



## Book Presentation

# Desertification, Land Degradation and Drought Resilience

Meeting on line September 12, 2023

"CONSERVATION AND RECONSTRUCTION  
OF THE OASIS ECOSYSTEM OF LOIYANGALANI"

PROJECT TO COMBAT DESERTIFICATION AND  
FOR WATER RESOURCES MANAGEMENT

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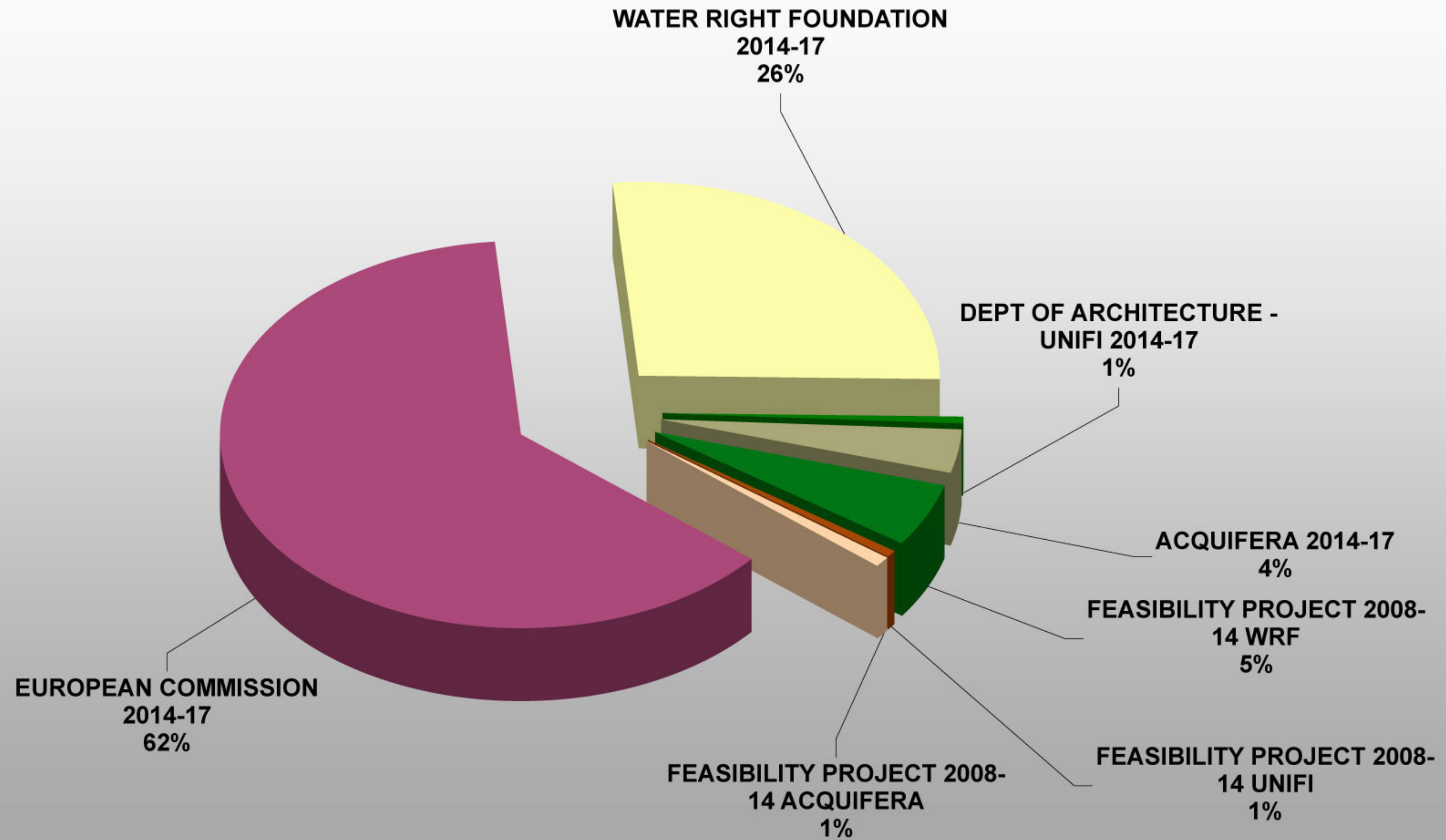


Water Right Foundation





## OASIS ECOSYSTEM FUNDINGS





# CLIMATE CHANGE AND COMBAT DESERTIFICATION

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**ALL THE TURKANA BASIN IS DEFINED  
AS ARID AND SEMIARID LANDS ON THE  
100% OF THE TERRITORY**

Republic of Kenya, Ministry of Environment  
and Natural Resources, *National Action  
Programme - A framework for combating  
desertification in Kenya in the context of the  
UNCCD, Nairobi, 2002*

Desertification is “... the process that brings  
to a progressive and not reversible reduction  
of the soil capacity to produce resources and  
services...” (FAO-UNEP-UNESCO, 1979)

Kenya ratified the Convention to Combat  
Desertification in 1997





# GEOGRAPHICAL FRAMEWORK

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300 km long, Turkana Lake is located in **Kenya** and lies along the **Rift Valley**.

The waters come from the Omo River, which crosses the whole of Ethiopia and, with a wide delta, flows into the lake.

Two dams have been built on the River Omo, and a third dam is under construction: the available **water is considerably reduced**.

Turkana has no emissaries: **all water entering the lake evaporates**.

It is estimated that there has been a reduction of some metres in height over the last 100 years.

These phenomena have led to the formation of **very salty and dry soils**.





# POPULATION

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The area is inhabited by different ethnic groups: the **Turkana**, the **Samburu**, the **Rendille**, which are nomadic populations dedicated to pastoralism, and the **El Molo**, sedentary, who live along the shores of the lake and practise fishing.

Nomadic populations and their goats moved monthly from one area to another and the grazing land could regenerate in the rainy season.

In recent years, however, the nomadic populations, no longer finding food for their animals, **have become sedentary**, but continuing to practice pastoralism.

The anthropic and animal load on the Oasis has increased (there are 5,000 people), with a **reduction** of the vegetated part and grazing.





# PROJECT OBJECTIVES

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Climate change, desertification, increasing poverty and migration are closely interlinked.

The project, carried out in the Loiyangalani area, is basically a project to combat desertification and the effects of climate change.

**New Well  
and Water distribution**



**Oasis reconstruction**



**New Areas for fodder  
with Vetiveria**



**New Nursery Compost  
Plant Monitoring and  
Communication Centre**



What is happening in these areas reflects the climatic changes in many areas of the Planet:

the identification of techniques and approaches that can be used in further **projects in other areas** is, therefore, of great importance.



## STUDIES AND RESEARCHES

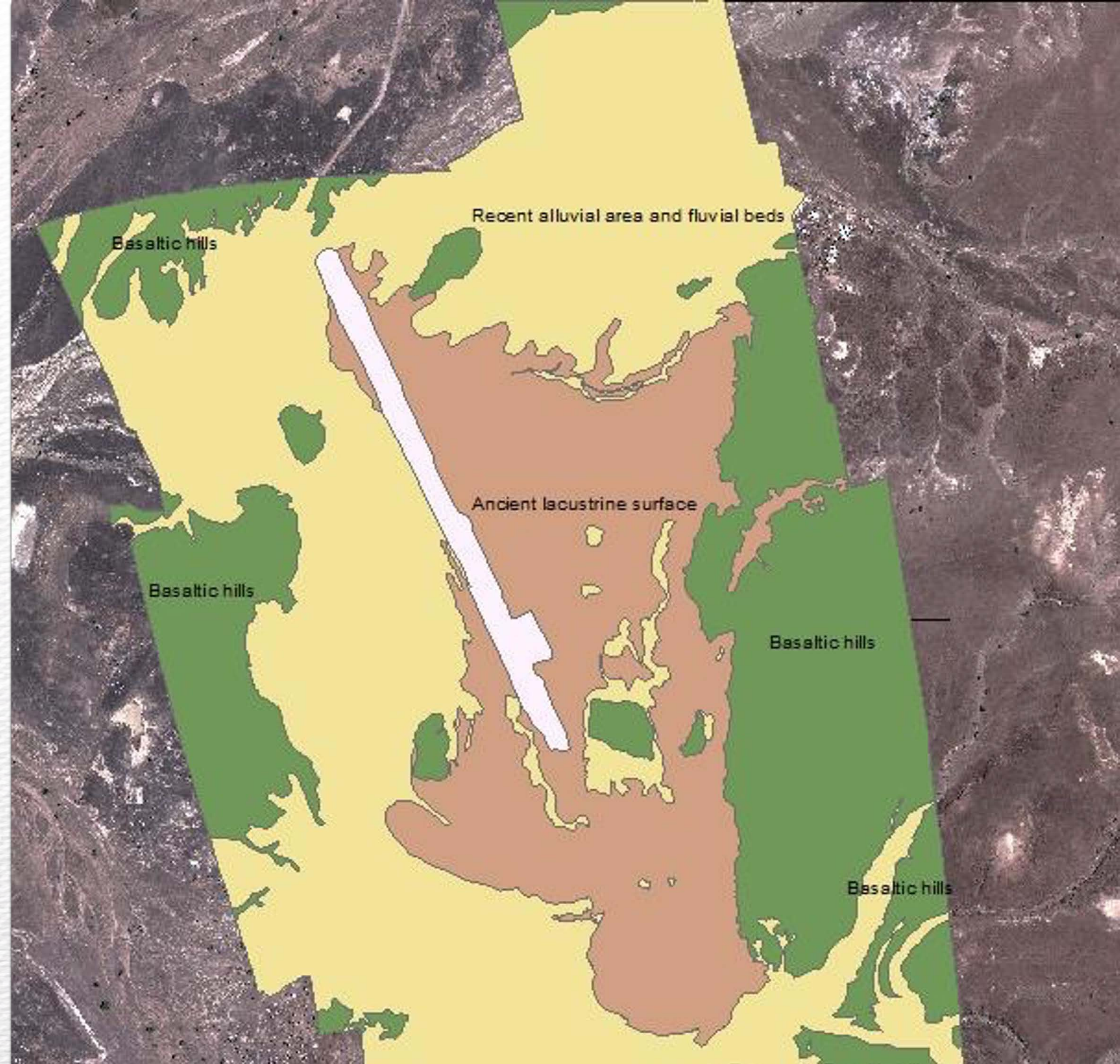
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During the various missions from 2008, 2011 to 2015, the distribution and characteristics of the geology, the soils, the vegetation within and around the Oasis were studied.

Ground surveys, excavation of profiles, sections that visually describe the soil normally up to the depth reached by the roots, sampling and laboratory analysis, were employed to establish some physico-chemical parameters and identify the most effective types of intervention.

### Ground Map

A map of the distribution of the different types of soil within the Oasis has been created, which has made it possible to understand which areas are the most suitable for the crops to be introduced.





# STUDIES AND RESEARCHES

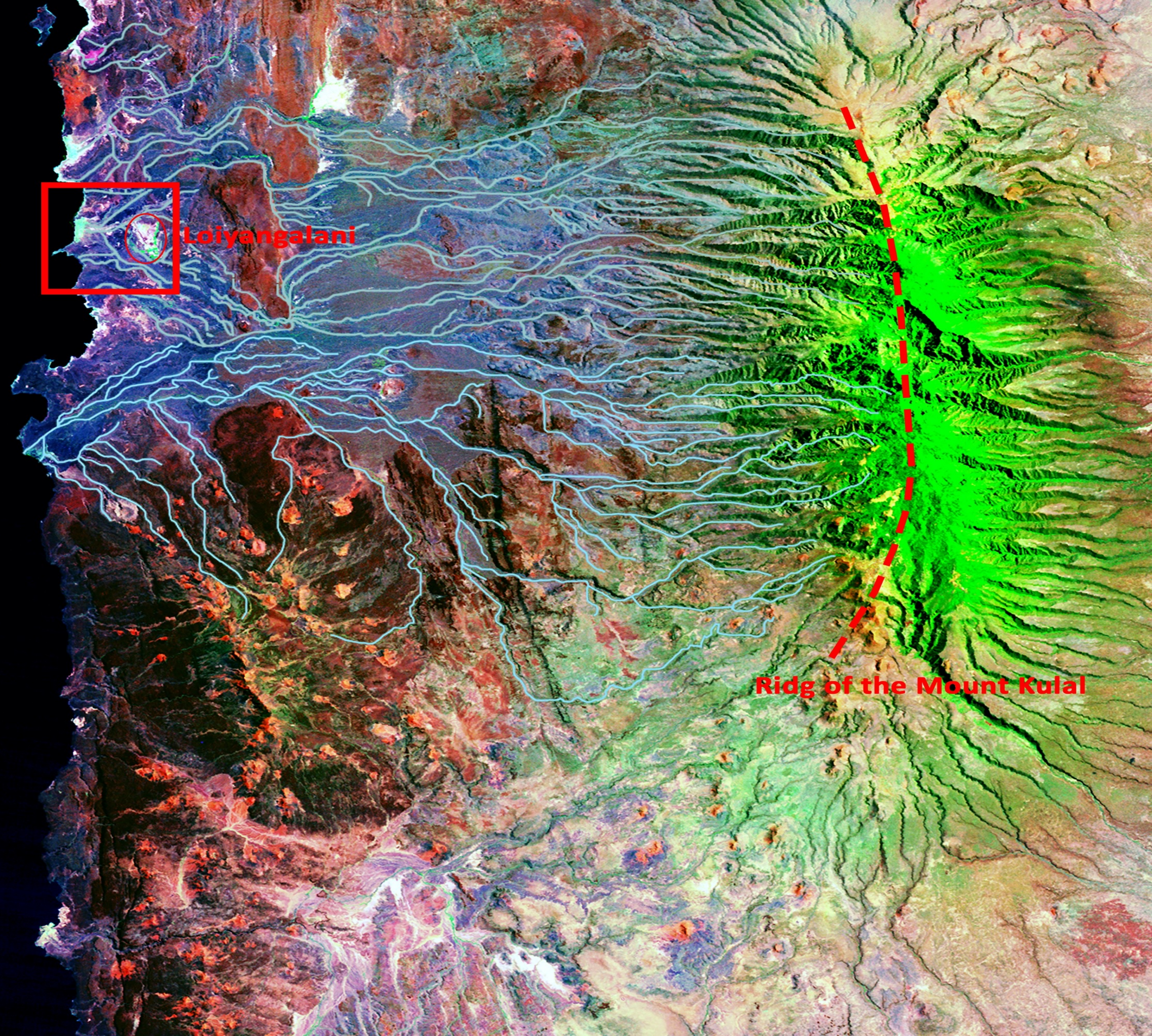
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- LOW RAINFALL WITH LESS THAN 200 MM. YEAR
- THE WATER SYSTEM FROM MOUNT KULAL TOWARD THE OASIS AND THE BIG WADIES IS AN IMPORTANT RESOURCE

## Water resources

The Lake Turkana water, apparently available, but due to the strong alkalinity, is not usable for drinking or irrigation purposes.

The presence of the oasis and some good sweet water sources, also thermal, intensely used and with some signs of degradation, constitutes a resource but, at the same time, is an environmental future problem for the growing scarcity of water and the increase of human pressure.





# STUDIES AND RESEARCHES

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The palm groves and areas with the presence of acacia, 17% of the total surface, are invaded by Prosopis, urban growth or intensive grazing for a total of 13%, which means that only 4% of the total may still be considered as a healthy palm grove ecosystem.

The palm grove is in a process of decay and in a phase of reduction.

14% of the area is still characterised by typical of arid and semi-arid zones, with some residual herbaceous species for grazing.

69% of the area is characterised by the presence of decaying vegetation or without vegetation.

## Vegetation

Detailed analysis of species and varieties grown in the Loiyangalani Nursery and in all area of action; check of the new plantations already made in the area by the Nanyori Group; on-site examination of the modalities used for protection against prevailing winds and animals (dead plant body , artificial ground relief , wall stones, etc.)





# ACTIVITY AREAS

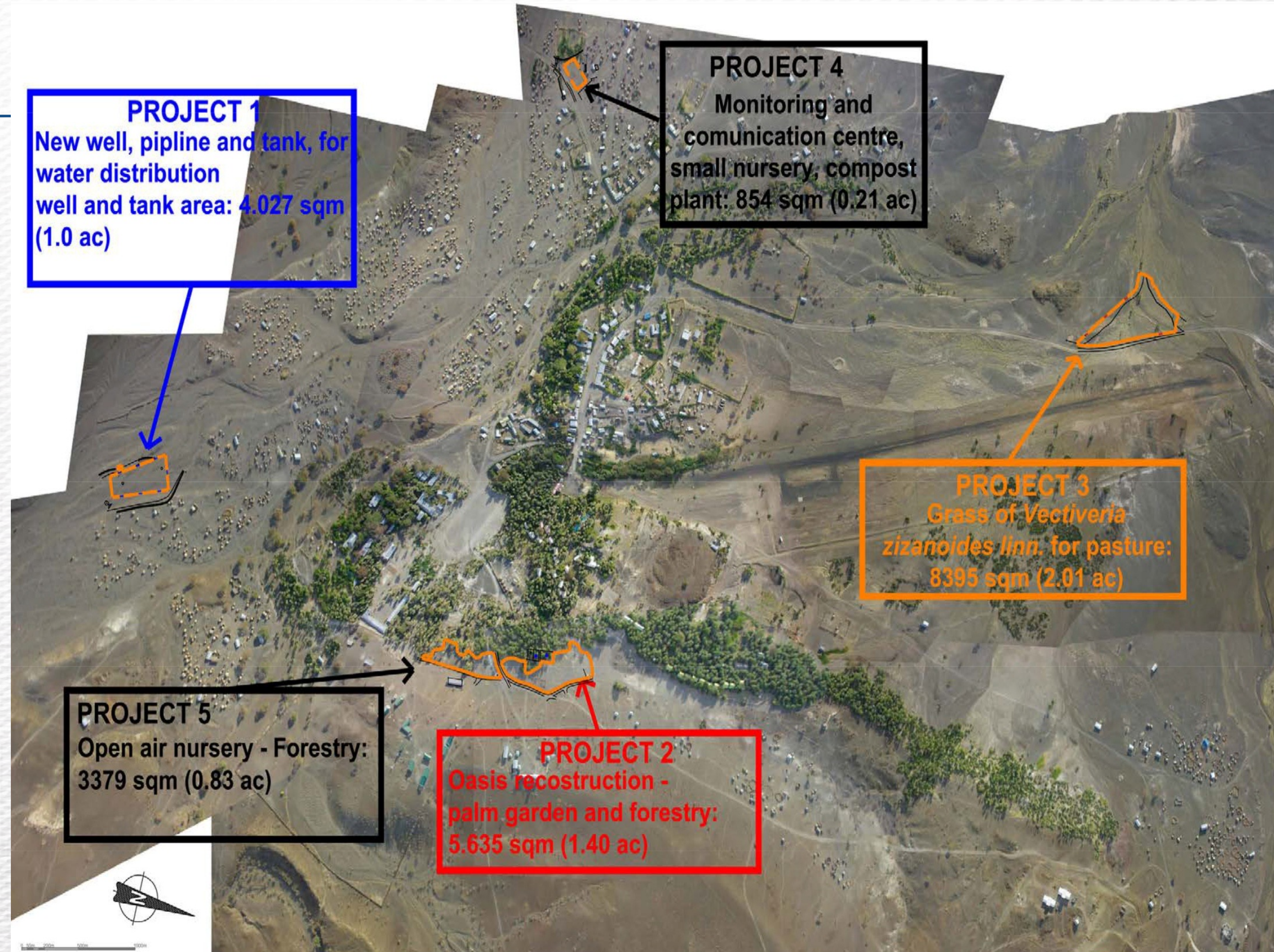
**PROJECT 1** - New well, pipeline, tank and public fountain for water distribution to the population is located to the South West in Kula Mawe village , in the Laga : about 4,000 m<sup>2</sup>

**PROJECT 2** – Oasis reconstruction, Palmeraie is established on a track to the East upstream edge of the Oasis: about 5,000 m<sup>2</sup>

**PROJECT 3** – New area for Forage with *Vetiveria zizaniodes* Linn. is of approximately 8,000 m<sup>2</sup> and adjacent to the airstrip at West

**PROJECT 4** – Monitoring and communication centre-M&C Centre, new small nursery and compost plant of 854 m<sup>2</sup> is located in Nachukule village to the West, an area of urban development

**PROJECT 5** – Oasis reconstruction, Afforestation is established on a track to the East upstream edge of the Oasis: about 3,000 m<sup>2</sup>





## NEW WELL AND WATER DISTRIBUTION

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While the water of Lake Turkana is salty and non-drinking, the **water from the sources of the Oasis is drinkable.**

The aim was to enable these populations to have effective access to drinking water since the sources were insufficient and difficult to access.

A well (depth of about 50 metres) and the tapping work in Loiyangalani were built. **Groundwater was found** in an area that is always dry, where nobody expected to find water at that depth.

To allow easy collection, a **submerged pump** was installed, fed by **solar panels**, a storage **tank** and a **fountain**.

The well, with a productivity of about **30 litres per minute**, provides approximately 20-30.00 litres of drinking water per day for about 2000 people. 40-60 litres day per family.

Another well was built 7 km from Loiyangalani for El Molo village.





# OASIS RECONSTRUCTION

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The project has set itself as one of the objectives of carrying out **productive forestation activities** (by producing a permanent productive tree culture and devoting an area to the new expansion of plants), for example, by using date palms, which can be important complementary food resources.

In front of the palm grove a small area has been dedicated to the **diffusion** of some **typical species** of both the north of Kenya, and the Oasis, such as Acacia Senegal (rubber tree), Sesbania, Sycomore and other tree species (a total of about 15 species) with a distribution made in order to form a forest park.

Local shrubs and trees used for the **reconstruction of the oasis** can support food needs but also provide marketable raw materials such as gum arabic.





# NEW AREAS FOR FODDER WITH VETIVERIA

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One of the objectives of the project was to create **new resources for fodder for** livestock, trying to restore pasture and introducing a forage plant

An area has been identified where to experiment, for the supply of fodder (not direct pasture) for both sheep and cattle, the **Vetiveria Zizanoides**, a plant with very developed roots, self-sterile, already widely spread also in Africa, but above all in Asia.

The Vetiveria, after the first phase, **no longer needs irrigation** and, when it has reached an adequate height, its leaves can be cut and harvested to be used as **forage** (it cannot be grazed).

The area dedicated to the Vetiveria was divided into 3 small sub-areas.

The seedlings were planted with the help of the Nanyori Group, which is responsible for the development of this agronomic project.





# NEW MONITORING AND COMMUNICATION CENTRE

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In the tradition of nomadic peoples like Turkana, the concept of agricultural practice is completely inconceivable. At a time when these populations become settled, an **appropriate cultural and educational process is essential** to pass on knowledge of agricultural practices.

The tutoring and training activities were carried out through the **Nanyori Group**, an association already operating in the area, which is responsible for conveying agricultural elements and practices, cultivation techniques, but also composting.

The Monitoring and Communication Center is the **operational centre** for project monitoring and management, to manage the distribution of seedlings raised in the **nursery** and to manage the phase after the project's closure.





# **INFORMATION AND AWARENESS    NANYORI GROUP AND LOCAL PEOPLE**

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## **TUTORING AND TRAINING AGRONOMICS AND PLANT NURSERY MANAGEMENT AND TECHNIQUES**

***BARAKA AGRICULTURAL COLLEGE (2016-2017)***

- **COMPOSTING**
- **NURSERY MANAGEMENT (TREE AND VEGETABLES)**
- **TREE AND FRUIT TREE PLANTING AND MANAGEMENT**
- **VEGETABLE PRODUCTION**
- **VETIVER PRODUCTION**
- **ENTREPRENEURSHIP**
- **EXPOSURE VISIT TO BARAKA COLLEGE IN NAKURU**

## **TUTORING AND TRAINING VETIVER**

***PLUS KENYA (2016)***

- **PLANTING-HARVESTING**
- **VEGETATIVE MULTIPLICATION AND NURSERY MANAGEMENT**
- **USE OF LEAVES AS ANIMAL FEED FOR LIVESTOCK**
- **USES OF THE ROOTS FOR PRODUCTION OF OTHER GOODS**



Back in 1966 the English economist Kenneth Boulding wrote an essay entitled "**The economics of the coming spaceship Earth**", he criticised the "*cowboy economy*" and promoted the idea to consider our planet as a "*spaceship*".

"....The closed Earth of the future requires economic principles which are somewhat different from those of the open Earth of the past. For the sake of picturesqueness, I am tempted to call the open economy the "cowboy economy," the cowboy being symbolic of the illimitable plains and also associated with reckless, exploitative, romantic, and violent behaviour, which is characteristic of open societies. The closed economy of the future might similarly be called the "spaceman economy", in which the Earth has become a single spaceship, without unlimited reservoirs of anything, either for extraction or for pollution, and in which, therefore, man must find his place in a cyclical ecological system which is capable of continuous reproduction of material form even though it cannot escape having inputs of energy..."

