The Development Plan is also aligned to the Agriculture and Natural Resources (ANR) Sector Policy, whose main focus includes sensitization, consultation and planning among stakeholders, thereby advancing the process of commercialization and transformation of the sector. The Plan also includes: strengthening of selected institutions and supporting the livestock, fisheries and forestry, as well as wildlife conservation and protected area sub-sectors. The Plan covers sustainable management of natural resources and protection of the environment, as well as strengthening capacity for disaster preparedness and management (GOSS, SSDP, 2011-13)⁷. In addition, the Plan enables issues pertaining to Land Degradation Neutrality (LDN) that can be addressed through the Agriculture and Natural Resources (ANR) Working Group as outlined in the Land Policy.

Sudan - Mainstreaming of combating desertification into policies

The NCCD updated the National Action Plan in 2018 to cover the six-year period of 2018 – 2024. This process was undertaken in collaboration with the European Union (EU) and the different States. The updating involved conducting of regional workshops and a final workshop at the Federal Level to ensure that the concerns and priorities of the different States were included. Updating of Sudan National Action Plan (SNAP) involved consultation with key representatives from the 18 States of the country, to agree on actions needed for the period 2018–2024.

The NCCD also developed the Sudan report on Land Degradation Neutrality (LDN) in 2018. The Sudan LDN 2018 report outlines efforts to be undertaken to reduce further net

⁶ Professor Nathew Gordon Udo; Undersecretary of MAFS, personal communication

⁷ Government of republic of Sudan, South Sudan Development Plan 2011-2013, pp. 64, 66, 68, 73, 74, 82, 83, 84.

loss of the land-based natural capital relative to a reference state, or baseline. Planning for neutrality involves counter-balancing anticipated losses with measures to achieve equivalent gains, within individual land types, where land type is defined by land potential. Integration of planning for LDN interventions into existing land use planning is also encouraged. Particular attention is paid to projecting and tracking the likely cumulative impacts of land use and land management decisions. Actions to achieve LDN include land management approaches that avoid or reduce degradation.

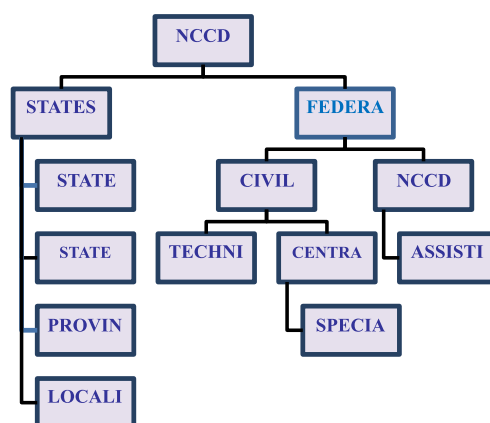
The Government of Sudan has also established an emergency response mechanism reflected in the Civil Defense Authority, which falls under the Ministry of Interior, with the mandate to;

- Organize civil defense operations and issuing necessary directives,
- Delegate power to the State Governors,
- Appoint committees to manage civil defense operations,
- Declare specified areas as disaster area; and temporarily commandeer fixed and mobile assets, water and electrical resources, fuel and transport

A Central Operations Chamber (COC) is linked to National Council for Combating Desertification (NCCD) and is comprised of technical experts from different Ministries. The main role of the COC is to implement decisions and policies endorsed by the NCCD. Each State has its own Operations Chamber, which is chaired by the State Governor and linked to the COC.

Each State prepares its own Contingency Plan, in consultation with the Line Ministries at the State level, civil societies, Non-Governmental Organizations (NGOs) and related stakeholders. These plans of action, with their estimated budget and needs are forwarded to the COC for review by Technical officials from the line Ministries and submitted for approval by the NCCD.

The Desertification Control Law has affirmed the necessity of coordination between the NCCD and the related bodies. The law provides that these bodies should fully coordinate and cooperate with the NCCD and Executive Organ. The Executive Organ should formulate necessary plans to involve institutions in civil defense operations. The plan targets; predicted disasters, on-going disasters, and precautions to be considered after the disaster. The plan also specifies roles and means of coordination. The body responsible for disaster risk reduction planning and implementation is the State Operation Chamber. The chamber normally operates during disasters, which asserts that the concept of disaster management is based on the principles of curative rather than preventive measures. The organizational structure of NCCD is as illustrated.



Organizational structure of NCCD

2.1.3 Country ownership and capacity development

Each participating country has worked towards country ownership and capacity development as a means of formulation and implementation of policy. In all countries, capacity development has been undertaken at all levels i.e. central, regional and community levels.

Djibouti - Country ownership and capacity development

Capacity development is integrated in all strategies, policies, and plans at all levels of government including; central, regional and community levels. Capacity development is usually undertaken as part of activities of ongoing projects. In Djibouti, training related to combating desertification has been undertaken in various fields including: nursery establishment and management; tree planting; management of fenced areas; and water harvesting techniques.

Eritrea - Country ownership and capacity development

Capacity development after Eritrea's LDN Target Setting (2017)

The following training activities have been undertaken:

- Arc-GIS training for over 100 regional (provincial) and headquarters staff, within the Ministry of Agriculture;
- LDN concepts and facts workshops for over 200 regional (provincial) and headquarters staff;

- Participation in various regional and international capacity building platforms;
- Soil and water conservation training for 204 experts and farmers; and
- Various trainings on installation of “Improved Stove” out of which more than 1200 women are actively involved

Ethiopia - Country ownership and capacity development

Ethiopia has invested in capacity development at all levels (central, regional and community), as a means for policy formulation and implementation. Ethiopia has a national capacity building program for implementation of Desertification Land Degradation and Drought (DLDD). The programme, known as National Forest Sector Development Programme, is mainly supported through Norwegian bilateral funding.

Kenya - Country ownership and capacity development

Stakeholder engagement in developing the LDN targets offered a learning platform and awareness creation on land degradation impacts and strategies to combat desertification. Other capacity development opportunities include; Technological and institutional capacities for monitoring environmental degradation and indicators of desertification in drylands through lead agencies such as the Kenya Forest Service (KFS) and the Directorate of Resource Surveys and Remote Sensing (DRSRS), and identification of capacity building needs at institutional and stakeholder level for resource allocations. Capacity development has been incorporated to the devolved government systems through the County Integrated Development Plans (CIDPs). Capacity building has also been undertaken through regional technical meetings and fora for Horn of Africa (HoA), where partner states share experiences and communities have been trained at grassroots level on sustainable land management.

At policy level, the country has participated in JICA Training course on “Combating Desertification to Strengthen Resilience to Climate Change in Sub-Sahara Africa”.

Somalia - Country ownership and capacity development

The Government of Somalia has capacity development programmes to strengthen national cooperation and integration to combat desertification. This includes holding meetings for Federal State members and civil society to discuss issues on; reducing or minimizing the effects of charcoal and other factors that contribute to deforestation, and sharing of knowledge to disseminate to the local level on research results and experiences with other partners. Other capacity development initiatives include; reducing shifting

cultivation to reduce deforestation; minimizing overgrazing particularly for small ruminants during transhumance; using methane gas instead of charcoal for cooking and investing in land improvement and reverse effects of degradation.

In Somalia, capacity development for effective implementation to combating desertification has been undertaken through the following measures:

- Cohesive and result-based programmatic approach towards integrated biodiversity management
- Mass scale awareness on the status of biodiversity, its importance and the road map to rehabilitate the biodiversity
- Encouraging entrepreneurship in community based management on value addition from products and services from biological resources

South Sudan - Country ownership and capacity development

Based on existing legislative frameworks which include: The Environmental Protection Bill (2009), the Southern Sudan National Environment Policy (2009) and the South Sudan Environmental Action Plan (2007-2016), overarching environmental policies and laws were drawn. They make provision for: creation of capacities such as South Sudan Environment Authority, which oversees and administers environmental affairs; coordination and development of environmental standards and guidelines; pollution control and counter measures; drafting of new laws; regulation and enforcement of local environmental regulations; as well as international agreements and conventions. Hence, commitment of the country's leadership in realization of UNCCD and UNFCCC including formulation of country policies and laws demonstrate the country's ownership. It is on the basis of such availed capacities that the country is able to recognize that the civil society in South Sudan is a fundamental stakeholder to actively engage in sustainable development and LDN activities. The Government in collaboration with GIF are working with communities to build capacity through training workshops. The workshops cover: feasibility studies on the establishment of national mechanisms for monitoring of LDN; impact of Sustainable Land Management (SLM); and enhanced data management. Awareness on media and advocacy activities with emphasis on gender equity in SLM is conducted.

Sudan - Country ownership and capacity development

The NCCD structure includes all levels of governance, from the local to federal level. At the local level, the grassroots institutions are represented. These include; local leaders, civil society organization, community organizations such as farmers and producers associations, NGOs, as well as youth and women groups.

The re-organized NCCD structure in 2015 included all stakeholders in the review, updates and follow up of implementation of different interventions as reflected in the Sudan National Action Plan (SNAP). The re-organized structure also reviewed working procedures for smooth delivery of mandates and improved coordination mechanisms.

The capacity building activities that have been undertaken within the NCCD structures and other levels are as follows:

- In 2018, with support from European Union (EU) and Arab Organization for Agricultural Development (AOAD), the NCCD conducted the following capacity building training activities:
 - Trained four technical staff from each of the 18 States on proposal writing and negotiation skills.
 - At State level, conducted orientation and awareness raising sessions on identification of priority needs and proposal writing.
 - Trained staff from the States on Land Degradation Neutrality (LDN).
- Established the Central Technical Advisory Team to help the NCCD Secretariat on technical consultations and guidelines.

2.1.4 Resource mobilization

A major challenge to combatting desertification is limited investment for environmental related initiatives. Within the Horn of Africa, varying efforts have been made by different countries in building suitable networks and establishing structured coordination with development partners, private sector as well as NGOs, in order to mobilize funds for suitable programmes towards environmental protection. The countries have strived to build capacity of staff to; design, plan, elaborate and draft applications for funding as well as capacities for managing complex environmental programmes.

Djibouti - Resource Mobilization

The Government of Djibouti is mobilizing funds from the public-private-partnership initiative through the “Combating Desertification and Sustainable Development National Fund”. However, this initiative has not been effective due to lack of advocacy, information and sensitization to development partners at multilateral and bilateral level. So far, funding has been received from Food and Agricultural Organization (FAO) for purchase of seeds as well as nursery and farm tools supplied to farmers at national level.

Eritrea - Resource Mobilization

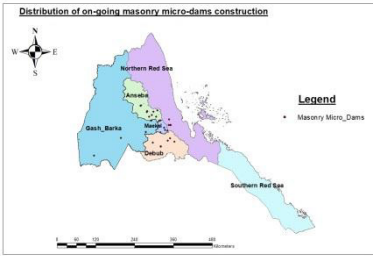
The main resource of the Government of Eritrea towards combating desertification is voluntary public participation in land reclamation programmes. To reinforce this

essential resource, the government has been working with various development partners in different natural resources conservation activities. Among the projects that contributed in implementation of combating desertification programmes are; National Agricultural Programme, Drought Resilience and Sustainable Livelihood Programme in the Horn of Africa - Project II (DRSLP II), and Drought Resilience and Sustainable Livelihood Programme in the Horn of Africa - Project IV (DRSLP IV). Currently, the Government of Eritrea in collaboration with African Development Bank, through Drought Resilience and Sustainable Livelihood Project II and IV – Eritrea Programme is engaged mainly in construction of dams.

Furthermore, there is a growing potential to mobilize additional funding for UNCCD implementation through non-traditional sources using innovative financial strategies. The Government of Eritrea also plans to build upon and consolidate past co-operation with development partners in order to mobilize increased financing and investments into SLM and LDN.

Community Participation in the Construction of Micro-dams

In Eritrea, more than 45 small and medium scale dams are being constructed in collaboration with African Development Bank under the Drought Resilience and Sustainable Livelihood Project II & IV– Eritrea Programme.



Case study for Aderde Village, Keren Sub-zone

Introduction

Aderde is a small village in the North-west of Keren, Anseba Region in Eritrea. A major challenge in the village was shortage of water for domestic and agricultural use. The agricultural land was also heavily degraded.

Intervention

Through project and community participation, an 11 metres high dam with a total water holding capacity of 300,000 m³ was constructed in the year 2017. The Aderde community participated in upper catchment rehabilitation and construction of the dam.



Construction of soil and water conservation structures



Constructed dam wall

Impact

Currently farmers are benefiting from downstream irrigation through cultivation of 32 hectares of land. Soil and water conservation measures undertaken have contributed to protection of the dam, which serves more than 1000 people and 1987 livestock.



Farmers cultivating downstream

Ethiopia - Resource Mobilization

Ethiopia has promoted partnership for financial mobilization with private sector and built capacity to design, plan, elaborate and draft an application for funding.

The Ministry of Environment, Forestry and Climate Change has mobilized resources for combating desertification. For example, the Forest Sector Development Programme and REDD+ programmes, which fall under the Ministry, are undertaking afforestation, reforestation, and participatory forest management funded through bilateral agreement. The Ministry has also received multilateral funds from Global Environment Facility (GEF) and Green Climate Fund (GCF) to carry out large scale impact assessment in areas where restoration activities have already been undertaken.

Kenya - Resource Mobilization

Kenya has sectoral priority areas in which investments are employed at various levels to ensure sustainable development and management of natural resources; reverse adverse trends; rehabilitate degraded areas and/or reclaim wastelands. These include innovative ways of creating alternative livelihood systems in order to spare land and land resources from unsustainable exploitation by the rapidly expanding human populations. These sectoral priority areas include programs and projects in: energy; vegetation cover and wildlife; forest conservation; agriculture and pastoralism; and soil management.

Kenya has developed a Climate Change Act, 2016 which led to establishment of a Climate Change Fund, where stakeholders and county governments can draw funds for preparing proposals. Proposals submitted for this Fund are those responding to impacts of climate change, mainly in building resilience and combating desertification at the local level. The regulations for operationalization of the Fund are being finalized.

Kenya has also developed a resource mobilization strategy for NAP, prepared a profile of all donor agencies and NGOs working in drylands, and developed a coordination mechanism of all donor funded activities in various counties with a view to avoiding duplication of efforts. In addition, Kenya has held roundtable meetings with Development Partners, for example during the AI-CD HoA meeting held in Nairobi in 2019 to mobilize resources. Further, Kenya has received a total of US\$ 655.69 million in the last 5 years from the Global Environmental Facility (GEF) with the primary focus on addressing land degradation, climate change and biodiversity.

Somalia - Resource Mobilization

Resource mobilization is geared to achieving the objectives of implementing the Strategic Plan for combating desertification. This is actualized through Resource Mobilization Strategy, which envisages increased availability of resources to implement the planned activities. The resources will be mobilized from; entrepreneurs, private companies, government, diaspora, charity groups, and bilateral and multilateral agencies.

South Sudan - Resource Mobilization

South Sudan has obtained technical and financial support from international partners such as JICA for UNCCD/AI-CD programmes and projects. Collaboration between JICA and government institutions such as MAFS resulted in formulation of CAMP/IDMP Masterplan⁸, which include resilience building activities for combating desertification and drought. The country is also promoting partnerships with other funding institutions, both international and regional including; Global Environment Facility (GEF), the African Development Bank (AfDB), the Islamic Development Bank (IDB), the United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), the Food and Agriculture Organization of the United Nations (FAO), the International Union for Conservation of Nature (IUCN), the Green Climate Fund, the LDN Fund, and private sector. The engagement aims at financial mobilization for UNCCD and other environmental related programmes. South Sudan continues building capacity of stakeholders in the country to design, plan, elaborate and develop successful application for funding.

⁸ CAMP/IDMP stand for comprehensive agriculture master plan/irrigation development master plan

Sudan - Resource Mobilization

The NCCD is building its partnership mechanisms for fund raising to mobilize formal and informal resources to combat desertification. Such partnerships include; mobilizing private sector entities working in the petroleum and mining fields to restore degraded ecosystems in their operational areas. This involves use of available water for tree planting to reduce contamination and wind erosion of top soil. Other initiatives include promotion of policies for; plantation of shelterbelts, water harvesting and conservation structures, to provide additional moisture for vegetation growth. Private sector companies are engaged and working with NCCD to increase green and tree cover in all industrial facilities to contribute to reducing negative effects of climate change.

The specific activities on resource mobilization undertaken by Sudan are in-built in programmes and initiatives being implemented. Implementation is undertaken in partnership with local community organizations and private sector in the target area. The main initiatives include the following:

- The Khartoum Green Belt Initiative, where private sector companies and associations has been mobilized for fund raising for food security and livelihoods;
- Nile Basin Initiative is a partnership among the Nile riparian states that “seeks to develop the river in a cooperative manner, share substantial socioeconomic benefits, and promote regional peace and security”. The main NGOs in Sudan involved in the initiative are the Sudanese Environment Conservation Society (SECS), Sudanese Women Association, and Sudanese Red Crescent;
- African Green Belt is an initiative to combat the effects of climatic change and desertification: The main NGOs involved in Sudan are the Teleb Society, Al Nabag El Fary, and Kenana;
- Community Forest: The main NGOs are Sahari, Goal, SOS Sahel, Coop, Sudanese Environment Conservation Society (SECS), Sudanese Women Association, and Sudanese Red Crescent);
- National Plan to Combat Desertification: The main stakeholders from the donor community are the EU, IFAD and World Bank. The main stakeholders from the UN agencies are FAO, UNEP, UN-Habitat and UNDP. Other development partners are AOAD, Arab Authority for Agricultural Investment and Development (AAID), and International Federation of Red Cross and Red Crescent Societies (IFRC/SRC);

However, due to the economic sanctions against the country, the only available avenues are regional projects and calls for proposals from multi-lateral donor community.

2.2 Institutional Building

2.2.1 Cross-sectoral and multi-stakeholders approach

Efforts have been made and engage relevant organizations and stakeholders at all levels in the country including; states agencies, private sector, civil society organizations, and Non-Governmental Organizations (NGOs) to contribute towards combatting desertification. The various countries have established multi-sectoral committees and teams that comprise members from different government ministries and non-governmental organizations with coordination being done by the government ministries. The sectors included vary from country to country but include; agriculture, education, finance, forestry, land, local administration and wildlife. This enables all stakeholders to pool efforts towards combatting desertification.

Djibouti - Cross-sectoral and multi-stakeholders approach

Djibouti has established cross-sectoral committees for combating desertification, climate change, and loss of biodiversity. The committees consist of all national stakeholders including; public, communities, civil society, private sector, media representatives and women organizations such as Djiboutian National Women Union (UNFD). The cross-sectoral committees have been successful as they have effective coordination and monitoring of activities. The Ministry of Agriculture and Environment undertakes coordination of activities.

Eritrea - Cross-sectoral and multi-stakeholders approach

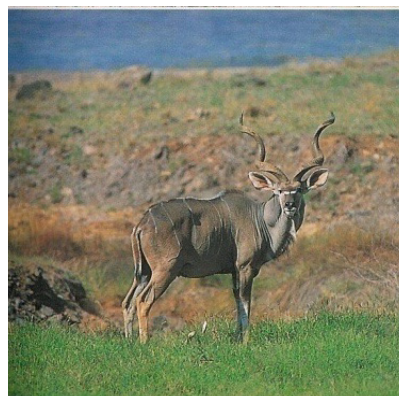
As the issue of land is cross-cutting, the Government of Eritrea has engaged all relevant Ministries, authorities and financial institutions to work together in development of strategies and implementation of activities. For example, during the annual students' summer campaign programme, Ministries of Local Administration, Education, Agriculture, Finance; and Forestry and Wildlife Authority are the lead agencies, while other sectors are also involved. The Greening Campaign is a responsibility of almost all government and private institutions.

Eritrea: Establishment of Forest and Wildlife Authority (FWA)

Forestry and wildlife have been part of the Ministry of Agriculture since Eritrea's Independence in 1991. Although these sectors were doing their best to promote afforestation and wildlife conservation, the Government of Eritrea decided to reinforce their contribution by restructuring them. Thus, in 2012, Forest and Wildlife Authority was officially established. To date, the Greening Campaign is organized through collaboration of the Ministry of Agriculture and the Forest and Wildlife Authority.



A well rehabilitated forest



Some wildlife of Eritrea

Ethiopia - Cross-sectoral and multi-stakeholders approach

Ethiopia coordinates and engages relevant organizations and stakeholders to combat desertification. The Ministry of Environment, Forestry and Climate Change is in the process of establishing a platform for all stakeholders engaged in restoration activities. The stakeholders will include NGOs, government institutions and private sector. Under the framework of Land Degradation Neutrality (LDN) targets set by Ethiopia, the Ministry plans to hold one national workshop to assess the progress.

Kenya - Cross-sectoral and multi-stakeholders approach

The Ministry of Environment and Forestry's Mission is to "*Facilitate Good Governance in the Protection, Restoration, Conservation, Development and Management of the Environment and Natural Resources for Equitable and Sustainable Development*". The Ministry takes lead on matters related to climate change by developing guiding action plans such as the National Climate Change Action Plan 2018 – 2022, that outlines among others, activities and strategies that sectors will employ to respond to challenges of climate change including desertification. The Constitution of Kenya 2010 has outlined mandatory requirement of stakeholder engagement in policy and strategy development processes at national and county governments. Therefore, the process of developing national plans engages a wide range of stakeholders that include; government ministries, departments and agencies, private sector, civil society, non-governmental organizations, academia, development partners and the 47 county governments.

Within the Ministry of Environment and Forestry, various Government departments and agencies such as Kenya Meteorological Department, Kenya Forest Service and Kenya

Forestry Research Institute, collaborate with development partners including JICA, FAO, UNDP, GEF to respond to impacts of climate change and desertification.

Somalia - Cross-sectoral and multi-stakeholders approach

Consultation between local communities, regional, national institutions, and relevant stakeholders involved in combating desertification is organized at government level. The consultations are on issues of sustainable land management challenges which include;

- Reduction of charcoal production by local communities.
- Initiating awareness on protection of forests by communities, regional and national institutions.
- Sharing of knowledge to reduce desertification.

Some of the activities undertaken include:

- Planting vegetation and grass that can control soil erosion
- Integrating land and water management to protect soils from erosion
- Protecting vegetative cover for soil conservation and control wind and water erosion
- Embracing good agricultural practices

South Sudan - Cross-sectoral and multi-stakeholders approach

Under the leadership of the MoEF, efforts have been made to coordinate and engage relevant organizations and stakeholders at all levels in the country including; states, private sector, civil society organizations, Non-Governmental Organizations (NGOs) and International Non-Governmental Organizations (INGOs) to combat desertification. Technical teams are established in the participating institutions to carry out networking. For example, MAFS has formed a sectoral team of National Adaptation Plan of Action (NAPA-Team). The NAPA emerged from the multilateral discussions on adaptation measures within the United Nations Framework Convention on Climate Change (UNFCCC). South Sudan's NAPA identified five priority adaptation activities for effective climate change adaptation. The priorities beside Agriculture included Environment, Water Resources, Disaster Reduction and Policy and Institutional legal Framework. The NAPA teams liaise with stakeholders to identify and communicate priority activities to address urgent and immediate adaptation needs. NAPA-Team also promotes Climate-Smart Agricultural Techniques to improve livelihoods and food security under the changing climatic patterns.

Sudan - Cross-sectoral and multi-stakeholders approach

The different coordination platforms at the various levels in the country's governance structure is an initiative of NCCD to engage and work with different stakeholders to combat desertification in the country. Special priority is given to areas vulnerable to desertification, and areas affected by desertification. Interventions include; water harvesting and conservation measures, use of underground water for planting of shelterbelts and wind breaks, and building resilience of communities in drought prone areas. Other interventions include; reducing use of firewood, and charcoal production by introducing the use of butane gas. To expand use of butane gas, initial financing was provided through the banking system in rural areas of the country. All these efforts could not be achieved without support of different UN agencies and NGOs engaged in activities on climate change and combating desertification. The Private sector is also engaged in NCCD activities, through tree planting activities using improved water conservation technologies. The main actors include; the DAL Group, CTC Group, Hagar Group and Mahgoub Brothers. There are also other private investment companies working in food production, but their main contribution is allocation of 10% of their land for tree planting.

The NCCD works with a permanent committee representing the following stakeholders: National Council for Environment, Ministry of Agriculture and Forestry, National Forest Corporation, Ministry of Animal Resources and Fisheries, Ministry of Water resources and Electricity, Ministry of Tourism, Antiquities and Wildlife, Minister of Federal Governance, Central Bureau of Statistics, Ministry of Finance and Economy Planning, Ministry of Welfare and Social Security (National Council of Population-SDG), Ministry of Oil and Gas, Ministry of Minerals, Ministry of Education, Ministry of Higher Education and Scientific Research, UNESCO chair for Desertification, Ministry of Information, Humanitarian Aid Commission, Sudanese Environment Conservation Society, General Federation of Sudanese Women, Sudanese Federation of Businessmen and Employers and Central Trading Company.

2.2.2. Awareness and Education

Community empowerment, awareness creation, and environmental education are useful approaches to promote wider stakeholders engaged in the fight against desertification. Awareness and empowerment also results in community ownership of any interventions towards combatting desertification.

Djibouti - Awareness and Education

Awareness, sensitization, education and communication to promote a wider stakeholder engagement in the fight against desertification and resilience to climate change are

undertaken regularly through; meetings with local communities, media features on television and radio, brochures in French and local languages, and Ministry of Environment website.

Biodiversity and combating desertification is included in the education curriculum of CRIPEN agency of the Ministry of Education. The main areas of focus of these initiatives are; tree planting, and water harvesting techniques.

Eritrea - Awareness and Education

Community empowerment, awareness creation and environmental education are useful approaches to promote wider stakeholders engaged in the fight against desertification. The Ministry of Agriculture closely works with the Ministry of Information to promote community participation in rehabilitation of degraded land. The main channels for communication include the following:

- 1. **Radio:** The Ministry of Agriculture has a radio programme, which is prepared in collaboration with the Ministry of Information. The programme has been in existence since mid-1990’s. The major target group for this programme is rural farmers. The programme has great influence in sensitizing farmers to adopt Sustainable Land Management
- 2. **Newspaper:** The Ministry of Agriculture has its own weekly “Agricultural Column”. The Column has been in existence since 2011 and is used to sensitize farmers on various agricultural issues including natural resource management.



“Agricultural Column” feature

- 3. **Television:** The Ministry of Agriculture funds a bi-weekly Television Programme. The programme has been in existence since 2018 and is locally known as ‘Fre-tsaeri’. The programme features exemplary farmers in various agricultural issues. The major objective of the programme is to promote sustainable land management to enhance productivity.

4. Events marking

Eritrea regularly participates in the UNCCD COPs by presenting exhibitions on Eritrea's endeavors to combat land degradation, desertification and drought.



Eritrea exhibitions at UNCCD COPs

Eritrea also regularly marks World Day to Combat Desertification by holding a national meeting which is attended by senior government officials including the Minister of Agriculture, H.E Arefaine Berhe. The event is adequately covered by the media to sensitize the public.



A series of media coverage

Ethiopia - Awareness and Education

The Ministry of Environment, Forestry and Climate Change has a department which is involved in public awareness and mobilization of communities through a series of activities on land degradation. The awareness and mobilization is carried out through a series of activities and involves school clubs and youth associations, which create awareness on impact of Desertification Land Degradation and Drought (DLDD) and its implication on mitigation.

Kenya - Awareness and Education

Engagement of people to change their behaviour and seek sustainable livelihood options is critical. This requires reorientation of current education and awareness engagements

into education for sustainable development (ESD). This form of education and awareness focusses on developing competences and values to live sustainably, where resources are harnessed in a way that ensures that plenty is available for use tomorrow and for the next generation.

In Kenyan drylands, community empowerment makes communities appreciate that they live within valuable yet climate sensitive resources, and many have started owning and sustainably stewarding these resources. In order to combat desertification, Kenya has prioritized awareness about the impacts of climate change and the increasing land degradation brought about by the growing population. Every year, the World Day to Combat Desertification (WCD) and World Forests Day are used as platforms to create awareness on effects of land degradation, climate change and desertification. Various platforms are used including the electronic media, and the Ministry's Radio network (RANET).



Marking World Day to Combat Desertification in drylands of Kenya

Kenya is a multi-cultural nation with different cultures and dialects, therefore cultural activities like arts or music serve as important platforms for creating awareness. Cultural and artistic activities are included in all events to mark WCD. We believe that art can initiate a transformation process, which enhances the awareness of people and closer involvement in environment and development issues.

At tertiary education level, a curriculum for climate change has been developed with a wide range of stakeholders in order to mainstream matters related to climate change and desertification in to school programmes. Further, the Kenya School of Government (KSG) where public servants attend refresher training and skills upgrading has introduced a climate change course.

Somalia - Awareness and Education

This involves creating awareness and public participation. Some of the activities undertaken include:

- Environment is integrated into the national syllabus
- National tree planting day
- Use of Weekly Somali National TV programme to promote community awareness on combating desertification
- Collaborating with NGOs that are engaged in environment issues.
- Creating new protected areas

South Sudan - Awareness and Education

Ministry of Environment and Forestry and MAFS with technical support of UNEP provide awareness and training activities to the government sector institutions, civil society organizations and communities on good practices to combat desertification. The information is provided through radio and television. The approach is one of the examples of policy integration in use of media to reach communities to enable them: (i) Reduce deforestation and combat desertification, thereby generating environmental benefits, and (ii) Manage land in a sustainable manner through land use planning to provide a firm basis for future actions, and to descale processes of desertification and deteriorating environmental quality. Furthermore, the Ministry of Education, Science and Technology has included in its policy an element for orienting the pupils in keeping their school environment green by planting ornamentals including edible plants. This element has been incorporated into school curriculum.

Sudan - Awareness and Education

The Government of Sudan believes that without community empowerment and engagement, any development interventions cannot be sustained. The Government, therefore involves representatives from local communities in all programmes and projects for combating desertification. Inclusion of local communities is expected to bring in indigenous skills and knowledge, and lessons learned from previous interventions.

The education system in the country includes environmental courses that vary in complexity depending on level of education, from primary, secondary and tertiary studies. A number of initiatives intended to build awareness and dialogue at the community level have been created through; workshops, videos and radio awareness-raising campaigns. There is need for continuous review and updating of the educational and awareness creation materials, and media packages to ensure that appropriate messages are circulated to the targeted communities and population in the country.

CHAPTER THREE

IMPLEMENTATION AT LOCAL LEVEL

In implementing measures to combat desertification at community level, several activities and good practices should be promoted and adopted. The activities and practices should address challenges related to; Land use planning; Land degradation, deterioration, destruction and pollution; Vegetation degradation and deforestation; Overgrazing; Shortage of biomass energy; Narrow genetic base; Soil degradation; Drought or water shortage; Poverty and poor livelihood practices; Weak community participation in natural resource management; Poor dissemination of good practices; Inadequate information on good practices; Inadequate Indigenous Technical Knowledge (ITK); as well Conflict management.

Some of the good practices that have been implemented within the Horn of Africa countries include the following:

3.1 Djibouti - Good practice at local level

Use of Improved Cooking Stoves to Combat Desertification in Djibouti

Introduction

Djibouti is characterized by arid climatic conditions and is covered by various forms of deserts that include; stony deserts, rocky and stony deserts, sandy and gravel deserts as well as clay deserts. The country experiences a very short rainfall period, with annual rainfall of 150-200 mm. The average temperature is about 31°C. The country is also vulnerable to effects of climate change. It is predicted that temperature in Djibouti will increase by 1.30C in the next 30 years. Due to effects of climate change, the country suffers from rescinding underground water, salinization of water, soil erosion, and land degradation. The main causes of the land degradation in Djibouti include; deforestation and severe soil erosion especially on the grazing and sloppy areas. Deforestation is aggravated by uncontrolled extraction of various wood and non-wood forest products.

In Djibouti, wood is the main source of domestic energy. The rural communities use firewood, while urban populations use charcoal. In the recent past, the price of petroleum-based fuel has greatly increased. This has consequently led to high demand for firewood and charcoal by the peri-urban and urban dwellers, hence leading to increased wood harvesting.

Cooking in the rural areas of Djibouti is done using traditional cook stoves which consist of three stones. These stoves are highly inefficient in wood utilization. In order to increase efficiency of wood use for energy, an improved energy saving cook stove was introduced.

Objective

- Reduce pressure on degraded vegetation
- Promote the stove for efficient utilization of the wood resource

Approach

Djibouti developed a National Action Plan Against Desertification (NAP/UNCCD) in early 2000's and implemented several activities and initiatives that had been developed by the Ministry of Agriculture (MoA), in collaboration with the participating communities and other national stakeholders and partners, including: Ministry of Environment, Global Environment Facility (GEF), Intergovernmental Authority on Development (IGAD), and The International Fund for Agricultural Development (IFAD).

Initial demonstration and promotion of the improved energy efficient cook stove was undertaken in three sites characterized by severe desertification, overgrazing, and deforestation. These three sites were; periphery and poor urban areas of the capital city, Dikhil Region in the south of the country focusing on semi-nomadic women headed households around the main town and Tadjourah Region in the North of the country focusing on the periphery and semi-nomadic women headed households. The project was financed by IGAD among other donors.

Participatory approaches were applied in implementing the improved cook stove activities with selected women groups. Sensitization was also done to other stakeholders such as; men working in charcoal value chain, households, and school pupils. Five (5) women were trained as trainers, and were used to disseminate the technology to local households. For each women group, the technical specifications of the improved cook stove were provided, and the improved stoves fabricated at the local workshops. In each site, fabricated stoves were provided to 100 households. Beneficiaries of the energy saving cook stove technology included households and small scale restaurants in the villages and in towns.

The MoA in collaboration with the Ministry of Environment undertook continuous dissemination and monitoring to assist women groups and small local Non-Governmental Organizations (NGOs) to scale out the improved cook stove technology.

Impact

- Consumption rate of wood and charcoal in the area where the improved cook stove has been adopted has reduced by about 50-55%.
- The Training of Trainers has ensured higher adoption of the technology because farmers learn from each other.

Innovation

Use of cook stoves

Constraints

The main constraints are:

- Disseminating the improved technology in remote rural areas which are difficult to access
- Shortage of skilled labour to fabricate the improved stoves in the nomadic areas

Lessons

- Use of improved cook stove which can be used in combating desertification.
- Sensitization of communities, provision of relevant information and collaboration with the national/regional organizations will contribute to large scale adoption of the technology.

Conclusion

Use of improved cook stove has led to reduced amount of wood used for energy requirements, leading to improved vegetation cover in Djibouti. The improved stoves are a simple and efficient technology for use by rural population, peri-urban households and restaurants in urban areas.

Acknowledgement

The authors acknowledge MoA, in collaboration with United Nations Development Programme (UNDP), GEF, French Facility for Global Environment (FFEM), and Ministry of Environment in undertaking the activity.

Compiled by:

Youssef Daher Roble

3.2 Eritrea - Good practice at local level

The Greening Campaign: Community Mobilization to Combat Desertification, Land Degradation and Drought in Eritrea through Tree Planting, Soil and Water Conservation, Energy Saving Stoves, and Enclosure Establishment

Introduction

Eritrea has a land area of about 125,000 km² with a population of about 3.5 million people. About 60% of the population depends on traditional subsistence agriculture, including crop production and livestock husbandry. Agriculture accounts for 11.6% of the Gross Domestic Product (GDP) (World Bank, 2012) compared to 30.6% for industry, and 57.8% for services. However, agricultural production is affected by many factors including; high rainfall variability with recurrent and long drought periods, continuous land degradation, frequent pest outbreak, and inadequate research and extension services.

The main causes of land degradation in Eritrea include: deforestation mainly due to tree cutting for fuelwood, settlements, overgrazing, and agricultural expansion. These practices contribute to increased incidences of drought; and desertification. The practices have also negatively affected agriculture and forestry sector leading to forest cover decreasing from 30% in 1891 to 2-3% in 2018.



Clearing land for agricultural expansion



Tree cutting for charcoal production

Objective

The overall objective of the Greening Campaign is to rehabilitate the degraded land of Eritrea through community mobilization.

Approach

The Greening Campaign started through government effort to reforest the country. The Campaign was launched by H.E. Isaias Afwerki, President of the State of Eritrea on May 15, 2006 at a National Conference. During the Conference, H.E. President Isaias Afwerki declared that “All national events in Eritrea should be accompanied by tree planting. Tree planting should not be left only to volunteers, rather it should be mandatory with clear action plans”. Consequently, May 15 is marked as the National Greening Day in Eritrea.

After launching the Greening Campaign in 2006, a National Committee was established to organize and follow-up the campaign in all regions of the country. The Committee thereafter developed a series of guidelines to assist in managing and monitoring annual achievement of the Greening Campaign as all the activities must be measurable.

The Greening Campaign consists of several components of which the major ones being:

- Tree planting
- Soil and water conservation
- Establishment of Green Clubs in schools
- Energy saving stoves
- Establishment of enclosures

Tree planting and Soil and Water Conservation

Soil and Water Conservation and Tree Planting are carried out in the following areas:

- In catchments
- Along road sides
- In religious institutions
- In Government institutions
- In schools
- At homesteads and compounds



*Guritat degraded land
in 2010*



*Guritat rehabilitated land
in 2015*



*The late Hagos Dirar
carrying tree seedlings for
planting.*



Gullies on farm land



Stone terrace on farm land



Rehabilitated farm land

The Green Clubs

The Greening Campaign reinforces the promotion of Green Clubs at all levels in schools and colleges throughout the country. Objectives of establishing Green Clubs in schools are to:-

- Shape the attitude of young children towards greening and improvement of the environment;
- Sensitize school children to establish nurseries and plant tree seedlings;
- Introduce Natural Resources Management (NRM) to school children.

Improved stoves

In Eritrea, trees are important energy sources for domestic use, hence contributing to increased deforestation. To minimize the problem, the Government of the State of Eritrea introduced energy saving stoves locally called “Adhanet” (saver). Advantages of the improved energy saving stove over the traditional stove are as follows:

- The improved stove reduces firewood consumption by over 50%.
- Labour and time of women and children who are responsible for fetching firewood is saved.
- Family health is improved as smoke is channeled outside through the chimney.



Traditional cooking stove



Improved cooking stove

Establishment of enclosures

There are two categories of enclosures promoted in Eritrea, namely;

1. National enclosure (within National Parks).
2. Community based enclosures.

The enclosures are divided into;

- Permanent enclosures
- Temporary enclosures

Various activities such as terracing and reseeded of grass are carried out before establishing enclosures. Once the enclosures are established, cut and carry and bee keeping are undertaken among other practices.



Re-seeded grass in terraced enclosure



Enclosure for cut and carry system for livestock feed



Enclosure for bee keeping

Impact

- Since 2006, more than 45 million tree seedlings have been planted to rehabilitate vast degraded land.
- Over 500 Green Clubs have been established across the country and are increasing exponentially every year. However, only 50% of targeted number of clubs have been established.
- Farmers have taken up tree planting at individual level. For example, the late Hagos Dirar planted 67,000 tree seedlings in the name of each Eritrean martyr who sacrificed his/her life for Eritrean independence and safeguarding the country's sovereignty.
- Individuals were given degraded land and survival rate of planted trees is about 100% in most cases.
- Soil and water conservation has been successfully undertaken by communities on farm land resulting in increased crop yield by 20-40% on the average.
- To promote energy saving, more than 150,000 efficient cooking stoves have been installed and are currently in use.
- About 380,000 ha of land has been put under enclosures to promote natural regeneration of trees and grasses.
- Wildlife is flourishing

Sustainability

Eritrea has a historic culture of involving communities in sustainable land management. The Greening campaign is taking advantage of this culture to reinforce land rehabilitation activities. Moreover, it noted that every Eritrean citizen has a right to have a land. However, the land is administered and managed by the Government for the benefit of the general public.

Innovation

- Tree planting is a good practice on catchment areas and save dams and diversions from siltation.
- Improved stove is contributing to saving energy, labour and time.
- Bee keepers are benefiting from the enclosures.
- Farmland soil and water conservation is enhancing land productivity.
- Many endangered wildlife are returning to their habitat and other new ones are emerging

Constraints

The challenges encountering in applying this good practice are:

- Inadequate resources to purchase farm tools, improved stove parts and tools and provision of awards.
- Lack of proper technical tools to document and map the outcomes.

- Low tree survival rate in catchments due to drought

Lessons learnt

- Continuous community mobilization can make a difference in sustainable land management.
- Awarding the exemplary farmers and institutions has a great influence to motivate others.
- Continuous promotion of improved stoves minimizes tree cutting.
- Expanding and protecting enclosures contributes to wildlife conservation.

Conclusion

Community based land rehabilitation can make a great difference if properly managed and sustained.

Acknowledgement

The Ministry of Agriculture, Forestry and Wildlife Authority, The Greening Campaign Management Committee and those who helped in the preparation of this write-up are highly acknowledged.

Compiled by:

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The Minimum Integrated Household Agricultural Package (MIHAP)

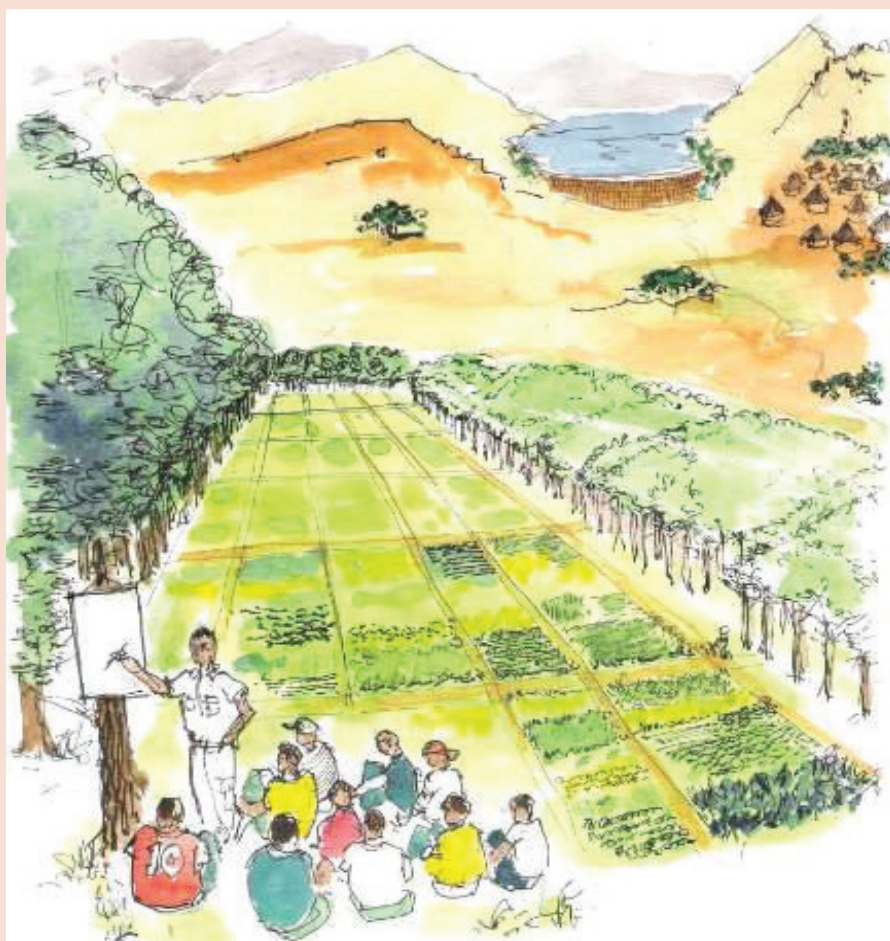
For self-sufficiency in small farm households in Eritrea



An initiative developed and implemented by
the Ministry of Agriculture of the State of Eritrea



Minimum Integrated Household Agricultural Package (MIHAP)



An initiative developed and implemented by the Ministry of Agriculture of the State of Eritrea since 2013.

Background

In Eritrea, agriculture plays a central role in economic development. Boosting farm productivity will provide food and nutrition security, income and employment for the farm households, as well as marketable surplus for urban dwellers, and eventually export/ cash crop production for industry and external trade. Increases in farm productivity are clearly central to economic growth and to the well-being of the population for the foreseeable future. Food and nutrition security and poverty alleviation are always major concerns and new methods must be introduced in order to tackle these concerns.

Since, an estimated 60-70% of the population is dependent on subsistence agriculture; one of the cornerstones of economic development in Eritrea is the improvement in farm productivity and income through diversification of high value commodities and improved technologies. Productivity at farm level has historically been low because of the predominance of subsistence farming, unpredictable rainfall and drought, lack of modern technologies and inputs. Food production has not kept pace with the needs of the country.

Farm production systems in Eritrea are varied; and include rainfed cereal/pulses system, irrigated horticulture system, semi-commercial peri-urban livestock (dairy/poultry), agro-pastoralist system, nomadic-pastoralist system, semisedentary, crop/livestock mixed system, as well as some commercial farming. The majority of the Eritrean farmers in the highlands practice rain fed crop production along small number of livestock (small ruminants and oxen for ploughing). However, its contribution to satisfy the increasing food requirement at the household level has been very limited. Indeed farmers generally produce about 60-70% of their annual food requirements except for good years which can be much higher. The remaining 30-40% is covered by selling their animals or through other activities such as growing horticultural crops, masonry work and working as daily laborers in nearby towns etc.



MIHAP: the concept and objectives

To alleviate this problem, the Ministry of Agriculture has introduced a Minimum Integrated Household Agricultural Package whereby each household/ family will acquire one improved cross-breed dairy cow or 6 shoats (to be kept inside and fed through cut and carry), 25 chicken, 2 bee hives, a vegetable plot and 20 trees (10 fruit trees, 5 leguminous trees like moringa, leucinia, pigeon pea etc. as feed supplement to the cow, 5 trees for fire wood) in addition to the land used for crop production.

This package has the potential to improve the living conditions of the family and satisfy their food and nutrition requirements for the respective family and four others; as well as providing extra money by selling surplus products. The crucial issue is for farmers to concentrate on one improved dairy cow which can provide a minimum of 10-15 liters per day milk instead of having 3-5 milking cows with low productivity. The family will consume 20% of the milk and sell the rest. The dung produced will also help to improve soil fertility of their land. The other component i.e. the backyard poultry is adaptable to

the Eritrean condition and will not need special care or attention in their feeding (as they are free range). They are not very susceptible to diseases and can be easily handled. Eggs produced will provide tasty nutritious food for the family and the rest can be sold to other families. Eggs produced by local hen breeds command a premium price because of their quality. Honey is a very nutritious and organic food which can be used by the family and the huge surplus can be easily sold. Vegetables and fruits which contribute the bulk of the nutrition are also an integral part of the package.

On-farm milk processing (Village or administrative village level milk processing)

Adding value to small scale dairy production is also a powerful tool for reducing poverty, raising nutritional levels and improving the livelihoods of farm households and rural communities. The on-farm or small scale processing of milk at a village level for the production of Artisan Dairy Products can be a way to add value to milk production. It can also create flexibility and provide a buffer to cyclical changes in supply and demand.

With fluctuating milk prices, many farmers desire a more reliable, less cyclical income stream. Many dairy producers consider on-farm processing in order to add-value to the milk produced on their farms by way of, cheese and yogurt production. Butter is already produced in Eritrea on many small dairy farms during the fasting seasons. Generally,



adding value to a product consists of transforming a product to an alternative form that will bring about more flexibility and a better balance between supply and demand as well as increased income. Through this process, consumers receive a high quality product, and farmers receive a new revenue stream.

Expected results

The decision to enter to a new venture such as this should not be taken lightly and like many small businesses, the failure rate for dairy on-farm processing enterprises could be high. Thus in this package the processing will be considered at village or administrative kebab level rather than at individual farm level. While producers may be attracted to the potential for increased value of their milk, consumers have to actually purchase the product before this extra income is realized. Moreover, the successful operation of dairy on-farm village level processing venture requires the farmers to acquire basic knowledge and skills in the following areas:

- Hygienic milk production and handling, quality control and testing
- Hygienic milk storage, preservation, transportation etc.
- Processing and packaging
- Maintenance of milk handling and cooling equipment.

The idea is to go to the basics and look at what people traditionally do to sustain their households. Elements included in the MIHAP are often practiced already in Eritrean rural households (dairy cow, chicken, beekeeping, wood and non wood trees, improved stove, etc.)

Households selected for this package are those who have a small plot of land around water points. The package offers the household both economic benefits as well as social benefits in terms of reducing burdens on women. The initial investment cost per household is high in year one, but the payback period is a maximum of two years. The idea to have a carefully designed modular approach mainly aimed at promoting grass-root-level-agro-development activities at sub-zoba, kebab and village level is a very good one.

Achievement indicators

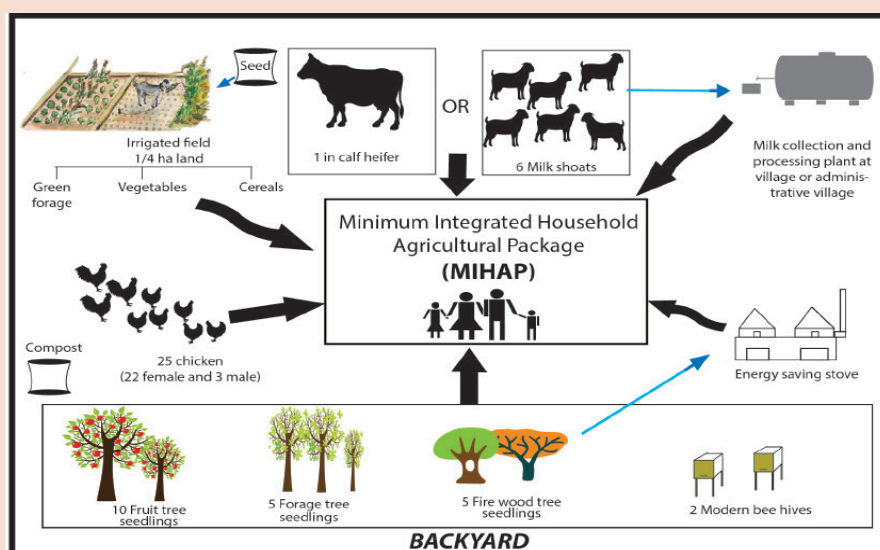
Besides securing household food and nutrition needs, farmers involved in this package and small-scale producers could also play a great role in increasing the supply of agricultural products to consumers as well as helping to stabilize markets. In order to further enhance these development, households could be organized into cooperatives which would also help to promote the whole concept.

This package will ultimately improve the living conditions of the family and satisfy their needs as well as providing extra money by selling surplus products.

If implemented properly, the MIHAP has the capacity to enable farm families become self-sufficient, provide food, nutrition and financial security at household and community level; and provide worthwhile employment for family members and rural communities.

Indicators of the MIHAP can be summarized as follows:

- Reduced number of persons living below poverty line in targeted areas
- Increased income of targeted (beneficiary) households as compared to baseline



- Reduced prevalence of underweight and malnourished children in targeted areas
- Increased number of families having fulfilled minimum household dietary feeding.

Main activities

The concept of the Minimum Integrated Household Agricultural Package needs to be understood by all stakeholders and the following core components need to be systematically put in place if the programme is to be sustainable and have national relevance.

1. This package is community based, around irrigation projects where drip/sprinkler irrigation should be used in order to provide an enhanced prospect of sustainability in the long term.
2. Each individual farmer is expected to have about 0.25 ha which will be utilized as follows:-
 - a. 1000 m² for green forage production
 - b. 1000 m² for food crop production
 - c. 500 m² for vegetable production
3. Each farm household will be provided with
 - I. one dairy cow or 6 shoats
 - II. 25 chicks (22 females and 3 males)
 - III. 2 bee hives
 - IV . 20 trees (10 fruit trees: 5 trees to provide supplementary forage and 5 trees for firewood)
4. It is envisaged that this package will provide sufficient food and nutrition for the participating farm household as well as sufficient supplies for 4 other families.
5. Farmers field school shall be established as part of each project to facilitate efficient technology adoption and experience sharing within the project and in the wider rural community.

Expected output

- Assuming that 95% of the heifers/cows calf and each dairy animal produce around 10 litres of milk per day, about 2,100 litres of milk can be produced in 210 days. If 2 litres of milk is consumed at home (given to calves and children), the remaining 8 litres is expected to reach market. Hence the amount of milk that could be collected and delivered to consumers on daily basis from the milking cow is 8 litres. If the milk is sold for 20 Nakfa per litre, about 33,600 Nakfa will be earned per year. Since the production cost is roughly 50 percent, each farmer would have a net gain of 16,800.00 Nakfa or 1120 USD per year.

- From the 22 female chicken supplied to each household, 20 chicken are expected to survive. It is assumed that 75% of them will start laying eggs at the age of 5.5 months and will continue to provide eggs for 210 days per year. Hence $20 \times 75\% \times 210 = 3150$ eggs will be available in one year. If the family consumes 3 eggs per day, 12 eggs are sold on a daily basis. In 210 days, 2520 eggs are sold at a rate of 3 Nakfa per egg which amounts to 7,560 Nakfa or 504 USD.

- From the two beehives supplied to each beneficiary, 50 kg of honey can be harvested per year. If the 10kg is consumed at home, 40 kgs of honey will be supplied to the market and each beneficiary can earn 8000 Nakfa per year assuming the price of a kilo of honey is 200 Nakfa.

- From the 500 m² of land each beneficiary will harvest variety of vegetables of a value of 800 Nakfa per one cycle. If we have an average of 2.5 cycles per year, the sales is $800 \times 2.5 = 2000.00$ Nakfa. It is assumed 100m² is enough for one family.

- From the 1000 m² of land sown with hybrid maize, each beneficiary will harvest 2 cycles per year. If 6 quintals per harvest is assumed, a total of 12 quintals (1.2 tons) will be harvested. And If 50% of the product is sold at 1500/ quintal, the beneficiary will get a total of 9,000.00 Nakfa per year.

- From the 1000 m² of land developed with forage crops, 4-7 tons (40-70 quintals) of fodder will be produced. This is adequate for the dairy cow and chicks for one year, on top of the other crop residues.

- From the 20 trees, each beneficiary will be able to harvest fruits, fodder and fire wood after 3-5 years. Of the 10 fruit trees, two are enough for the family. The produce from the other eight trees (25kg/ tree) will be sold to the market.

$$8 * 25 = 200 \text{ kg} * 20 \text{ Nakfa/kg} = 4000.00 \text{ Nakfa}$$

Direct cash benefits

	Description	Net income per year (USD)	Net income per year (Nakfa)
1	Milk Sales	1120.00	16,800.00
2	Egg sales	504.00	7,560.00
3	Honey sales	667.00	10,005.00
4	Hybrid maize & vegetable sales	733.00	10,995.00
	Total	3,024.00	45,360.00

Each beneficiary household will earn a net of 3,024.00 USD or 45,360.00 Nakfa per year. This income is considered high when compared to the ordinary government employee's income or in general to the per capita of the country.

Budget consideration

Implementation phase (12 months for each individual community project)

Sr	Description	Unit	Units	Unit cost (USD)	Total cost (USD)
1	In-calf dairy heifer	No	1	3,000	3,000.00
2	Backyard chicken	"	25	7.00	175.00
3	Bee hives	"	2	375.00	750.00
4	Vegetable, forage, cereal seeds	Kg	5	10.00	50.00
5	Tree seedlings	No	20	3.75	25.00
	Total				4000.00

The total cost of establishing MIHAP for each beneficiary household is USD 4000.00 and the payback period is a maximum of two years.

If properly and sustainably implemented, this program will help Eritrea significantly in meeting the poverty and hunger eradication targets of the global Sustainable Development Goals (SDGs) before the set deadline in 2030.

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The State of Eritrea, Ministry of Agriculture, July 2018



3.3 Ethiopia - Good practice at local level

Participatory Forest Management in Oromia Regional National State in Ethiopia

Introduction

Ethiopia is located in Eastern Africa within the Horn of Africa. The country covers a land area of 1,127,127 km² and has a population 102,836,362 persons. Ethiopia receives rainfall ranging from 250 mm -1600 mm per annum. The temperature varies from 6°C - 60°C. The lowest point, Danakil, is 125 m below sea level, while the highest point is Ras Dejen at 4,620 m above sea level. Ethiopia is currently promoting three pillars of biodiversity conservation namely; conservation, sustainable utilization, and access and benefit sharing. Although the country is rich in biodiversity resources with over 6000 plant species, these resources are under threat from; deforestation, over-exploitation, climate change, invasive species, overgrazing, population pressure, inappropriate use of chemicals, and theft of genetic resources. Deforestation and the resulting environmental degradation is a major problem in Ethiopia and is a key factor affecting; food security, community livelihood, and sustainable development. Between 1955 and 1979, over 77% of the country's forests were lost and the country continues to loss 8% of its remaining forests annually. Participatory Forest Management (PFM) has been identified as one of the strategies to protect forests and enhance livelihoods of communities who use and benefit from the forests. PFM was first introduced to Ethiopia 20 years ago, but the approach is expanding to cover larger areas of forests across the country.

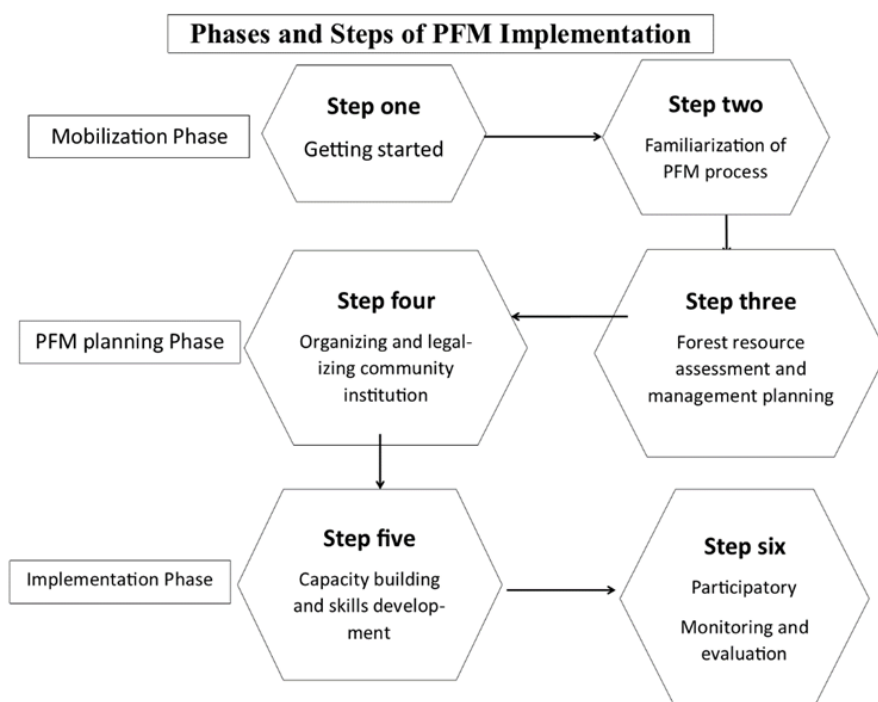
Objective

PFM was introduced in Ethiopia to;

- Mitigate biodiversity loss, forest degradation, and deforestation
- Improve livelihoods of forest adjacent communities by giving them rights to utilize forest resources legally and sustainably.

Approach

PFM in Ethiopia is undertaken in three phases: mobilization, planning and implementation phases.



Impact

- Impacts of PFM on forests include:
- Improved regeneration of trees
- Sustainable use of forest products
- Improved biodiversity
- Minimized forest fire incidences
- Reduced protection costs

Sustainability

Some of the factors that contribute to sustainability of PFM include:

- Existence of good practices in the Forestry Sector
- Government commitment to scaling up best practices
- Existence of strategies and development plans including Climate-Resilient Green Economy (CRGE) and GTP for implementation of PFM.

Constraints

- Some of the constraints affecting success of PFM include:
- Inadequate skills and knowledge on PFM
- Inadequate resources
- High staff turnover

- Inadequate participation of beneficiaries
- Lack of appropriate phasing out or exit strategy for externally funded projects; and,
- Poor forestry extension service.

Lessons learnt

- Communities are capable of achieving forest conservation if they are involved through participatory approaches
- PFM can contribute to forest restoration and improvement of livelihoods
- Communities not only benefit economically from use of forest products, but are also empowered in decision making, thus contributing to good governance
- PFM offers great potential for expansion of forest-based income
- The potential of PFM has not been fully realized.

Conclusion

- Forests under PFM are expanding in coverage in Ethiopia. The management strategy has good intentions to sustainably manage forest land and contribute to poverty reduction.
- Implementing PFM is a sustainable land management strategy that has been shown to be effective and successful. This management strategy can minimize secondary effects on neighbouring forests.



*Adaba Dobola PFM
Area*



Adaba Dobola PFM Area



Bonga PFM Area

Acknowledgement

This good practice is from Ethiopia

Compiled by:

Yemiru Tesfaye, Melaku Bekele, Hussien Kebede, Fekadu Tefera Habtemariam Kassa and Mokennen Alemu Meshesha

3.4 Kenya - Good practice at local level

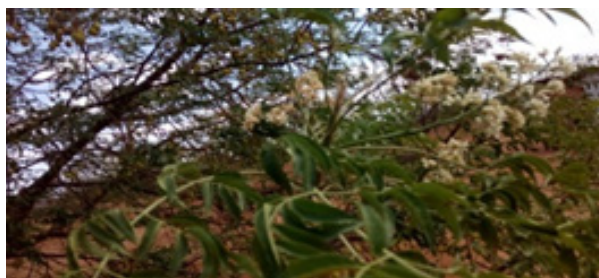
Growing *Melia volkensii* for Improved Livelihood and Environmental Conservation in Makueni County, Kenya

Introduction

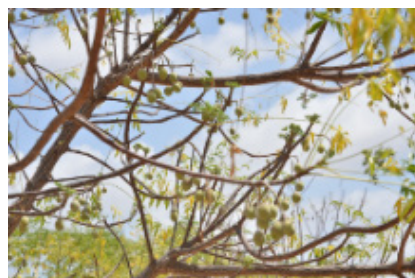
Makueni County is located in Eastern Kenya and lies between latitude 1° 35' and 3° 00' South and longitude 37° 10' and 38° 30' East. The county is generally dry exhibiting semi-arid conditions. The average annual rainfall and temperatures are 600 mm and 23°C respectively. Rainfall is bimodal with long rains occurring from March to May and short rains from November to December. The short rains are more reliable than the long rains with about 60% of the annual rainfall being received during the short rains. The soils are primarily sandy and acidic in nature.

Makueni County is characterized by a rapidly growing population, water scarcity, falling food production, and low resilience to climate change. These challenges lead to food insecurity, low income, and malnutrition for many small holder farm families.

Economic empowerment for farmers living in Makueni lies in diversification and investment in low risk ventures such as growing of appropriate high value trees. A suitable candidate is *Melia volkensii* (Melia, Mukau), a tree native to drylands of Eastern Africa. The tree is deciduous (sheds leaving in the dry season), fast growing, drought tolerant and produces high quality timber that is termite resistant. Other products include; poles, posts, fodder, bee forage, medicine, and firewood.



Flowering Melia tree



Fruiting Melia tree

Objectives

Objectives of growing Melia on-farm include:

- Diversification of farmer's income sources
- Environmental conservation
- Adaptation and mitigation to climate change

Approach

Over the years, rainfall in Makueni County has been declining leading to low crop production, hence the need for other investment alternatives such as tree growing. Melia growing was introduced on-farm after identification of the species as suitable for growing in dryland conditions, and training model farmers such as Mr. Jonathan Kituku by KEFRI.

To establish Melia, site preparation is carried out through; clearing of land, fencing, ploughing, harrowing and levelling. Planting holes should be 45 cm deep x 45 cm wide x 45 cm long and spaced at 4 m x 4 m. Melia seedling should be planted at the start of the rainy season.

Management of the tree is through weeding twice per year for the first three years, and pruning which is carried out through removal of buds (de-budding). De-budding begins three months after planting, and is carried out up to two thirds of the tree height until a desirable clear bole is attained.

Impact

Growing of Melia has improved farmers income through; sale of Melia seed, seedlings, timber and firewood. One kilogram of Melia seeds sells at between Ksh 5000 and Ksh 8000 (~US\$ 50- US\$ 80) while a Melia seedling sells for Ksh 50 (~US\$ 0.5). Value of a mature tree is about Ksh12,000 (~US\$ 120). Value addition to Melia tree can be done by sawing to timber.

Growing of Melia has contributed to; soil and water conservation, improved soil fertility, enriched bio-diversity and improved resilience to climate change. Trees have also improved microclimate on the farm, aesthetic value and act as windbreak.



A farmer's housing before growing Melia



Improved farmer housing after continous sale of Melia products

Innovations and Success Factors

Melia growing has been adopted by many farmers in Makueni County. Adoption has been enhanced through training of melia growing farmers and raising seedlings in their own nurseries

In order to increase quality and volume of Melia timber, Mr Kituku increased the tree

spacing from initial 4m x 4m which was introduced by KEFRI to 5m x 5m, 6 m x 6m, 7m x 7m, and plans to increase to 8m x 8m. The farmer also intercrops Melia trees with green-grams and natural pasture grasses to diversify income sources.



On-farm Melia tree nursery



Melia trees plantation established on-farm



Making hay from grass growing naturally under Melia trees



Melia trees having shed leaves during the dry season

Constraints

Some of the constraints experienced by the farmer include:

- Livestock damage to trees
- Diseases incidences especially canker

Lessons learnt

Some lessons learnt include:

- Farmer modification to technology maximizes productivity
- Farmers raising their own Melia seedlings ensures sustainability as seeding are available at planting season
- Intercropping Melia trees with food crops and pasture grasses ensures food security and increased income

Conclusion

Growing of Melia is a viable enterprise and has potential to; improve farmer's income, conserve environment, and enhance mitigation and adaptation to climate change. The

practice has been widely adopted within Makueni County.

Acknowledgement

The authors acknowledge Mr. Jonathan Kituku of Kibwezi, Makueni County for providing information on growing Melia which enabled the compilation of this manuscript.

Compiled by:

Samson Fessehatsion, Major Brhane, Dawit Mebratu, Aquilino Lado, Mary Sitina, Justin Igu, Damaris Mwende, Michael Mukolwe, James Gituri and Teijima Shigenharu.

Natural Pasture Improvement for Enhanced Livestock Productivity in Makueni County, Kenya

Introduction

Makueni County is classified as arid and semi-arid lands (ASALs) and is characterized by low rainfall of about 150 - 650 mm per year and high temperatures that range from a minimum of 12°C to a maximum of 28°C. Much of the county has suffered environmental degradation mainly due to poor land use systems. The key drivers of land degradation in the county include: land fragmentation, land use change, over-exploitation of woodlands, overstocking, soil erosion, loss of biodiversity, and spread of invasive plant species. As an adaptation strategy, farmers in Makueni County who are mainly livestock keepers, are now adopting technologies that can improve productivity of both land and livestock through growing of natural pasture grasses. One such farmer is Mr. Jeremiah Ngaya, a farmer in Makindu, Makueni County who adopted pasture improvement technology in 2008. The farmer's intervention involves growing a range of natural pasture grasses adapted to semi-arid climatic conditions.

Objectives

Objectives of growing natural pasture grasses are to:

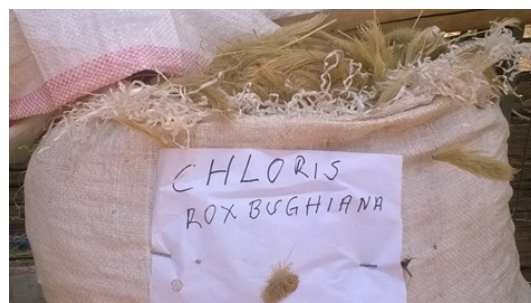
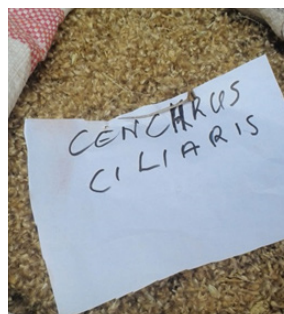
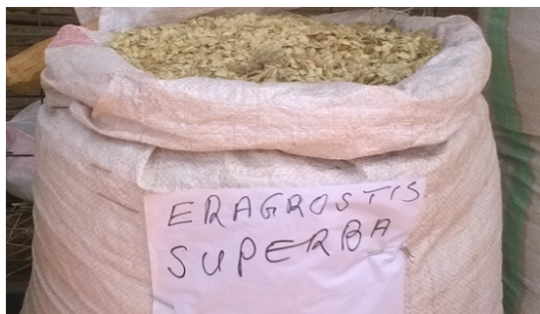
- Enhance livestock pasture availability throughout the year.
- Improve livestock productivity.

Approach

Natural pasture grass farming was introduced after several years of crop failure and environmental degradation within Makueni County. The practice was identified, and established after consultation between research institutions within Makueni County and the local community. The community was instrumental in identifying indigenous pasture grass species that originally grew in the area. The four main grass species identified and selected for re-introduction were; Maasai love grass (*Eragrostis superba*), Foxtail grass (*Chloris roxburghiana*), African foxtail grass (*Cenchrus ciliaris*) and Bush rye (*Enteropogon macrostachyus*). The grasses were selected based on their resilience and ability to provide high quality feed even in the dry season. Grass seeds were then supplied by Kenya Agricultural and Livestock Research Organization (KALRO) formerly known as Kenya Agricultural Research Institute (KARI).

To establish the pasture grasses, land is prepared using oxen-plough before on-set of the rains. The different grass seeds are mixed in an equal ratio and broadcast at a rate of 3-5 kg per ha after which they are thinly covered with a layer of soil. The grass crop can be managed for either seed or hay production. Seed is harvested when over 60% of the seed heads of a given grass type have turned golden brown. Harvesting is done during the dry season. High quality hay is derived from harvesting pre-seeded grass. For hay harvesting grass is cut at about six inches above the ground. Harvesting is mainly done by women using sickle cutters while men bale and store the hay. Hay may be dried under shade and

then stored in a dry cool place. About 300 bales of hay can be harvested from one hectare under pasture grass. Re-planting of the grass is done after 6 to 7 years.



Natural pasture grass seeds from Mr. Jeremiah Ngaya's farm



Scattered grass after 6 years



Land preparations using an ox-plough



Mr. Ngaya demonstrate seed sowing in furrows created by ox-plough

Impact

- The farmer has diversified sources of income through sale of grass seeds, hay and livestock products such as milk.
- The farmer now has healthy animals that fetch high prices in the market, leading to improved living standards.
- The farmer harvests 150 - 200 kg of seed from 1 acre of land. The seed sells at about Ksh 400 - 800 per kilogram fetching a minimum of Ksh 60,000 from 1 acre, an area which initially yielded Ksh 10,000 from sale of maize crop. The average milk yield in Makueni County has also increased (Table 1).

Table 1: *Average milk yield in Makueni County before and after introduction of pasture grasses*

Type of livestock	Amount of milk per animal per day (litres)	
	Before introduction of pasture grasses	After introduction of pasture grasses
Cattle	0.9	2.5
Goats	0.1	0.2

- Other land users have gained knowledge on the practice from Mr. Ngaya leading to social cohesion.
- There is a general improvement in aesthetics as the area is now greener due to grass cover.
- Conflict has reduced after introduction of the practice since other farmers have access to pasture and hay.
- As pasture is available on-farm, farm families save time which can be used for other activities.
- The practice has created employment opportunities from harvesting of grass for seed and baling hay.
- Reduced soil erosion as land is now covered by grasses.
- Use of land that was previously idle and neglected due to degradation.

Sustainability

Mr. Ngaya is able to sustain pasture production on his land and build capacity of local community on the good practice without external support. The local community has adopted the practice, which is coordinated through a pasture farming group.

Innovation and Success Factors

- The farmer has formed a grass pasture farming group to ensure production and multiplication of quality seed and hay in quantities that can meet local and external markets.
- The farmer introduced cut-off drains on his land to enhance water harvesting and water infiltration into the soil.
- The area under the practice was expanded from an initial 2 ha to over 32 ha due to increase in demand for hay and grass seed.
- The farmer leases sections of his pastureland to other farmers for grazing during the dry season, therefore, increasing his income base.
- There is continuous learning from relevant institutions therefore improving knowledge base on pasture management.
- The farmer gets links to market through institutions and individuals who visit the farm.

Constraints

The challenges encountered in applying the good practice include:

- Termite damage to grass
- Prolonged drought
- Demanding process of obtaining permit to export grass seed

The farmer counters the challenges by; terminating queen termites, constructing water harvesting structures, creating awareness and lobbying, respectively.

Lessons learnt

- Drylands have potential to produce improved natural pastures, grass seeds and hay to sustain livestock productivity throughout the year as well as generate income to improve farmers' livelihood.
- Sharing knowledge through community sensitization, farm visits and training-of-trainers offers a good learning platform for farmers.
- Adoption of improved natural pasture management has reduced conflict on grazing land.

Conclusion

Adoption of improved natural pasture growing in the drylands enhances pasture availability, livestock productivity and improves farmers' livelihood as well as resilience to climate change.

Acknowledgement

Mr. Jeremiah Ngaya is acknowledged for his informative interaction and willingness to share information on the good practice which enabled compilation of this extension material.

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3.5 Somalia - Good practice at local level

Production of Frankincense for making Uunsi Fragrance in Erigavo District, Somalia

Introduction

Erigavo District is located in central Sanaag region of northern Somalia. The District is the largest and most populous in Sanaag region. About, 10 km to the north of the Erigavo

are remnants of a juniper forest, found along the edge of the escarpment overlooking the Gulf of Aden. The escarpment is approximately 2,000 m above sea level. The Erigavo settlement within the District is several centuries old and lies approximately 60 km from the ancient northern town of Maydh. The area is also known for its numerous historical tombs. Climate in Erigavo is semi-arid. Despite its location in the tropics, temperatures rarely exceed 30°C due to its high altitude. The Erigavo receives less than 400 mm of rain annually. Monthly average temperatures range from 14.3°C in the month of December to 19.7°C in the month of July. Absolute minimum temperatures are sometimes below 0°C.

Objective

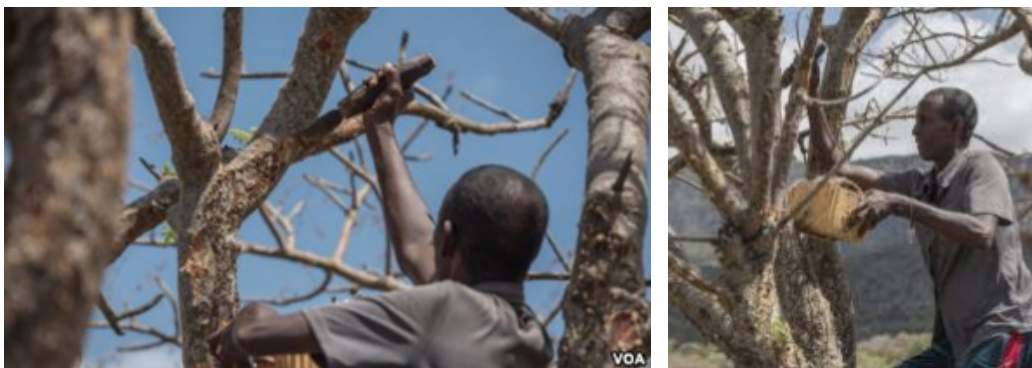
- To Improve farmers income
- To enhance socio-cultural values

Approach

Frankincense is an aromatic resin used in incense and perfumes and is obtained from *Boswellia sacra*. *Boswellia* is a small deciduous tree, growing to a height of 2 to 8 m, with one or more trunks. Its bark has a paper texture and can be easily removed. The tree has compound leaves with odd number of leaflets, which grow opposite to one another along its branches. The *Boswellia* harvested in the North Eastern Bari area of Somalia is believed to produce resins with unique scent and stickiness.

To produce the perfume, a resinous sap is harvested and extracted by making a small, shallow incision on the trunk or branches of the tree, or by removing a part of the bark. Once the incision is made, a milky substance that coagulates once in contact with air and sap is collected by hand.

Somali (uunsi amber) fragrance is blended by combining the age-old art and recipe of natural handmade bakhoor, which is made from a variety of classical and exotic attars (oils). Each fragrance is enriched with various natural ingredients including; agar wood, aromatic wood, sugar oud, musk, exotic flower essence and essential oils, floral waters and frankincense (luban). Somali (uunsi) fragrance is boiled while the conventional bakhoor is baked. The fragrance is of premium quality and is handmade.



Harvesting of gum from the tree



Sap/gum draining from the tree



Processed gum

Impact

Social economic: increased farmers income from production of Uunsi amber

Socio-cultural: Uunsi amber releases fragrance that is pleasant to smell and refreshes the environment.

Ecological: Boswellia trees are conserved thus enhances biodiversity

Sustainability

- The resin is produced by tapping the trees and thus there is no destructive harvesting
- Livelihood of communities are improved

Innovation

- The fragrance is also used in medical field for; improving gut functions, alleviating asthma attack and curing certain types of cancers.
- Production of the fragrance is itself an innovation

Constraints

The challenges encountered in applying the good practice include:

- The tree only grows in northern part of the Somalia
- Prolonged drought and winter season in the area affects resin production.

Lessons learnt

- Farmers can produce fragrance without modern technology
- Boswellia sacra tolerates harsh environmental conditions and can grow in calcareous soil

Conclusion

Uunsi amber is a traditionally make perfume incense, an activity mainly undertaken

by Somali women. Perfume making is a viable enterprise with a potential to improve farmer's income.

Acknowledgement

Mr. Kenadid Mumin Cali is acknowledged for collecting, documenting and sharing the good practice.

Compiled by:

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3.6 South Sudan - Good practice at local level

Construction of Dykes for Building Resilience of Argo-Pastoralist Communities in Flood Plains of South Sudan

Introduction

South Sudan has flood plains known as Eastern and Western flood plain zones. The Western flood plain zone is highly populated. Both zones experience seasonal flooding besides drought. The flooding is caused by either direct rains or overflow of rivers or streams into large spaces. Flooding occurs every year during rainy seasons between May and October. This causes destruction in the area and many people lose their property including livestock, and homes. Cultivated fields become waterlogged thus destroying crops, while roads became impassable, subsequently compromising food and nutrition security. Flood period is therefore characterized by hunger, sickness, as well as livelihood disruptions. The agro-pastoralists are often forced to move out of flooded to safer areas.

Soils in the flood plains are predominately heavy black cotton soils; which have low water percolation capacity. The plains are of low gradient; almost flat leading to water stagnation. Flooding and the associated challenges require advanced technology to be efficiently controlled and mitigated. However, many of the available technologies are not affordable to agro-pastoralists within the flood plains of South Sudan. The agro-pastoralists therefore continue to apply their traditional subsistence agriculture practices and transhumance livestock rearing systems, both of which are not resilient to flooding. To build the communities resilience, use of dykes to control flooding has been identified as a viable practice.

Objective

Construction of dykes to build resilience of the agro-pastoralist communities inhabiting flood prone areas of South Sudan

Approach

Implementation of this activity is an initiative of the Ministry of Humanitarian Affairs and Disaster Management (MoHDM) of South Sudan. The ministry works through Inter-Ministerial Committee which is responsible for making necessary policy decisions. MoHDM through its coordinating body - Relief and Rehabilitation Commission (RRC), has structures at state and county levels. The RRC also supervises humanitarian agencies that support affected communities.

At community level, formal messages on prospective hazards and any support from the government is communicated by the chiefs or the elders. Communities mobilize themselves and meet to develop precautionary plans of action. Usually, the prospective actions are communal, with communities offering free labour.

To mitigate flooding, materials such as sand-filled sacks are used for construction of dykes. Canals are dug using tools such as one or/and two edged diggers including hoes, and shovels. The dykes are built either by heaping up earth into wall-like structures around houses and settlements. The dyke construction is done prior to but just before the rain. The height of the dyke should remain above flood level.

Impact

- Resilience of the agro-pastoralists to floods is enhanced.
- Incidences of death of livestock and humans are avoided.
- Destruction of crops and homesteads is minimized and thereby wealth is preserved.

Sustainability

The following is necessary for sustainability of the initiatives:

- Existence of early warning system and access to information for all stakeholders.
- Continued awareness creation and sharing of information on flood mitigation strategies ensures wide scale adoption of the use of dykes.
- Availability of free labour which mostly comprise youth.
- Availability of technical support by the government authorities and partners to the agro-pastoralists such as agricultural extension packages, including veterinary services.

Innovation

- The change to use sand-filled sacks for dyke construction was a modification from use of earth heaped dykes. The advantage of the sand-filled sack dyke is that it is more durable than bare earth dyke. In addition, construction of sand-filled sack dyke entails little digging, but digging and collection of soil for earth heaped dykes is labour intensive.
- A combination of the dykes and upland settlement complements strength for protection as dykes do not suppress water flowing down but only prevent its inward/outward flow. This is why homes/homesteads are built on up slope.

Constraints

- Cost and availability of sacks in the markets and when available they are expensive.
- High cost of tools.
- Excessive rains that prolong flooding

Lessons learnt

- Early warning system is an essential tool for alerting and preparing communities to take precautionary measures against impending hazards.
- Inhabitants of flood prone areas should stock food, medicine and other essential goods to avoid shortages.
- Schooling calendar in flood prone areas requires adjustment to prevent incidences of children getting drowned in the flood waters.
- There is need to create alternative livelihood sources to compensate for non-crop production during flood period. For example, although floods are a hazard, they provide opportunities for harvesting fish for the household nutrition. In addition, cultivation can be carried out for production of food in receding floods. Furthermore, as water recedes, milking cows return closer to homesteads and with availability of green grass for them to feed on, enough milk can be obtained for consumption and selling for income.
- As flooding is a natural, but hazardous, it may not be prevented and hence mitigation and adaption are the only options to addressing the problem.

Conclusion

Floods are natural phenomena and those who inhabit flood prone zones can only attempt to adapt to it through mitigation measures. In South Sudan, majority of inhabitants in the flood plain being agro-pastoralists, thus they depend on subsistence agriculture and livestock rearing. This involves transhumance life style, and the inhabitants can hardly afford the costs and use of high technologies for mitigation of the flood circumstances. Simple and affordable innovations can improve and build resilience of the affected communities for adaptation in the flood prone areas.

References

- Progress in the Implementation of the IGAD Drought Disaster Resilience Initiative (IDDRSI) in South Sudan.
- South Sudan Country Programming Paper to End Drought Emergencies in the Horn of Africa.
- The Economic, Cultural and Ecosystem Values of the Sudd Wetland in South Sudan: An Evolutionary Approach to Environment and Development.

Compiled by:

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3.7 Sudan - Good practice at local level

Sand Dunes Fixation for Livelihood Improvement and Resettlement in Desert Areas of North Kordofan State, Sudan

Introduction

North Kordofan State in Sudan lies between latitudes 300-27' and 220-23' east and longitudes 140-12' and 160-18' north. The State has a population of about 354,000 people, whose livelihood activities are predominately agricultural in nature, mainly shifting cultivation and traditional livestock rearing systems. Bara is a region within the North Kordofan State. The region is semi-arid and receives rainfall of 150 - 250 mm per year. The soils are sandy in nature with low fertility. Large sand dunes are common in north and west of Bara. Due to climatic conditions of the area and overgrazing, natural resources have been heavily depleted leading to land degradation. This has resulted in negative environmental, economic and social impacts, which require urgent attention through prioritization of relevant development programmes and plans. A project was therefore undertaken in the area through the Arab Center for Agriculture (AKSAD), and Ministry of Agriculture and Forestry of Sudan. The project was designed to combat desertification and rehabilitate the desert areas.

Objectives

- Rehabilitation of desert areas through sand dunes fixation
- Resettlement of the inhabitants of the area.
- Improve community livelihood and food security.

Approach

Vegetation recovery and enrichment planting was undertaken through broadcasting of seed in target areas. Some of the main species used in the vegetation cover enrichment planting and mechanical fixation include; *Banicum* species, *Cenchrus* species, and *Zornia diphlla*. Planting for reforestation purpose was done at the beginning of the rainy season. In areas that receive 250-400 mm rainfall per year, *Acacia senegal* and *Leptadenia pyrotechnica* were preferred. These species have shown fast growth and high survival rate of up to 80% in plantation establishment.

Sand dunes fixation

Sand dunes fixation is undertaken through mechanical fixation and bio-fixation.

Mechanical fixation of sand dunes

The area affected by sand dunes is 80% of the north east region of Sudan. The sand dune carrying winds are dominant in the winter season. Three types of mechanical fixation techniques have been adopted in the area. These are: Rectangular, circular, and square.



Mechanical fixation of sand dunes



Bio-fixation of sand dunes

Impact

- Stabilization of sand dunes
- Reduced wind speeds leading to improved growth of plants.
- Change in behaviour of individuals and pattern of construction: The local community is now using sand bricks in construction, as opposed to using wood, thereby reducing the number of trees cut for construction purposes.
- Increased vegetation cover.
- Improved plant and animal biodiversity through annual and perennial plants such as Saial and Seder, and the return of small burrowing animal.

Sustainability

The method is simple, easy to implement, using low cost locally available materials and therefore easy to disseminate.

Innovation

- Sand dunes fixation technologies have been disseminated by local communities to other areas of the state such as Umm Quzin, Hamra al-Waz and Namla village.
- Collaboration between national and regional institutions working in the region has contributed to successful implementation of the project activities.

Constraints

- High percentage of bare land at on average 28.1%.

- Low tree density, grass cover, and forage production at 25 tree/ha, 25.5%, and 80 g/m² respectively.
- High poverty rate in the state.

Lessons learnt

- The bio-physical process implemented in the area of the project and positive community participation enabled fixation of the sand dunes and converted the area from a desert to a productive area, which benefitted the community in restoring their natural environment.
- Raising awareness of the local population about desertification and land degradation through various strategies leads to higher adoption rates.

Conclusion

The positive effects of the project indicate that the ecosystem in the region is stabilizing due to success of the implemented activities and technologies. The activities of the project have been carried out with participation of the local community. The project has resulted in long-term environmental and societal benefit.

Acknowledgement

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Compiled by:

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Useful Links for Knowledge-Sharing

- AI-CD
<http://aicd-africa.org/>
- CADEP Good Practices
<http://cadep.kefri.org:4080/cadep/>

AI-CD Participating countries, co-organizers, partners and HoA secretariat.



Co-organizers



Partners



Horn of Africa Secretariat

