Furrows in the Desert

Agricultural development program
northern Turkana, Kenya

2012 - 2022

Arava Institute for Environmental Studies (AIES), Israel

Missionary Community of Saint Paul the Apostle (MCSPA), Kenya

Saint Isidore Turkana Farmers Association (SITFA)

The Turkana People

We operate in Turkana

- Arid region in north-western Kenya
- Borders with Ethiopia, South Sudan and Uganda
- The largest yet least developed county in Kenya
- Area of county: 70,000 km^2
- Area targeted: 20,000 km^2
- Population: 1,000,000 (county)

  150,000 (targeted)

We operate in Turkana

- Temperature: 20-40^{0}C
- Precipitation: 100-350 mm/y
- Two short rainy seasons, typically flash floods lost in runoff
- Evaporation: 7-12mm/day (high)

Water quality: Poor in shallow basin-aquifers & Lake Turkana: pH 8-9, EC: 2.5-3.5 dS/m

Good in shallow rocky-aquifers & surface runoff: pH: 7.8, EC: 0.9 dS/m

Soil quality: Poor in places: 40% sand, 30% silt, 30% clay (Montmorillonite), pH 8-9

Good in our floating seedbeds: 2:1 ratio of dry-river-sand to compost

We work with Turkana People

- Nilotic Tribe of **semi-nomadic pastoralists**
- **A family** that can no longer sustain the traditional way of life is **“in transition”**

Local name for drought	Year	Mortality rate (1) %
Lotiira	1952	61
Namotor	1960	55
Kimududu/kibekbek	1970	54
Kiyoto atang’aa/Lopiar	1980	65
Lokwakoyo/Alkalkal	1990	53
Logara/Epompo	2000	63

Note (1): Mean mortality rate of small stock. Source: Ebei, Oba & Atuja (2007)

Major droughts recorded:
1971, 1975, 1977
1980, 1983/1984,
1991/1992, 1995/96,
1999/2000, 2004/2005, 2009,
2011, 2016/2017, 2018/2019

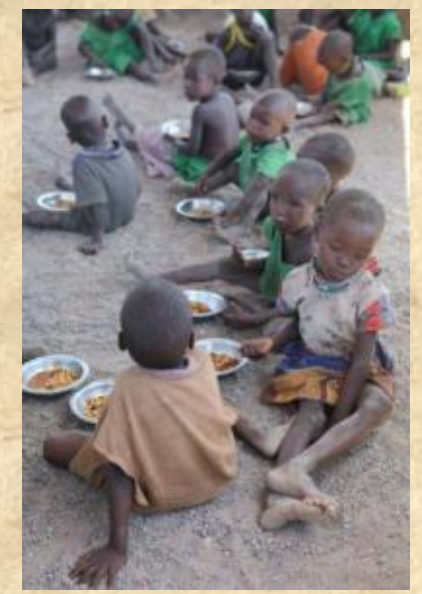
Recent environmental and geo-political changes across East Africa

- Increase of frequency and duration of droughts due to global warming
- Land degradation due to overgrazing
- High survival stress
- Dependency on aid food
- Migration to urban areas
- Increasing tribal conflicts
- Population in transition from traditional life

A family that can no longer sustain the traditional way of life is “in transition”

Diversification

- A **complementary** or **alternative way of life** towards food security and community resilience
- A viable example: **Commercial fishing** on Lake Turkana since 2007
- We believe that the development of **sustainable agricultural** is the next form of **diversification available to the Turkana** People that are “in transition”.



Turkana Children at one of the MCSPA mother and child nutritional centres

Temporary camp inside the protecting fence of the Todonyang Mission to families “in transition” who lost their herds to drought and raids. Here they learn the trade of fishing before they move on.

Former attempts to develop agriculture failed

- Harsh environmental conditions
- Lack of know-how
- Installing equipment without training and guidance
- Experts only visit for short time periods
- Cultural gap: herders to farmers
- Lack of infrastructure and markets

The old perception:

- Impossible to develop agriculture due to harsh environmental conditions
- Current state of infrastructure does not allow for community and private commercial development
- Cultural gap is too big to bridge

Nakinomet…

Failed “installation projects” that did not provide training and on-going guidance to the Turkana participants

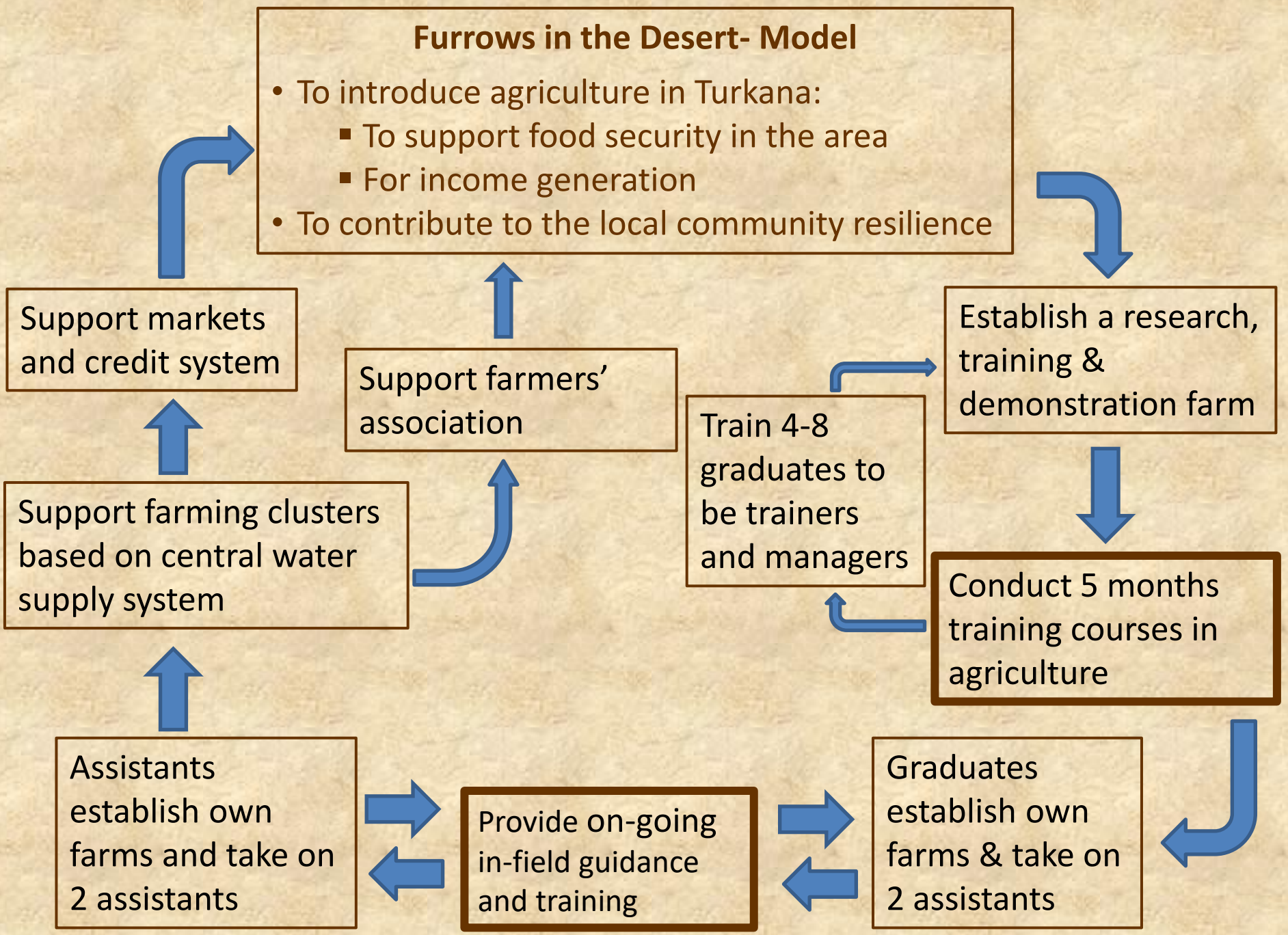
Agricultural development initiative and irrigation scheme by County Government, Napuu 1, Turkana Central

- Initiated in 2016
- 2,200m of fence
- 418 plots of 500m^2 each
- 2,000L tanks placed 2m above the ground, each serving 2 plots
- Low pressure gravity-fed drip-irrigation system

- Napuu farmers were left to manage their affairs by themselves without appropriate knowledge, experience, guidance and access to agricultural inputs.
- **No farmer in the world can succeed under such conditions, whether they live in Turkana or Israel or Arizona**

Our development concept

- It is possible to **adapt agricultural methods** for growing a variety of crops and **sustain self subsistent and commercial agriculture**
- The pioneering Turkana that choose a farming lifestyle need **appropriate training** and **in-the-field long-term guidance**
- Local food production improves the **nutrition of the hosting communities,** is **key in the development of markets** and contributes to the **social and economical resilience** of the communities and county
- The **success** of the pioneering Turkana **proves** that agriculture is feasible for Turkana and eventually **will drive** the public and private sectors **to invest on a larger scale** in appropriate infrastructure and the development of farming markets


Furrows in the Desert- Model
• To introduce agriculture in Turkana:
▪ To support food security in the area
▪ For income generation
• To contribute to the local community resilience
Establish a research, training & demonstration farm
Conduct 5 months training courses in agriculture
Train 4-8 graduates to be trainers and managers
Support farmers' association
Support markets and credit system
Support farming clusters based on central water supply system
Assistants establish own farms and take on 2 assistants
Provide on-going in-field guidance and training
Graduates establish own farms & take on 2 assistants

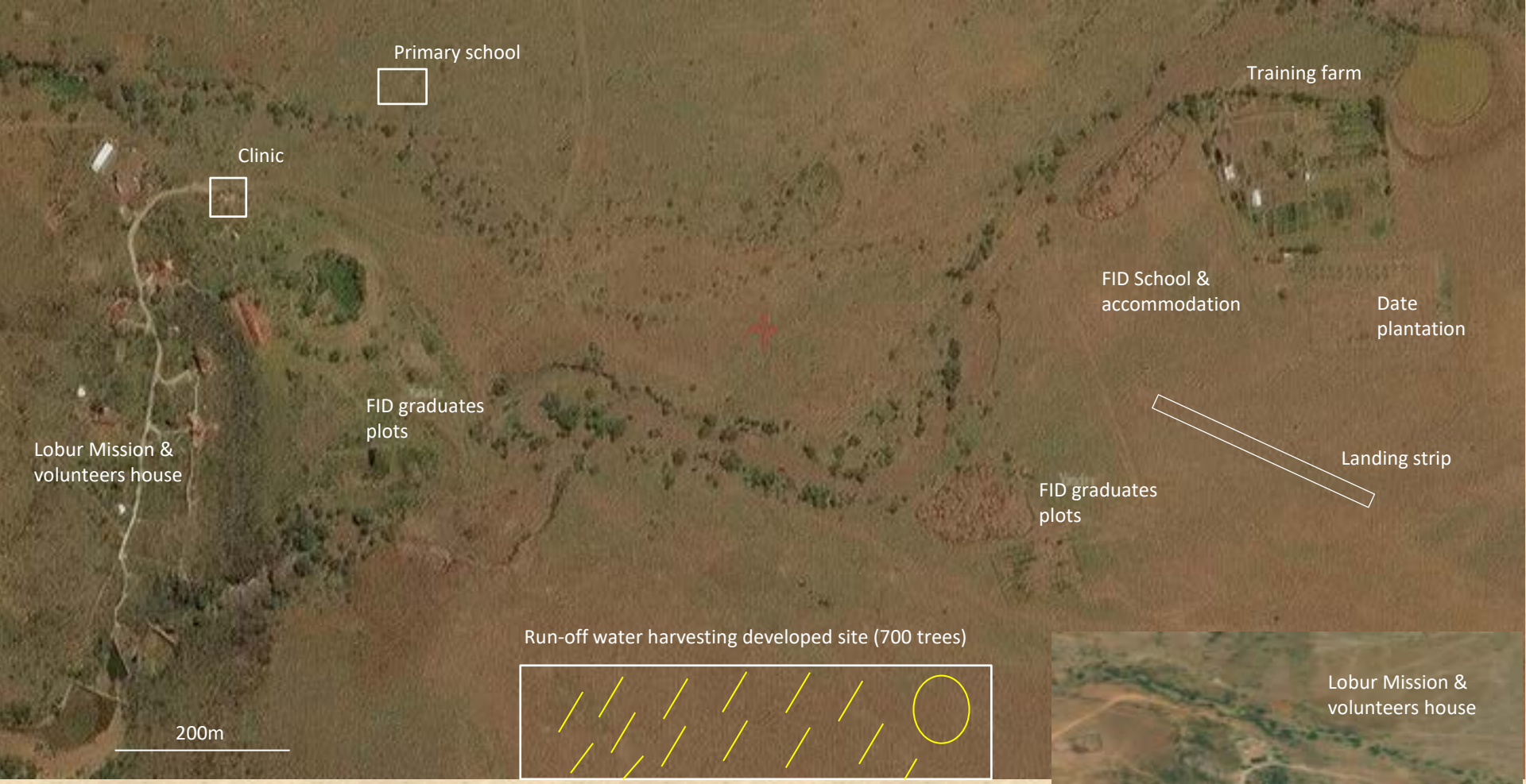
FID central training, experimental and demonstration farm, Lobur, Turkana

Proving FID development concept

Teaching agriculture to children, Lobur

Guidance: Paulina, FID graduate farm, Kopotea

Date plantation, Lobur



Lobur central training, demonstration and R&D farm

- Kenyan operation manager
- Turkana agriculture school manager
- Local Turkana trainers & foreign trainers (volunteers)
- Visiting Israeli-experts

Land preparations

Crop planning

Compost preparations

Planting & Plant protection

Nursery

Gravity-fed Drip Irrigation

Growing in net-houses

Donated by Amiran Kenya in 2012

Weed and pest control

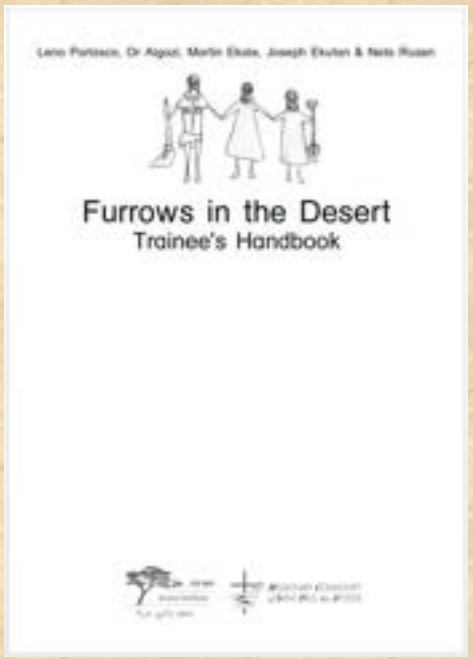
Crop management

Post-harvesting

Harvesting

Cooking

- Administration
- Planning & Marketing
- Literacy

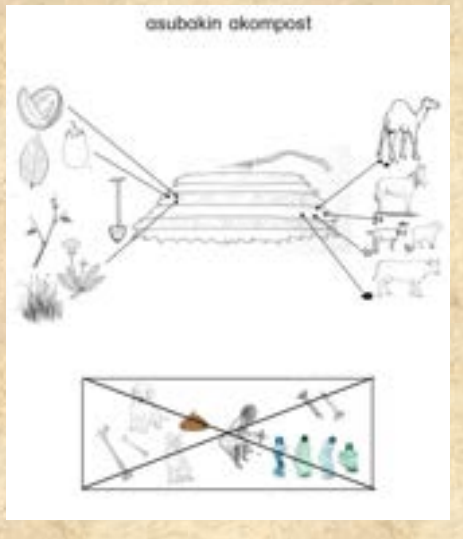

Lario Portoaco, Dr Agoot, Martin Ekale, Joseph Ekuten & Nelo Rusan

Furrows in the Desert

Trainee's Handbook


Ngadiripio ka atanki awi


Nasar


asubakin akompost


enyanya tomato
moringa
espinac spinach
asukuma kale
ekitunguo onion
indendi maize
ngiimeri sorghum
kitunguaum garlic
soyo soy bean
ekunde cowpea
achorage green gram
ekoidait naachi squash
kakuba cucumber
namunye water meson
omelon sweet melon
biringonyo eggplant
okra
pili pili oo green pepper
pili pili hot pepper
paw paw papaya


akiyangar anawi ka etichkon

aseun ngikeng'arakinak ng'arei

akicor amana / acorun amana

akiwakia awes namana

asubakin akompost

akitakin moringa


Akilokony kori

Cucurbitaceae Family

Solanaceae Family

Amaranthaceae Family

Brassicaceae Family

Rosaceae Family

Beans Family

FID Trainee's Handbook

Written in Turkana.

Used by graduates at their farms.

First farmers association in Turkana 18 December 2014

Saint Isidore Turkana Farmers Association (SITFA)

Cooperative since January 2020

- Fully operating central training farm
- 17th course commenced January 2022
- 234 graduates
- Trained 6 Turkana trainers in agriculture and 8 assistant trainers
- Success rate in long term operation of graduate farms: 62% in first 6 years, 85% in last 4 years
- No access to water is #1 reason for failure


Certificate Of
Irrigated Desert Agriculture

This is to certify that

Ms. / Mr _____

Has successfully completed an intensive residential training
In the framework of
Furrows in the Desert

The course took place in Lokwar Mission – Turkana, Kenya
from _____

Course contents included:

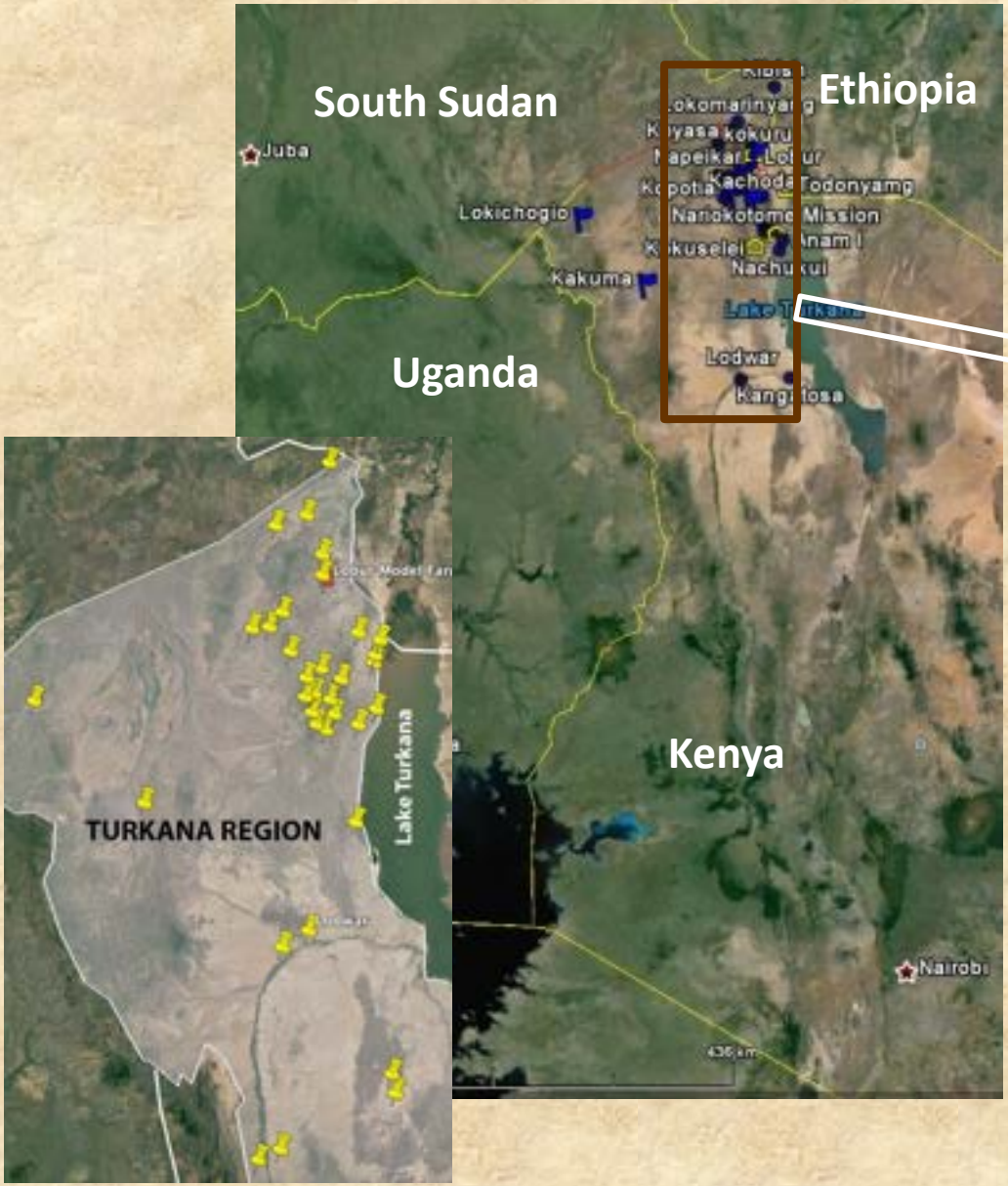
- Compost preparation
- Land preparation
- Crop planning – Market based
- Nursery
- Irrigation
- Basic administration and marketing
- Plant protection monitoring system
- Weed control
- Crop management
- Post harvest
- Record keeping
- cooking skills

David Lehrer
Executive Director
Arava Institute for Environmental Studies

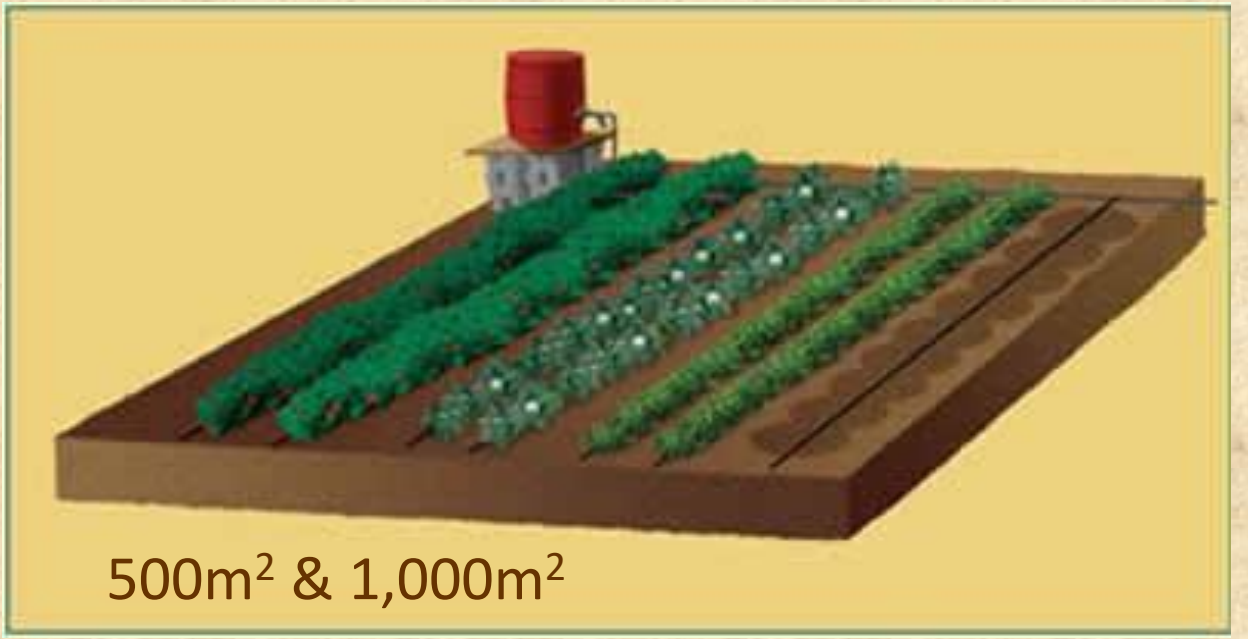
Fr. Alex Campón
Director
MCSPA
Caritas Lodwar

Caritas

Established 237 local farms within 76 communities



Adaptation of Israeli know-how in desert agriculture



Gravity-fed family drip-irrigation system, developed by Netafim, Israel

Providing Farmer's Kits to FID graduates through the **Rotary Israel, Rotary Kenya** and **Rotary International** TIPA initiative

Adaptation and R&D in Agriculture

Adaptation and R&D in Agriculture

Adaptation and R&D in Agriculture

Continued education and guidance at the graduates' farms

Christopher, Kaikor

Atuane, Lobur

Paulina, Kokuru

Thomas & Yhoana, Nariokotome

Rotary International, Rotary Israel and Rotary Kenya

- Funding farmers' Kits and maintenance costs

Examples of what we grow

Location	Graduate	Types of crops seeded & planted
Kaikor	Shara	Cowpea, tomatoes, onion, watermelons
Riokomore	Joseph	Kale, okra, swiss chard, melons, gourd
Napekar	Dorcas	Onion, kale, chard, green grams, melon
Kopotea	Paulina	Onion, tomatoes, okra, gourd
Kokuro	Paulina	Okra, cowpea, squash, melon, kale
Lobur	Evelin	Tomatoes, kale, green pepper, melon, swiss chard

Sukuma, Spinach, Radish, Swiss chard, Onion, Garlic, Cucumber, Zucchini, Melon, Watermelon, Squash, Pumpkin, Maize, Sorghum, Sudan gras, Green gram, Cowpea, Soya, Peanuts, Green pepper, Hot pepper, Eggplant, Tomato, Chilli, Okra, Moringa, Papaya, Sweet potatoes, Kangkong, Cassava, Custard apple, Gourd, Pome granite, Date palms, Banana

Supporting volunteers and Israeli operation managers

- 1 operation manager a year
- 6 volunteers a year for 6 months of volunteering work
- One week training in Israel followed by appropriate training in Turkana
- 2 experts visits to Turkana a year

Introducing agriculture to school children

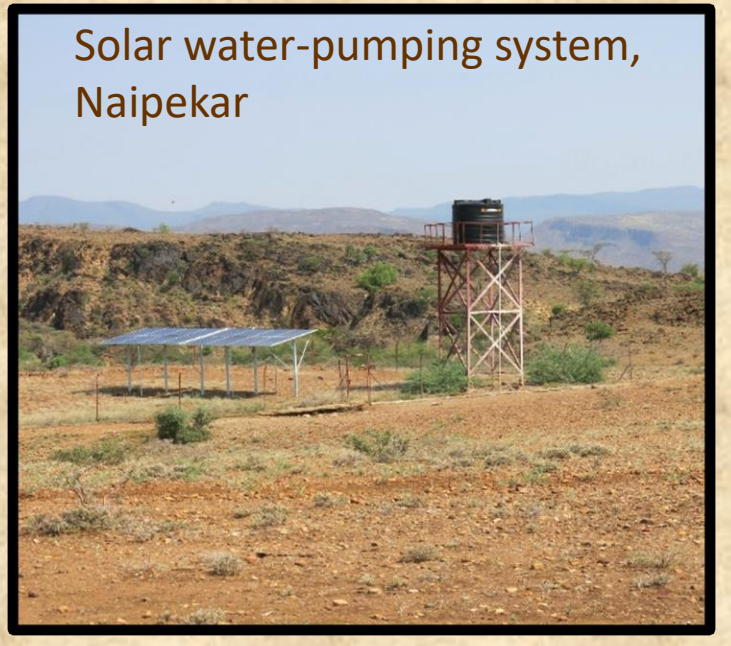
Opening the 8th course, 15 January 2017

Training the 7th course at the nursery

Adaptation of Israeli know-how in desert agriculture

Bringing Medjool Dates to Turkana & installing solar water pumping systems

- 170 date shoots arrived from Israel, March 2017
- Installed 2 solar water pumping systems at the Kopotea and Maisa farming clusters
- Established the first medjool date plantation in Turkana using the local alkali water



2017

2022

Bringing watershed management practices to Turkana for the development of agro-silvopastoral systems

- Increase the local production of pasture and other animal feed
- Prevent land degradation through erosion
- Improve soil quality through organic matter decomposition
- Increase the spatial availability of shading trees, wind breakers and the supply of fuel wood
- Increase re-charge of shallow aquifers
- Contribute to environmental education and awareness of local communities through high visibility of variable and dense plant production, especially of trees
- Produce fruits by fruit trees towards food security

First developed site, Lobur

- Training in designing and constructing water-runoff harvesting infrastructure for land reclamation
- 700 trees were planted in 2020

The Lobur site in November 2021

- Trees planted in 2020 are doing well (700)
- Natural vegetation is growing fast and used to feed the local goats
- Intergrowing watermelons by site caretakers as a new source of income
- New tree nursery grows 1,000 seedlings for Kopotea site and for use around graduates' farms. Its full capacity is about 9,000 seedlings.


Lobur agro-silvopastoral system


Kopotea graduates' farms and shichs within fenced site

Kopotea site in November 2021. Shichs and terraces were developed by FID team. 500 trees were planted.


Kopotea terraces site with particular fencing

Supporting higher education and appropriate training to FID Turkana staff member, Martin Ekaale, in Israel

- Involved with FID since 2014
- Was responsible over the trainees wellbeing
- Visited and guided graduates at their farms
- Coordinated the activities of SITFA
- Studied at the **Arava Institute** for two semesters June 2016 to June 2017
- Two research projects in sustainable agriculture and in commercially oriented growing of date palms.
- **Funded through MCSPA and AIES**

At the central training farm, Lobur, Turkana

In the fields and date plantations of Kibbutz Yotvata, Israel

Teaching agriculture and environmental awareness to children

Supporting organisations and institutional bodies

- ROTARY International through an initiative of ROTARY Israel
- Israeli Foreign Office through MASHAV and the Israeli ambassador to Kenya
- Emalaikat Foundation (Spain)
- New Ways Charity (UK)
- DKA Austria on behalf of the Catholic Children Movement of Austria
- GIZ (German society for international Cooperation)

For a better tomorrow in Turkana

Be part of a change

amit.eliyahu@arava.org

In the 3rd course participated 5 women and 10 men, all Turkana People. Group photo was taken in Kokuro at the farm of Paulina, an FID graduate.

Arava Institute for Environmental Studies (AIES)

- Established in 1996 at Kibbutz Ketura
- To advance cross-border environmental cooperation in the face of political conflict "Nature knows no political borders"
- Main student body comprised of Jordanians, Palestinians and Israelis
- Academic programs in partnership with Ben Gurion University
- Research centers: water resource management, sustainable agriculture and renewable energy.

Field study, Turkana 2011

Establishing the farm, Lobur 2012

Beginning of Spring 2018 semester

MCSPA visiting AIES, Israel 2012

The Missionary Community of Saint Paul the Apostle (MCSPA)

MISSIONARY COMMUNITY of SAINT PAUL the APOSTLE

A public association of Christian faithful of the Catholic Church, made up of priests and lay people from different parts of the world. It operates in north-east Turkana and in south Ethiopia since 1986.

Among its various activities MSCPA strives to develop, together with the local Turkana population, new sources of water supply, and solutions towards food security and health care in the area.

Over 25 years of activities in the field of community development MCSPA established a significant water infrastructure including:

- The construction of over 150 rock dams by trained teams of Turkana people
- The construction of over 100 earth pans and dams using own bulldozers
- Drilled over 200 boreholes, equipped with either hand pumps, solar-powered pumps or Kijito wind-pumps

Around some of its water projects, the MCSPA has established nutritional centers which provide daily meals and primary education for children.

Some of the missionary centers in the area also operate clinics and dispensaries providing basic medical services for the local population.