MISSIONARY COMMUNITY of SAINT PAUL the APOSTLE

St Isidore Turkana Farmers Association

מכון הערבה
Arava Institute
معهد وادي عربة

Furrows in the Desert

Agricultural development project northern Turkana, Kenya

Arava Center for Sustainable Development (ACSD, AIES, Southern Arava R&D), Israel
The Missionary Community of Saint Paul the Apostle (MCSPA), Kenya & Spain
Saint Isidore Turkana Farmers Association (SITFA)
The Turkana People, Turkana, Kenya

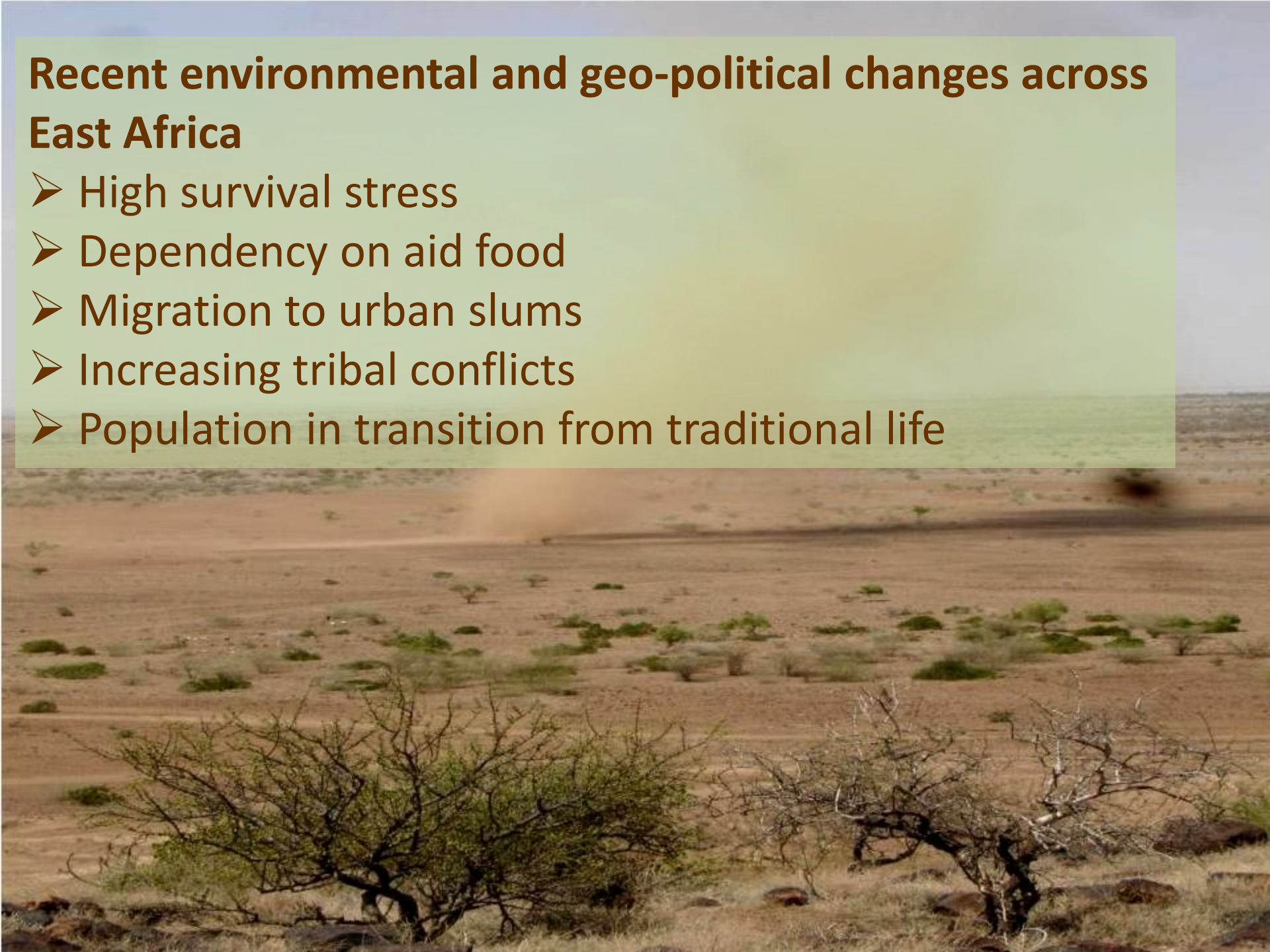
Where we work

Turkana: a semi arid region in Northwestern Kenya

We work with

Turkana People: Nilotic Tribe of semi-nomadic pastoralists

Model can be adopted with appropriate changes by similar communities living under similar environmental conditions



Recent environmental and geo-political changes across East Africa

- High survival stress
- Dependency on aid food
- Migration to urban slums
- Increasing tribal conflicts
- Population in transition from traditional life

“Estimates show that emergency relief in famines costs seven times as much as preventing them“

Sam Dryden, Director of the Agricultural Development Program, The Bill and Melinda Gates Foundation

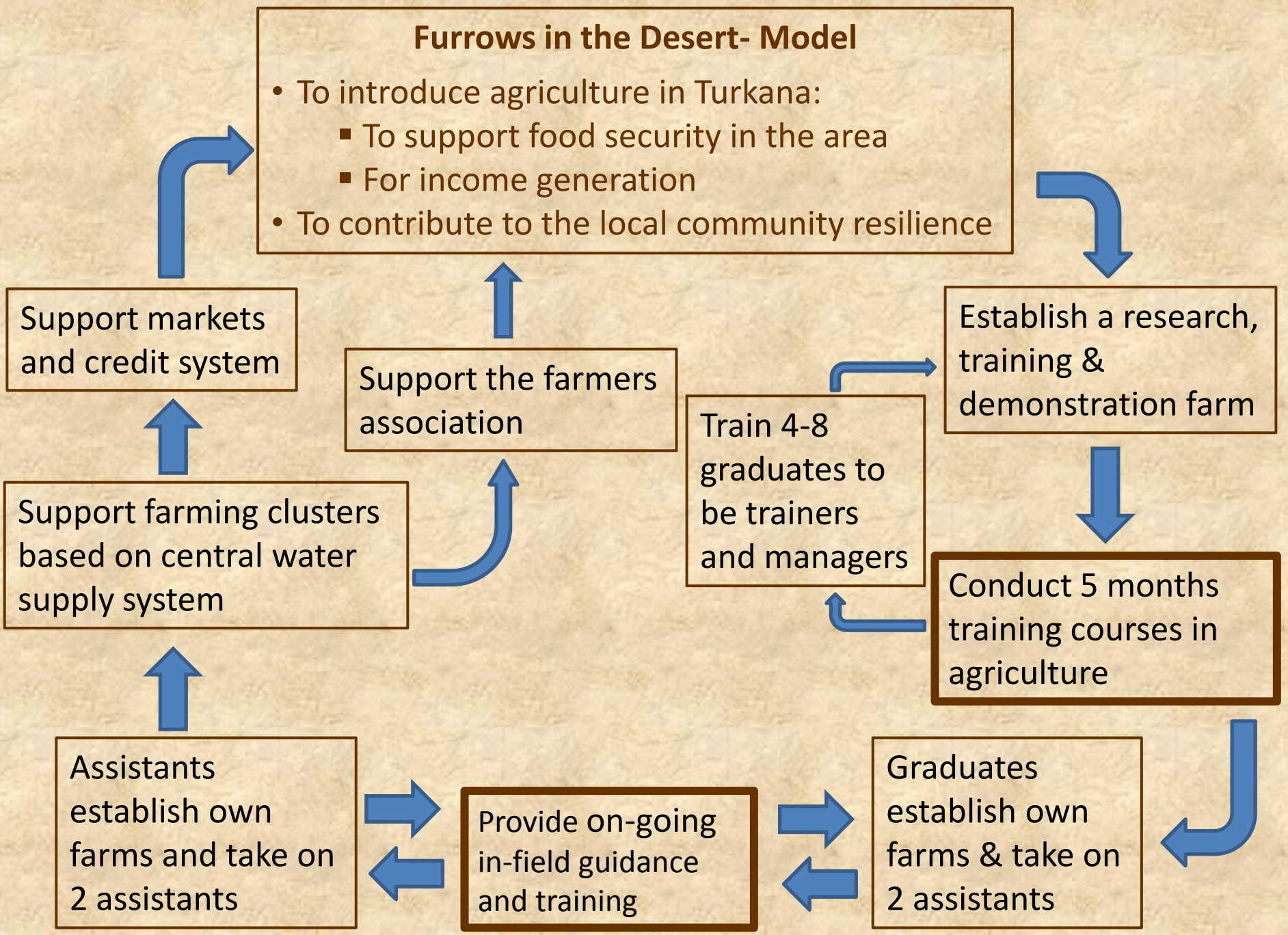
Diversification

Agriculture as an alternative way of life for a population in transition

FID central training farm, Lobur, north Turkana, Kenya

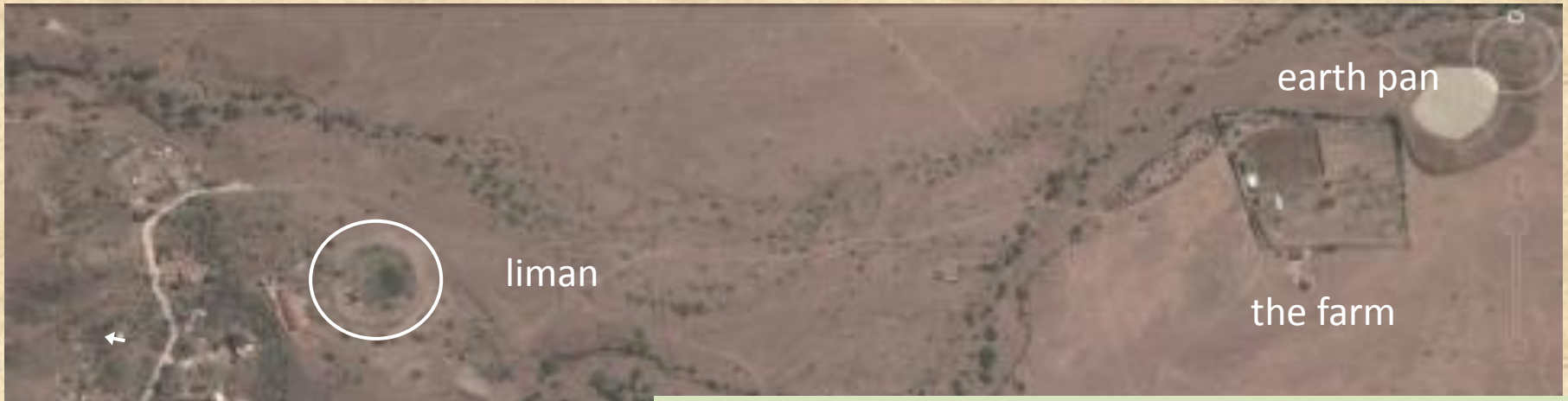
Former attempts failed

- Harsh environmental conditions
- Lack of know-how
- Experts presence over long time
- Cultural gap: herders to farmers
- Lack of infrastructure
- Lack of 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 the 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

Central Training, Research and Demonstration Farm

Endorsement of FID by the former Kenyan Prime Minister Raila Odinga, the former Ministress of Agriculture Sally Kosgei, and the former Israeli Ambassador to Kenya, Gil Haskel, August 2012



- insect proof nursery and net-house
- tree nursery
- **7 gravity-fed drip-irrigated open fields**
- central water distribution system
- 2 Limans, 1 earth pan, 2 compost pits
- storage facility for agricultural inputs
- living and studying facilities for the trainees
- **Israeli operation manager, Turkana farm manager, Israeli and foreign trainers (volunteers), local Turkana trainers, 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
- Literacy

First farmers association in Turkana 18 December 2014

Saint Isidore Turkana Farmers Association

- Fully operating central farm
- 7th course completed Dec 2016
- 93 graduates and 113 assistants
- Trained 4 Turkana trainers in agriculture and 8 assistants

Certificate OF

Irrigated Desert Agriculture

This is to certify that

Ms. /Mr. _____

Has successfully completed a 6 month intensive residential training

In the framework of

Furrows in the Desert

The course took place in Lobur Mission – Turkana, Kenya

From 1st October 2012 till 31st March 2013

Course contents included:

1. Compost preparation
2. Land preparation
3. Crop planning – Market based
4. Nursery
5. Irrigation
6. Plant protection monitoring system
7. Weed control
8. Crop management
9. Post harvest
10. Record keeping

Established over 100 local plots within 34 communities


Wanjala, Lobur


Paulina, Kokuru

Alice, Kokuselei

Wiliamina, Kopotia

Ruth, Manalogoria

Peter, Manalogoria

Christopher, Kaikor

Thomas & Yhoana, Nariokotome

Supporting volunteers from Israel and the Diaspora
Joint project FID-KKL-JNF Germany
(2016-2017)

- Supporting 6 volunteers a year from Israel and Germany for 6 months of volunteering work
- One week training in Israel followed by appropriate training in Turkana

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

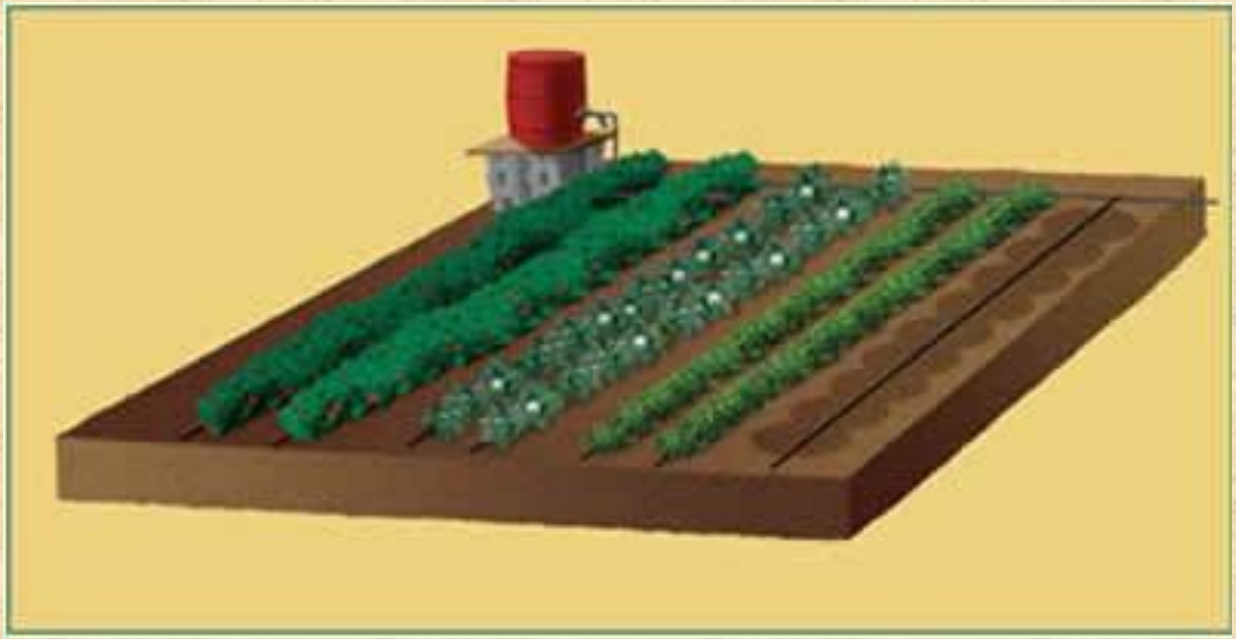
Bringing Majhul Dates to Turkana & installing solar water pumping systems
Joint project FID-KKL Israel (2015-2017)

- Purchased 170 offshoots from Kibbutz Samar
- Completed land preparation & installation of irrigation system over 1 Ha at Lobur, Turkana
- Compliant with Kenya Plant Health Inspectorate Service (KEPHIS) for 3 months quarantine of date shoots
- Date shoots are expected in Lobur by end of February 2017
- Installed 2 solar water pumping systems at the Napeikar and Kopotea farming clusters

Site inspection by KEPHIS, December 2016

Photo from the Arava, Israel

Adaptation of Israeli know-how in desert agriculture



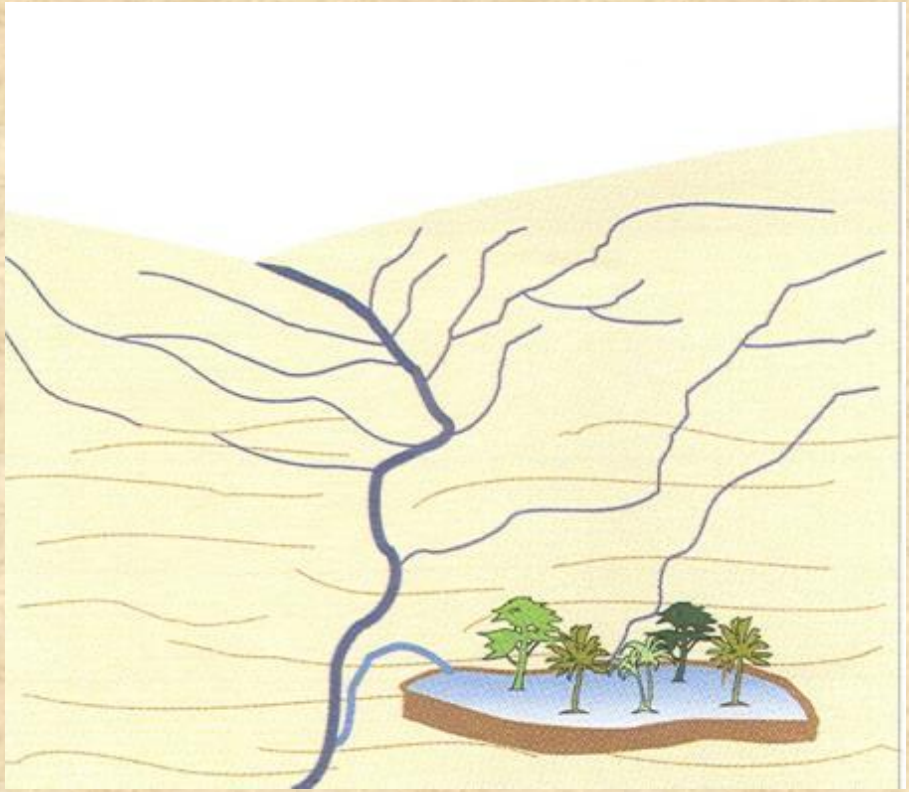
Gravity-fed
Family drip-irrigation system
Developed by Netafim, Israel

350 farmer's kits donation
by Rotary International

Adaptation of Israeli know-how in desert agriculture

Liman: diverting seasonal runoff water to an area enclosed by low retention walls for growing fruit trees and fodder for animals.

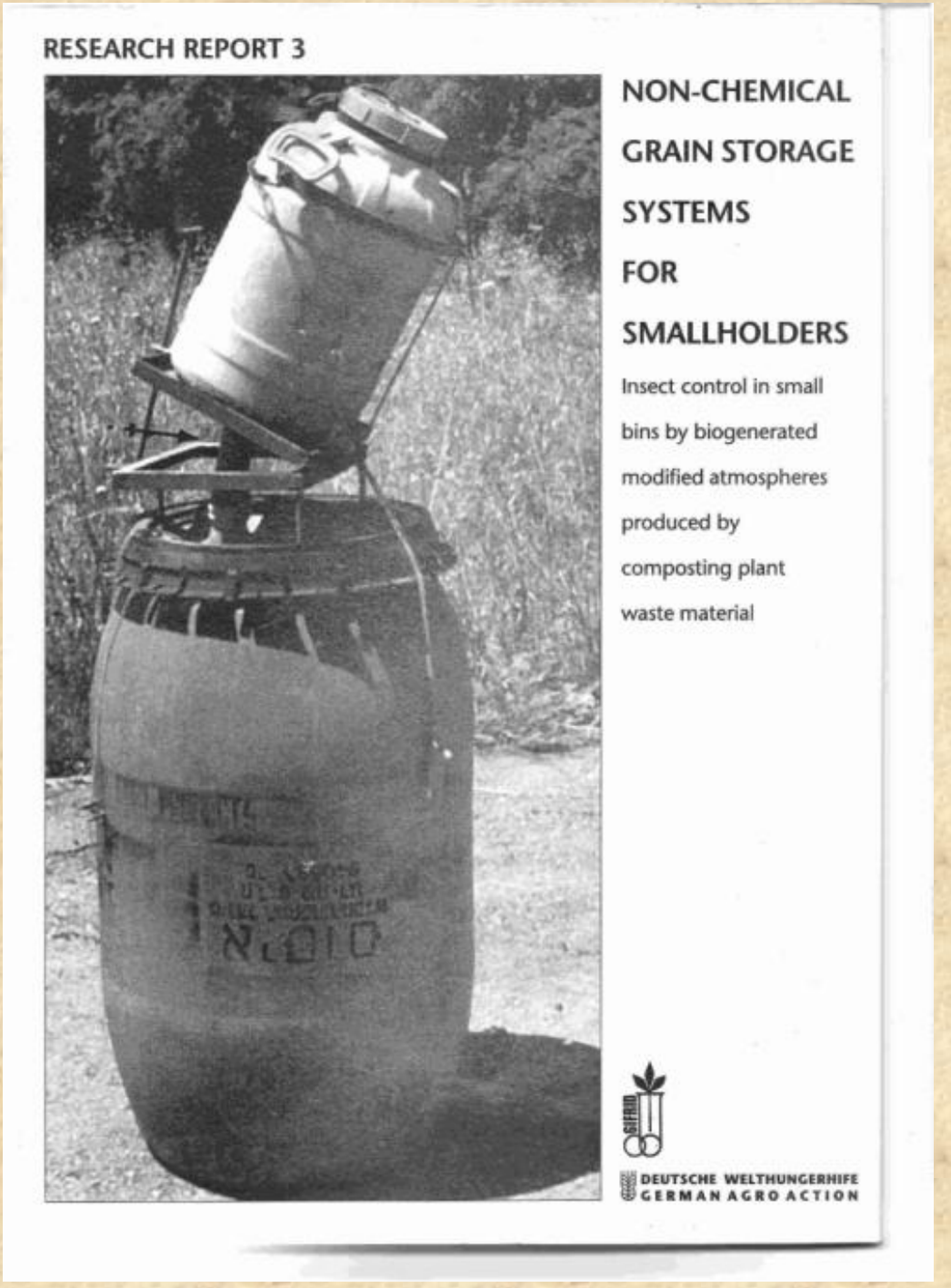
Nabataeans & Israelis, Negev Desert, Israel



Adaptation of Israeli know-how in desert agriculture

Seed and product protection

Developed in Israel for GIFRID (Germany)



For a better tomorrow in Turkana

Be part of a change

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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.

Supporting organisations and institutional bodies:

- ROTARY International through an initiative of ROTARY Israel
- Israeli Foreign Office through MASHAV and the Israeli ambassador to Kenya
- KKL- JNF, Israel & Germany
- Emalaikat Foundation (Spain)
- New Ways Charity (UK)
- DKA Austria on behalf of the Catholic Children Movement of Austria

Additional Information:

- The partnering organisation
- The environmental conditions in Turkana
- The Turkana People
- The 4 agricultural models we practice
- Examples of what we grow

Arava Center for Sustainable Development (ACSD)

Partnership of three research and academic institutions, the Arava Institute for Environmental Studies, the Southern Arava R&D Center in Agriculture and the Dead-Sea & Arava Science Center, Arava region, Israel

Conducting research in water resource management, sustainable agriculture and renewable energy

ACSD was established to facilitate the dissemination of these expertise to developing communities facing environmental and technological challenges.

Field study, Turkana 2011

MCSPA visiting AIES, Israel 2012

Vision

To support community-driven development programs locally and worldwide, aiming at poverty reduction, gender empowerment and improvement of life quality by collaborating with local and international partners to design and implement technology-based sustainable development projects.

Activities

- Generating development projects and appropriate technology transfer to developing communities
- Conducting short-term adaptive training programs in developing countries and in the Arava region
- Disseminating knowledge acquired through applied research with partner institutions as well as lessons learned from experience in the field

The Missionary Community of Saint Paul the Apostle (MCSPA)

MISSIONARY COMMUNITY of SAINT PAUL the APOSTLE

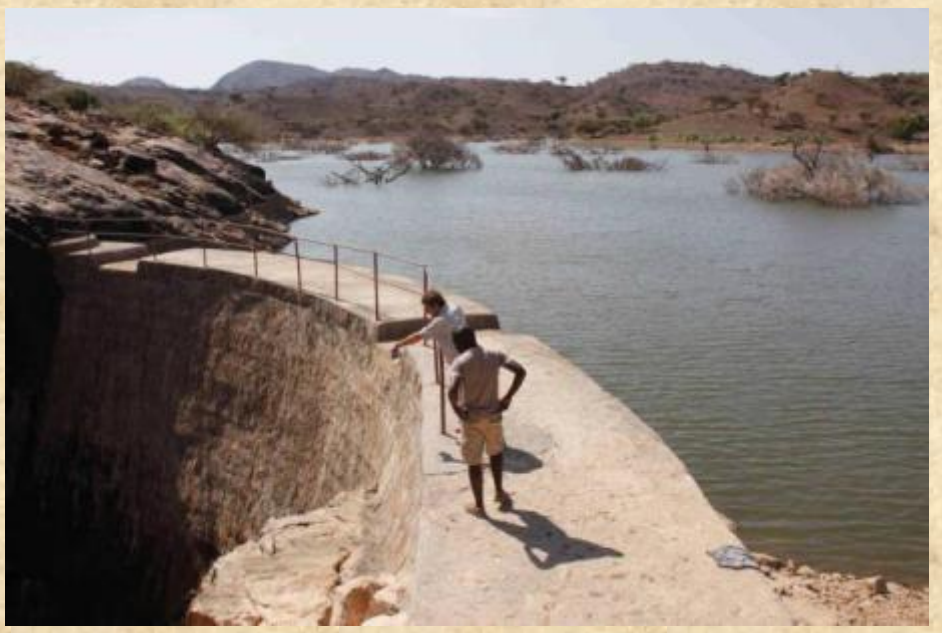
A public association of Christian faithful of the Catholic Church, made up of priests and lay people from different parts of the world. It operates in north-east Turkana and in south Ethiopia since 1986.

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 107 rock dams by trained teams of Turkana people
- The construction of 92 earth pans and dams using own bulldozers
- Drilled over 165 boreholes, most are equipped with a hand pump, some with a solar pump and 30 with Kijito windpumps

Water infrastructure installed by MCSPA in Turkana



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.

Turkana is a semi arid region in Northwestern Kenya, on the border with Ethiopia, South Sudan and Uganda.

It is the largest yet least developed district in the country. Most of its inhabitants are children and youth.

Area of Turkana:	77,000 km^2
Area targeted:	20,000 km^2
Population:	850,000 (Turkana, estimate)
	140,000 (north Turkana, estimate)
Temperature:	20-40^{0}C
Precipitation:	100-400mm/y (low land - elevated land)
(non drought year)	2 short rainy seasons
	Typically flash floods lost in runoff
Evaporation:	7-12mm/day
Water quality:	Poor: underground & Lake Turkana: pH 8-9, EC: 2.5-3.5 dS/m
	Good: surface runoff: pH: 7.8, EC: 0.9 dS/m (Natoo rockdam)
Soil quality:	Poor: 40% sand, 30% silt, 30% clay (Montmorillonite), pH 8-9
	Good: floating seedbeds: 2:1 ratio dry-river-sand:compost

Traditionally the Turkana way of life evolves around their livestock for nutritional and cultural needs

They grow camels, goats, zebus and donkeys

For food they rely on their animals for milk, meat and blood. Occasionally they would gather wild fruits, hunt wild animals and gather honey. Often they would trade with neighbouring tribes for maize, beans and a very limited variety of vegetables and grains.

Traditionally, if a family lost their livestock it would arm itself and raid a neighbouring tribe to restock.

The Turkana share the same origin and language with the Karamojong tribe of Uganda, and the Toposa and Nyangatom tribes of South Sudan.

The main adversaries of the Turkana People over grazing territory and water resources in north Turkana are the Daasanach (Merille) People of Ethiopia who speak a Cushitic language and share a similar way of life

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

Without a viable alternative they may raid other tribes for restocking of livestock or collapse into complete dependency on aid food.

Diversification for the Turkana People is to have an **alternative way of life** that can be a mean to self-subsistence and provide the family with food security.

In the past decade commercial fishing on Lake Turkana became such a viable alternative way of life to many who were forced to settle and abandon the nomadic life.

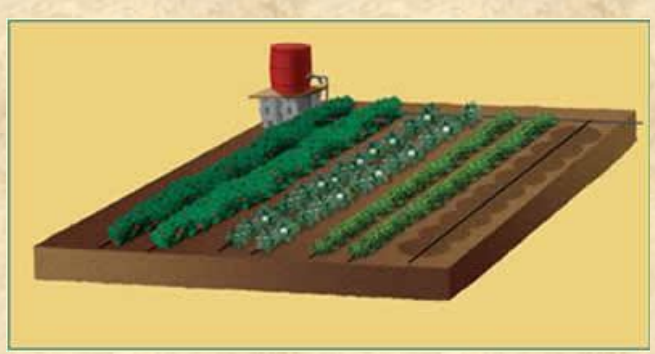
We believe that the development of **sustainable agricultural** is the next form of diversification available to the Turkana People that are “in transition”.

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

Temporary camp inside the protecting fence of the MCSPA mission in Todonyang to families “in transition” who lost their herds to drought and raids

Practicing 4 Agricultural Models

Four types of agricultural models are practiced for training, demonstration and research:



1. Subsistence to commercial agricultural plots

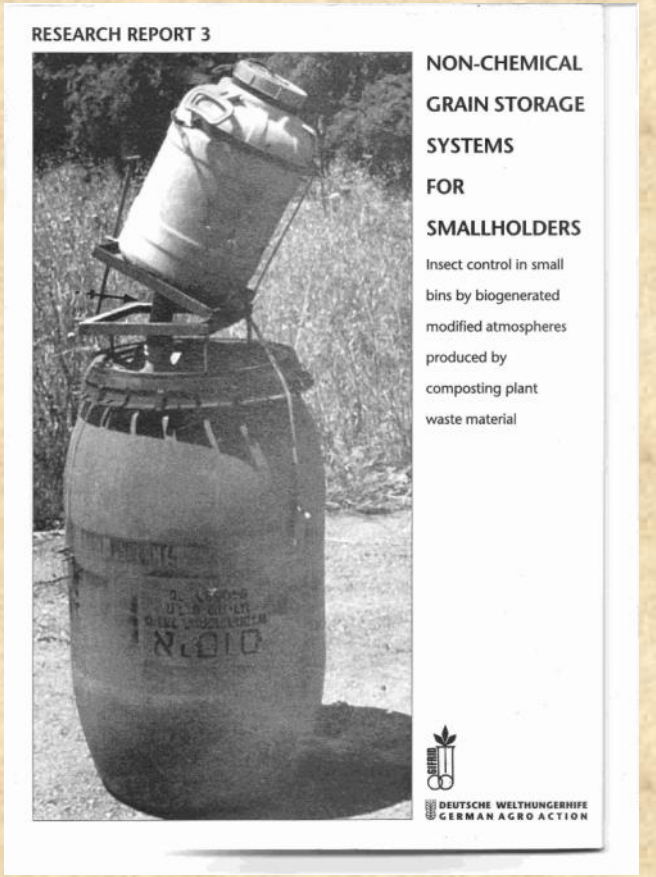
- Family scale to a community cluster scale of several plots sharing a central water infrastructure
- Growing in open field with or without a net-house over a growing area of 500-750m^2 per farming unit
- Gravity fed Family Drip irrigation Systems (FDS)
- Crop selection according to:
  - nutritional value
  - suitability to the local climate, soil and water properties
  - water availability
  - marketing potential (transportability properties and economical parameters)

Plant growing plan:

- 4 crops a year out of 5 plant groups in 2 cycles
- Legume: soy beans, peanuts, chickpeas, green gram, cowpeas
- Solanaceae: tomatoes, eggplant, chilli
- Cucurbitaceae: water melons, melons
- Allium: onion, garlic
- Others: sorghum, corn, okra, spinach, kale, beetroot
- Selected varieties of fruit trees

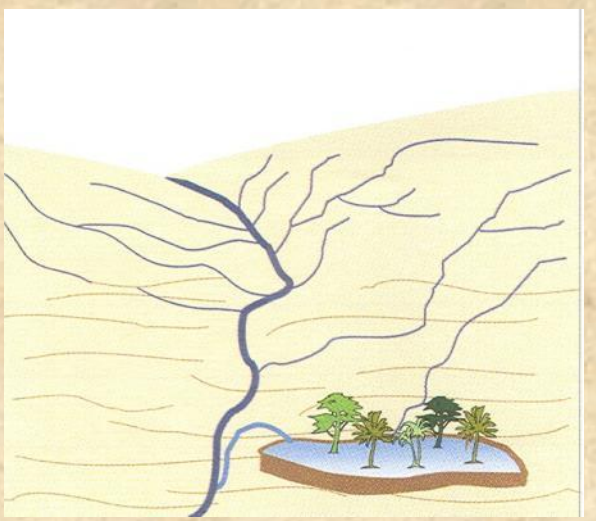
Seed and product protection:

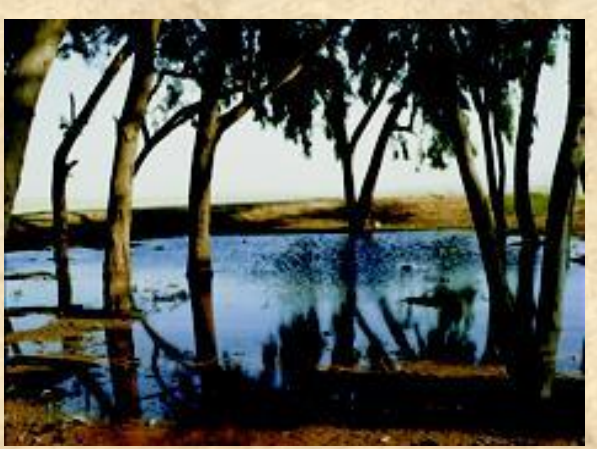
- Double container system for keeping seeds for next season planting or for sale when prices are high when a product is out of season
- Produce low level processed products:
  - ➢sealed clay pots for later consumption such as cooked okra or chickpeas in tomato juice covered by a thin layer of oil
  - ➢Dry products such as tomatoes and chilli

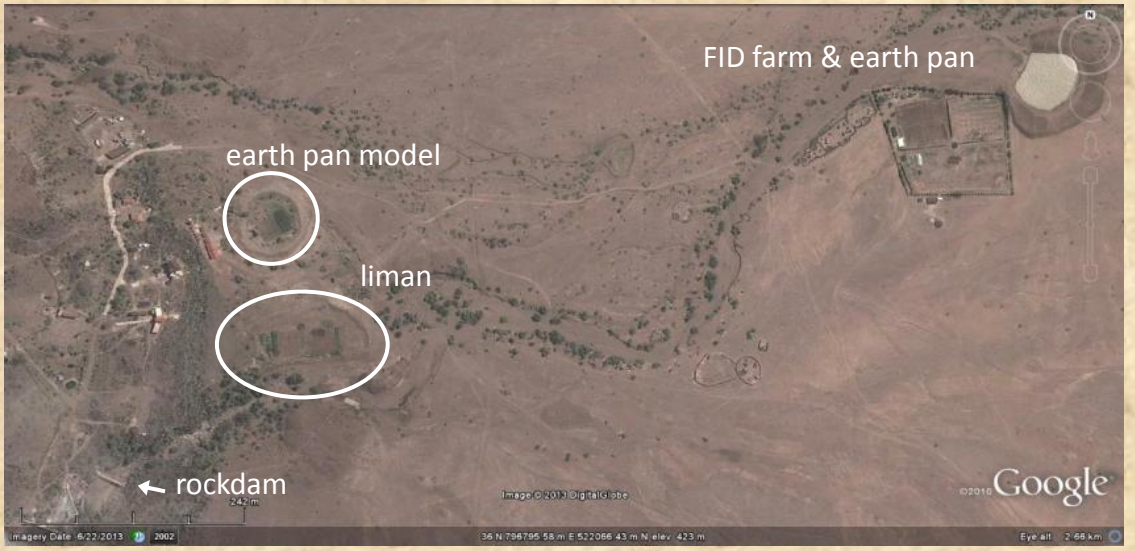


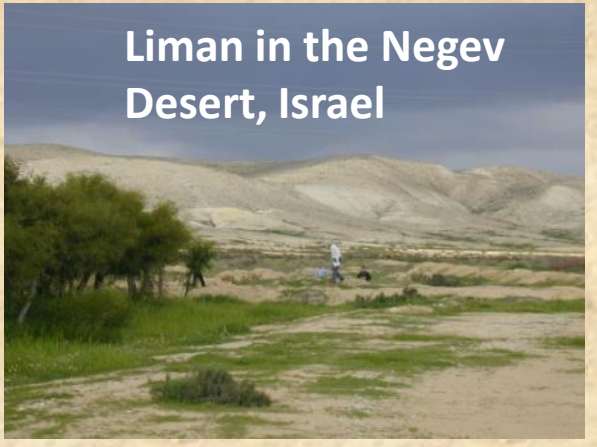
2. Liman – diversion of flood runoff

- Cultivation of crops based on diversion of seasonal runoff water to an area enclosed by low retention walls
- To be used for:
  - Fodder: animal feed
  - Fruit trees: such as pomegranates, almonds, and olives adapted to arid conditions
- This method requires relatively small investment in infrastructure and maintenance and is suitable for implementation along many of the dry rivers cutting through the plains of North Turkana









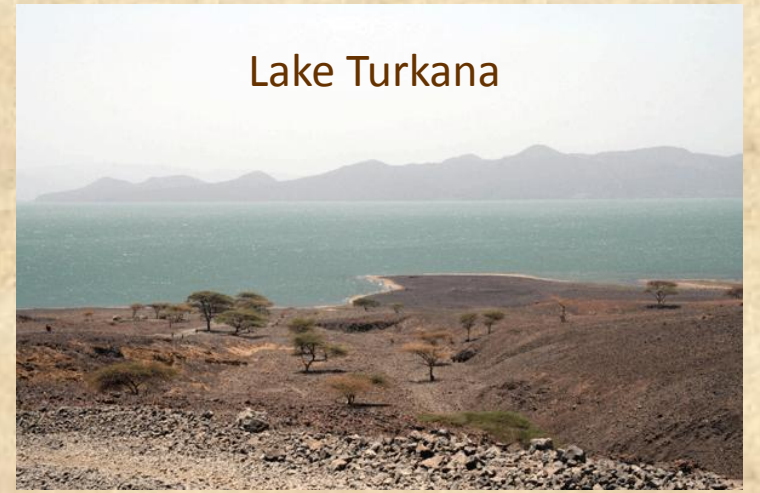
3. Earth Pan System

- While full with water the earth pan will support adjacent plots growing short-duration crops
- When the water in the earth pan will reside, rain-fed crop types will be planted inside the earth pan, utilizing the water absorbed by the soil
- Production of vegetables, fruit and grain (sorghum, millet etc.) is expected to be supported for a duration of 9 months

FID earth pan: maize & watermelon

4. Central Farm for dates and fodder on a commercial scale (to be developed out of FID)

- Utilizing the alkali water from some of the boreholes and of Lake Turkana for this water intensive model
- Dates will be intercropped by annual crops in order to provide income from the first year onward
- Propagation of offshoots from the third year after planting will support future date plantations and be a source of income in addition to the dates
- Date crops are expected from the fifth year
- Other saline/alkaline-water resisting crops will be intercropped such as pomegranates or sapota with fodder like sudan grass



Dates and Pomegranates grown at the Arava R&D Agricultural Center, Arava Desert, Israel

Examples of what we grow

Location	Graduate	Types of crops seeded & planted
Kaikor	Kennedy	Onion (nursery) cowpea (direct seeding)
Lokitaung	Joseph	Kale, okra, swisschard
Lokitaung	Peter	Onion, okra, swisschard
Narikotome	Peter	Tomatoes (nursery), okra (direct seeding)
Kokuro	Paulina	Okra, cowpea, squash, melon, kale
Lobur	Wanjala	Tomatoes, kale, green pepper (nursery) Melon & swisschard (direct seeding)