



## OUR WORK IN PUNTLAND



### Introduction

Since 2006 the project Somalia Water and Land Information Management (SWALIM) has been operating in Puntland. Informative data has been collected on land, water and climate. The information is organized in themes: Water Resources (Climate, Floods, Water Resources and Water Reports); Land Resources (Land Degradation, Land Suitability, Soils and Land Reports). This information is generated with the support of a strong Information Management, GIS and remote sensing units in collaboration with Puntland government partner institutions. SWALIM information management team has organized the data to facilitate quick retrieval through a variety of online and offline platforms. SWALIM work in Puntland was prompted by the lack or the loss of data on natural resources due to the destruction resulting from collapse of government institutions and ensuing civil strife. The major activities completed by SWALIM in Puntland are summarized below.

### Water sector in Puntland

#### Urban water supply assessment

In 2016 a water supply assessment was carried out in Bossaso city. The study focused on the technical information related to the availability of water and their status, water services providers, water quality and water consumers. The socio-economic aspect focused on consumer's ability and willingness to connect and pay for water services and the sustainability of water institutions.

This study proved the sustainability of water institutions in Puntland. As follow up all the major towns adopted Public-Private water utility companies who are providing running water to large populations in those cities and towns.

#### Rural water supply assessment

A rural water supply assessment was carried out in 2016, to understand the status. The assessment exposed the different water sources and their different technology use in both surface and sub surface water in Puntland.

The assessment concluded that: a long term water development plan should include the improvement of the use of natural spring water; a long term shallow wells

programme should be based on privately operating well sinkers teams; a long term borehole projects may cover the investment costs for cleaning and development of existing boreholes. Further, the study proposed more attention in rural water supply be given to the eastern part of Bari, Mudug, Sool and Sanag Regions.

#### Water source inventory for Puntland

SWALIM in collaboration with UNICEF and other partners has carried out a number of surveys on strategic point water sources in Puntland. The first survey was in 2008, where over 600 sources were visited and mapped. Subsequent surveys were carried out in 2012, 2014 and the most recent in 2019 where 184 boreholes were visited and data collected on their functional status, water quality, etc. The surveys are carried out by Puntland Water Authorities, initially PSAWEN, and now PWDA through letters of understanding. Data collected on water sources is useful for water resources management, and informing interventions in the water sector especially in drought response.

Monitoring of water quality has specifically been prioritized, with detailed laboratory analysis carried out on water samples collected during field surveys. Over 15 parameters

cutting across common compounds and heavy metals are analyzed against the WHO standards. Further, SWALIM has provided PWDA with portable physio-biological testing kits for onsite water quality analysis.

The data can be assessed through the link:

<https://swims.faoswalim.org>

## Hydrogeological assessment of selected areas in Puntland

In response to frequent water shortages in Puntland, SWALIM undertook a hydrogeological assessment in 2011/2012 to identify and map potential groundwater aquifers. The assessment was done through remote sensing analysis and field surveys for geological and geophysical data collection. A detailed report "Hydrogeology Survey for Selected Areas in Somaliland and Puntland" was published out of this assessment.

Regional hydrogeology and water quality maps of were produced at a scale of 1:250,000, with more detailed analysis in 2 selected areas of interest. The report, and associated products are useful in guiding groundwater exploration, and overall management of water resources in Puntland.

## Meteorological network

SWALIM has established 19 meteorological stations, three Automatic Weather Stations in Eyl, Garowe and Galkayo and two Synoptic Stations. The Ministry of Agriculture carries out routine monitoring of weather across Puntland. The data is collated and analyzed, then published in weather update bulletins every dekad during the rainy season.

The data generated from these stations are important tools for the assessment of the food security. They are often used by Government, the UN and other humanitarian organizations as early warning tool. Private enterprises utilize weather parameters such as temperature, humidity, and wind speed and wind direction for industrial plan purposes. More often than not, airport authorities ask online Automatic Weather Station data especially during the Hagaa season when strong gusty winds blow across Puntland.

The seasonal climate forecast for the Greater of Africa and the three day and seven day rainfall forecasts are increasingly enquired by people and organizations from all walks of life including nomads and village dwellers.

## Ground water monitoring

With the growing population and rapidly expanding urban centres in Puntland, the risk of over exploitation of groundwater sources to meet increasing demand for water is high. For this reason SWALIM introduced groundwater monitoring in major urban towns in Puntland, namely Garowe, Bossaso and Galkayo as a pilot to a foreseen groundwater monitoring network across Puntland. The pilot faced initial hiccups, but the need to monitor the groundwater motivated SWALIM to adopt new technologies, and all is set to restore the stations using telemetry for data transmission as soon as COVID 19 travel restrictions are lifted.

The Puntland Water Authorities will benefit in data coming from the monitoring stations for long term analysis and management of groundwater resources. Plans are also in place to work with the water authorities to expand the network to all major aquifers across Puntland.

# Land sector in Puntland

## Land resources assessment of Somalia

This study covered whole of Somalia and was focused on the fact that to ensure water and land resources are developed and managed in a sustainable way, a strategic overview of these resources is required, based on structured, up-to-date, and location specific information.

In Somalia, most information has been lost during years of conflict. On the other hand, it has been acknowledged that stakeholders supporting rehabilitation and development of rural production systems are faced with lack of structured information on water and land resources.

## Application of remote sensing techniques for the assessment of pastoral resources in Puntland

The main objective of this study was to test the application of remote sensing techniques and products for assessing resources in pastoral areas and in particular with respect to rangeland and environmental degradation in the two study areas in Puntland. Specific objectives were:

- To assess changes and trends in land cover in the study area using satellite image interpretation and field surveys.
- Assess applicability of the average phenological behavior of the major vegetation physiognomic groups as an input for the analysis of drought conditions in 2006.
- To assess human and animal impacts on the pastoral resources using remote sensing techniques with focus on settlements, water points and vegetation removal
- To Outline potentialities and limitations of remote sensing techniques and products in assessing non palatable invasive species.

## Land degradation assessment and monitoring framework

The objective of the study was to identify potential causes, types, and impacts of land degradation at the national level and to identify local spots for comprehensive assessment. The outputs from this study were envisaged to support policy decisions for combating land degradation at the national level and to give the general guidelines of the sections of the country experiencing severe degradation so that appropriate

planning of the national resources could be instituted. A Land Use Systems Map, produced at the same time, formed the basis of mapping land degradation. Land use systems are homogeneous areas of similar human activities (i.e. land use patterns) and biophysical information. In addition to the assessment, the study also established good baseline information for future monitoring of land degradation in Somalia.

### **Land use system map of Puntland**

By definition, Land Use System = Land Cover + Land Use, as used in the study. Mapping of Land Use Systems was done to form basis for mapping land degradation in Somalia. The land use system in Puntland is mainly pastoralism with the land cover being mainly savanna. The animals kept include goats, sheep, cattle and camels. Other land use includes irrigated agricultural farming along the streams where water is either channeled directly from the springs and/or from shallow wells which are constructed close to the streams, in the valley bottoms. Up on the Golis Mountains the land cover is different and the land use also varies. Pockets of crop fields can be found up the Golis Mountains and the vegetation includes *Juniperus* spp. and among others. Frankincense extraction is a practiced activity in some of drier areas in the north-eastern part of Golis Mountain (Cal Madow) in Puntland.

During this study, Woodlands of *Acacia bussei* (Galool) were characterized by intense charcoal production activity that threatened the entire fragile ecosystem. The charcoal produced was for both local and export destination.

### **Detection of tree cutting in the rangeland of Northeastern of Somalia using remote sensing**

The reduction of vegetation cover in time was identified as one of the main types of land degradation in the country due to different activities like livestock grazing and wood collection (Omuto et al, 2009) for fire wood and charcoal production. The tree layer has been identified as the main vegetation type used for fuelwood collection, fencing and construction materials. Charcoal production was found to be a very vibrant activity in the woodlands of Somalia, and Puntland in particular. The activity increased with time. There were some attempts to quantify the production of charcoal.

Using very high resolution remote sensing images and expert assessment, the trees of the tiger bush ecosystems of North Eastern Somalia were identified as areas in which tree cutting for charcoal burning was a common activity (Oroda et al. 2007). However, the real figures in terms of rate of trees cut per year were not calculated.

In this study, SWALIM made the attempt to continue the assessment in terms of quantifying the tree cutting activity as the main source of income. The use of very high resolution satellite images combined with fieldwork was the main tools for the detection and quantification of tree population for two different dates, with a five year difference (the earlier

images were either from 2001/2002 while the second date was 2005/2006). Based on the assessment, it was possible to estimate the yearly rates of tree cutting in the study area. The findings have contributed to understanding the dimensions of charcoal production in Puntland and have called the attention regarding the impacts of the activity on the environment.

### **Mangrove monitoring**

The overall objective of the project was to generate baseline data for monitoring of mangroves in the three regions of Somalia; Puntland, Somaliland and South Central Somalia. Specific objectives of the activity were to:

- Generate baseline data on vegetation (species composition, frequency, density and cover) of the mangrove.
- Produce a cover map of the mangroves of Somalia
- Outline the activities related to resource use and management in the mangrove ecosystem.
- Establish monitoring sites within the mangroves.

### **Mapping and assessment of irrigated agricultural areas in Puntland**

The overall objective of the project was to provide the information needed to obtain a comprehensive understanding of the status, dimension and management of the Irrigated Agricultural production systems in Puntland. Specific objectives were:

- Produce land cover map showing the Irrigated agricultural farms in Puntland.
- Produce data on (production systems - crops and livestock) type of crops planted, type of livestock, strengths in irrigated agricultural farming, weaknesses in irrigated agricultural farming, and opportunities in irrigated agricultural farming in Puntland. produce data on soil nutrients in the irrigated agricultural areas of Puntland.

The irrigated agricultural farms in Puntland were found to be associated with the distribution of the shallow wells and springs as the main source of irrigation water. However, these farms fell far below the irrigation potential of the land in Puntland. There were claims of infertile soils, use of poor crop seed, incidences of crop pests, increased soil salinity due to continued irrigation with slightly saline water and poor technical farming knowledge among others. Soil samples taken for analysis at the laboratory also confirmed the incidence of soil salinity in the irrigated agricultural areas of Puntland. These compounded constraints lead to reduced crop production. Besides crop production practices the communities in these irrigated agricultural farming areas were found to be essentially agro-pastoralists. Animal diseases were rampant in these areas, and veterinary services were wanting.

As regards the environment of these irrigated agricultural farming areas, it was established from the surveys that

charcoal production activity was common wherever there were trees.

Lastly, the irrigated agricultural farming areas were found to be important crop producing baskets in Puntland. The study observed that there was great potential in increasing the area under irrigation in the oases of Puntland.

### **Monitoring of Golis mountain forest**

The overall objective of the project was to generate baseline data for monitoring of the Golis mountain forest. Specific objectives were to:

- Generate baseline data on vegetation (species composition, frequency, density and cover) of the Golis Forest.
- Produce a land cover map of the Golis mountain Forest;
- Outline the activities related to resource use and management in the Golis Forest ecosystem.
- Establish monitoring sites within the Golis Forest.

### **Land use and land cover**

In northern Somalia, water is available within pockets of deep soil for irrigated orchards, or from shallow wells and springs, which are the major sources of water for crop irrigation, with water pumped to the fields. Irrigated crops grown on a small scale include maize, sesame, fruit trees and vegetables, while crops such as bananas, guava, lemon, mango and papaya are grown on a large-scale for domestic consumption.

Inappropriate land use has led to the original vegetation cover being heavily degraded, especially in northern Somalia, and in various places it has been entirely destroyed. This progressive destruction of plant life also has impaired animal habitats and reduced forage, affecting Somalia's wildlife and its greatest food resource, its livestock (goats, sheep, camels, and cattle).

### **Land degradation monitoring**

The overall objective of the study was to establish a land degradation monitoring system in Puntland. The specific objectives were:

- To build the capacity of the Ministry of Environment Wildlife and Tourism on land degradation monitoring.
- Collect and analysis land degradation data from ADESO and CARE intervention sites for EU MDG natural resources management project.
- Strengthen land degradation monitoring and assessment throughout Puntland and improve food security and livelihoods for rural communities in Puntland.

### **National Biodiversity Strategy and Action Plan (NBSAP)**

The Context for the National Biodiversity Strategy and Action Plan (NBSAP) was set by the key stakeholders with the following objectives:

- Creating a shared understanding of biodiversity among the stakeholders at the national and regional levels in Somalia; and
- Aligning their understanding as well as commitment to

biodiversity conservation with the overall Strategic Plan for Biodiversity 2011-2020.

As a first step to achieve this NBSAP, the key stakeholders agreed to an inclusive process of taking on board the relevant actors both in Somalia and abroad. Series of focused group discussions, structured interviews, two training and six consultative workshops were held in Mogadishu and the zonal capitals of Somalia.

Together with the Somali stakeholders, the draft NBSAP was refined through the substantial insight of CBD Secretariat, FAO Headquarters & Regional office, and the NBSAP Forum. The final validation workshop was held in Mogadishu in August 2015 which was chaired by the Deputy Prime Minister of Somalia together with State Minister for Environment and the FAO Representative for Somalia. This workshop was attended by representative of all the key stakeholders who unanimously validated this NBSAP.

Finalization of the NBSAP was identified as just the beginning of a useful, though long and challenging journey, a journey that could only be attained through the meaningful and lasting commitment of conservation partners both at the national and global levels.

### **FAO SAFE strategy for Somalia**

Energy access for crisis-affected people in Somalia is a key issue to be addressed through the Somali Compact and by the international community at large. Modern forms of energy are only available to a small percentage of the population while the majority rely on woodfuel as a source of energy. Women face tremendous challenges in collecting and using woodfuels while the production of charcoal is a risky and unsustainable livelihood activity practiced primarily by the poorest and most marginalized parts of the Somali population.

FAO has been employing a holistic approach to manage fuel issues in protracted crises through the inter-agency Safe Access to Fuel and Energy (SAFE) initiative. SAFE promotes the implementation of multi-faceted approaches that address protection, gender, environment, nutrition and livelihood objectives, among others. SAFE was initially established as an Inter-Agency Standing Committee (IASC)3 Task Force on Safe Access to Firewood and alternative Energy but has since evolved into a global Steering Committee with FAO, WFP, UNHCR, UNICEF, International Lifeline Fund, GIZ, Mercy Corps and others as key members.

The strategy document produced for Somalia was developed and finalized by a team of SWALIM and other FAO experts following comprehensive consultations with various technical divisions in FAO headquarters as well as the regional, sub-regional and the FAO Somalia country offices.

The formulation of the strategy was based on an analysis of the multi-sectoral challenges faced by households in various parts of the country. The first section of the strategy is composed of a background and country context section which frames the issue of energy around a set of key themes

and challenges faced by crisis-affected people in Somalia. The country context is followed by a section highlighting a set of key principles that guide FAO's work on addressing the fuel needs and challenges of crisis-affected people in Somalia. Lastly, the document is composed of a section detailing a set of proposed key objectives to support the energy and livelihood needs of vulnerable and crisis-affected households in Somalia<sup>4</sup>. These objectives section present a roadmap for addressing the challenges and specific means of achieving the objectives.

## Capacity development

SWALIM has completed a large number of capacity development activities in Puntland. The capacity building activities include the following:

- Establishment and support of 4 data centers (MoAI, MoEWT, PSAWEN and HADMA).
- Support of 6 data center staff which are continuously supported through the liaison office.
- Support in the establishment of ministry monitoring networks including those for water quality, water sources, ground water aquifer and weather.
- Training of ministry and other information users on a wide range of courses including Map reading, GIS, water quality, water sources mapping, soil fertility assessment and land degradation assessment among many others courses.
- Theoretical and practical capacity building in the use of SWALIM drone in a selected area North of Garowe.

