



# KNOWLEDGE AND EXPERIENCE SHARING SYMPOSIUM

## Towards Highly Rewarding and Inclusive Flood-based Livelihoods

Significant contributors to food and nutrition security and healthy environment

*Abraham Mehari, Principal Researcher and Project Manager  
MetaMeta/ICRAF*

4<sup>TH</sup> TO 8<sup>TH</sup> MARCH, 2019

VOI WILDLIFE LODGE, TAITA TAVETA COUNTY, KENYA





**Peak discharge: 500 m<sup>3</sup>/s**

**20,000 ha Wadi Mawr  
scheme in Yemen**

**Up to 10% sediment  
concentration**

**50,000 ha Gash Scheme,  
Sudan**



# Flood-Based Livelihood Systems (FBLS) are productive and innovative

---

Reversing the destructive nature of floods and the huge sediment challenges they bring along into a blessing for:

- ❖ Increased cropped area and higher yield: cereals, oil seeds, pulses, trees
- ❖ Preserving biodiversity, rehabilitation of degraded environments
- ❖ Better groundwater recharge
- ❖ Domestic and livestock water supply
- ❖ Mitigating climate change impact and variability



## There are many reasons to invest in FBLS

---

- ❖ They are staged in remote locations – they can directly benefit flood and drought prone communities
- ❖ They are significant: 15 million ha in arid and semi- arid regions in SSA – and another 15 million in Asia and the Middle East
- ❖ Much of the potential is still unharnessed – relatively much investment has so far been directed to rain-fed and conventional irrigated agriculture.



## The future of FBLS is bright .....

---

- ❖ The flood and drought prone ASAL areas are increasingly becoming important livelihoods hubs.
- ❖ ”Due to population growth and urbanization, farmers, who had enjoyed rain-fed farming systems or places with relative plenty irrigation supply, are being pushed into dryer, more marginal areas where they become increasingly vulnerable to recurrent drought and flooding, and the unpredictability of weather patterns resulting from climate change.” *FAO (2017) Partnering to build resilience, food and nutrition security*



## The four categories of FBLS

---

- ❖ **Spate irrigation:** diversion, distribution and management of short duration flood flows from seasonal or ephemeral rivers
- ❖ **Flood-spreading weirs:** using a series of weirs to manage and spread floods for rehabilitating degraded land, enhancing ground water recharge
- ❖ **Flood plain agriculture:** cultivation of flood plains, using either receding or rising flood water or both
- ❖ **Roads for water:** water harvesting from roads for multiple use



## Spate irrigation defined

- ❖ Ephemeral rivers - short duration floods (last a few hours to a few days )
- ❖ Floods carry large quantities of sediment (up to 10%)
- ❖ Floods are directly diverted and distributed to cultivable land
- ❖ Crops grow on residual soil moisture
- ❖ Deep soil profiles with good infiltration, water holding capacity, and hydraulic conductivity are necessary
- ❖ Deep rooted crops are preferred



**Wadi Mawr spate irrigation in Yemen**



## Innovative earthen flood diversion bund with porous spillway



A breached earthen bund could cause significant damage



Earthen diversion bunds with porous spillway





## Simple interventions can make big difference



## Soil moisture conservation in flood prone areas - Kajiado County (Celestine Kilongosi)

---



**Ridge and mulching increased**

**Yield of sorghum by 56%**

**From 5.2 to 8.1 ton/ha**



## Some bright spots

**Spate irrigated  
areas in Eritrea and  
Ethiopia**

**1<sup>st</sup> harvest : 4 ton/ha**

**2<sup>nd</sup> harvest (ratoon):  
2 ton/ha**

**Third crop: water  
melon**



FAO data base: A good sorghum yield under irrigation is 3.5 to 5 ton/ha



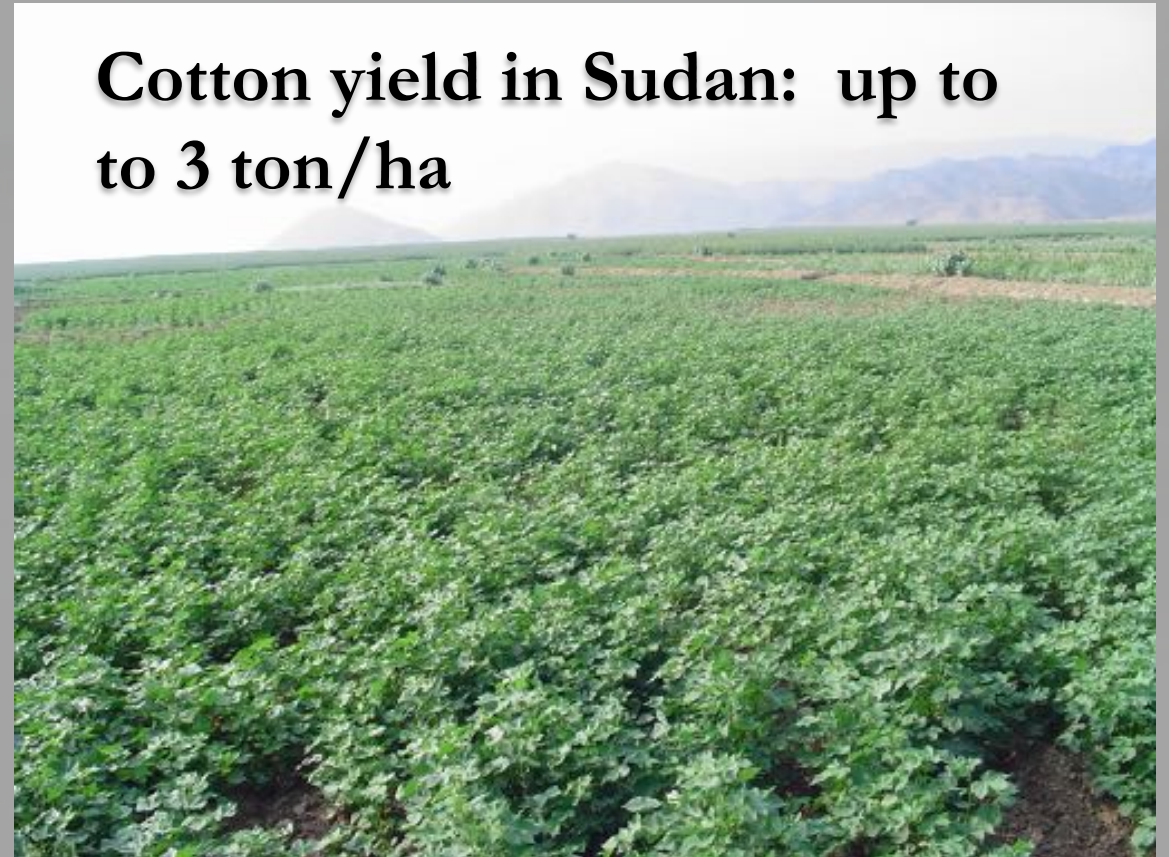
## Some more bright spots

Highly value crops also flourish under spate irrigation



**Oil Seeds yield (Sunflower, Soybeans) in Pakistan : up to 3.5 ton/ha)**

**Cotton yield in Sudan: up to to 3 ton/ha**



**FAO data base:**

**Cotton yield : 3.5 to 5 ton/ha, Oil seeds 2 to 4 ton/ha**

# Floods major source of drinking and livestock water supply in Gash, Sudan

---



**Flood-fed artificial well recharge basins mainly for drinking water supply**

**Flood-fed reservoirs for both human and livestock consumption**

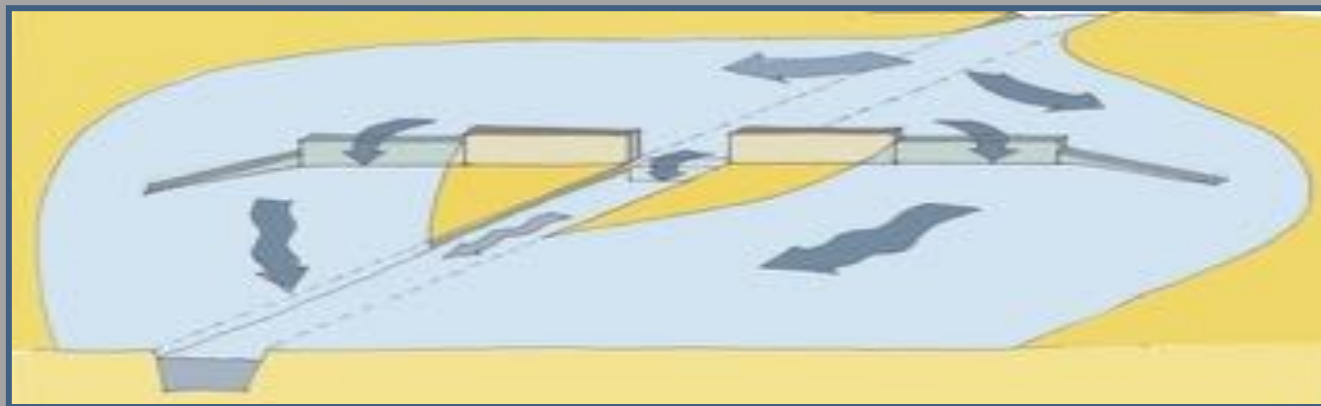
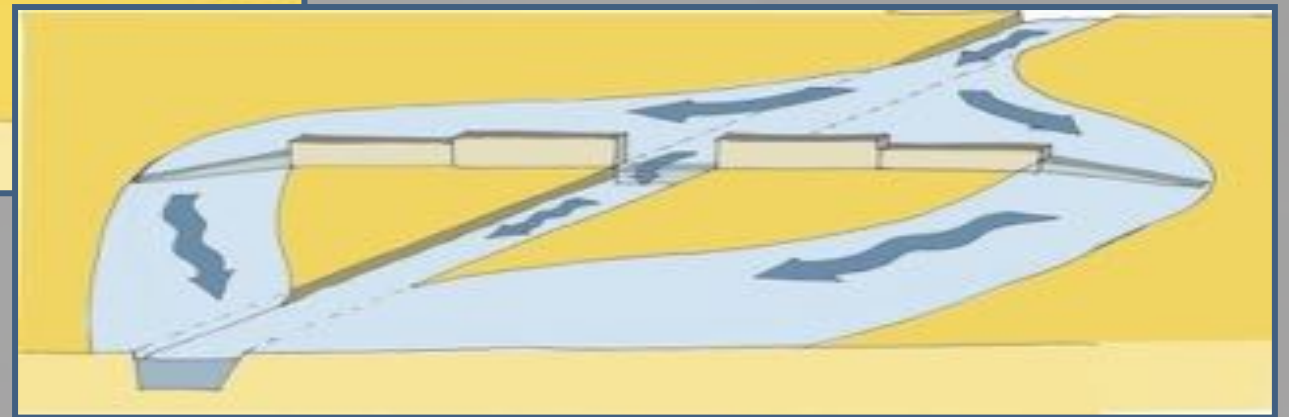


# Floodwater spreading weir (Giz, Dieter Nill) - Niger

Rehabilitate degraded land,  
improve groundwater  
recharge and agricultural  
productivity



# Floodwater spreading weir - the principle



## Changes in arable land, yield and production in 11 rehabilitated valleys in Niger (Betifor, 2010)

Element	Situation before flood spreading weirs	Situation afterwards	Difference	Growth factor
<b>Area under cultivation (ha)</b>	2,847 ha	8,132 ha	5,285 ha	<b>2.9</b>
<b>Yield (kg/ha)</b>	333 kg/ha	675 kg/ha	342 kg/ha	<b>2.0</b>
<b>Production (t)</b>	<b>948 t</b>	<b>5,489 t</b>	<b>4,143 t</b>	<b>5.8</b>

- ❖ 2 to 3 times harvest per year of pumpkin, tomato, sweet potato, onion
- ❖ Groundwater level increased by 8.5 m in 5 years



# Flood plain agriculture – flood recession



Flood recession Agriculture in  
North West Ethiopia

## Chick pea - yield

- ❖ Rain-fed: 400 to 600 Kg/ha
- ❖ Flood-recession: 2 ton/ha
- ❖ FAO data base: 2 to 3 ton/ha



## Flood plain agriculture – flood rise

---

- ❖ Deep water rice that grow in flooded conditions: water  $>$  50 cm deep for at least a month
- ❖ More than 100 million people in South and Southeast Asia rely on deep-water rice for their sustenance
- ❖ Adaptation strategy: advanced elongation ability



# Harvesting floods from roads





## Flood-Based Livelihoods Network Foundation



"Floods are not always a hazard. They may also sustain aquatic life and riverine biodiversity, recharge aquifers, enrich soils and in some of the world's poorest areas they are the main source of irrigation."

Global Water Partnership (2000) 'Toward water security: a framework for action'



### NEWS

[www.spate-irrigation.org](http://www.spate-irrigation.org)

- Read our latests newflash [here](#)
- Practical note no. 38 **The Use of Trees and Shrubs in Spate Irrigation Areas** is now available
- From the 4th till the 8th of March the knowledge and experience sharing symposium on FBLS will take place in Voi, Kenya. For more information and subscription, click [here](#).

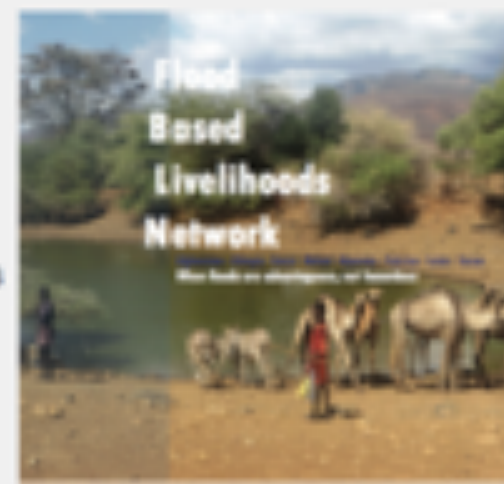


Join the Network

## THE FLOOD-BASED LIVELIHOODS NETWORK

is a network of spate irrigation professionals and practitioners. The network stimulates the development of programmes of implementation that improve the livelihoods of those in spate irrigation areas, exchanges experiences and good practices, helps upgrade training, identify priority fields for improvement and research and development.

[Read more...](#)





## Newsflash February 2019

### Flood-based rice farming in Ahero

In Ahero (Kenya) over 1000 farmers practice flood-based rice farming and are fully dependent on floodwater. [This video](#) gives an overview of their practices and innovations.

### Staff training on FBFS and rainwater harvesting

FBLN Malawi trained 42 extension workers from government departments and NGOs in the Shire Valley (Chikwawa and Nsanje Districts). The training took place the 21<sup>st</sup> and 22<sup>nd</sup> of January and covered FBFS and rainwater harvesting. Through FBFS the Shire Valley could potentially be the bread basket for the country. Participants visited some farmers practicing FBFS in the area. Communities associate floods with short term benefits in form of relief items e.g. blankets, cooking oil, clothes. However further probing and discussions revealed that FBFS form the basis their food production systems. There is need for more awareness raising on FBFS and changing of attitudes towards floods. Strategies have been drawn to set up demonstration sites and farmer field schools.



### Field Day on FBLIS in Kajiado, Kenya

The Ministry of Agriculture – State Department of Irrigation, is the key institution having collaborating arrangement with ICRAF, and by extension – The FBLIS Programme that aspires to cross fertilize knowledge between Africa and South Asia. One of the key areas of focus for the Kenyan Chapter of the FBLIS Programme is to map



potential sites within the country. The field day was thus organized to convene Kajiado farmers in a bid to sensitize them on the FBLIS potential in their county, get them to ground-truth, ascertain and approve the mapping result and expound to them – the opportunities they can tap through enterprises such as Sorghum and Calotropis that can tolerate the twin challenges of flood inundation and cyclic droughts. About 35 farmers attended the field day on the 31<sup>st</sup> of January and participated in discussions and presentations made by ICRAF, SDI officials and a Lecturer from Jomo Kenyatta University of Agriculture and Technology. Participants were amazed to know that it is possible to grow Sorghum under spate irrigation for animal feed and grains for human consumption as well as beer production. This was evidenced by the research that was undertaken under an AICR project in Kajiado, Kenya. The farmers participated and agreed

## Strengthened farmers' outreach



Farmers from Ethiopia, Sudan and Yemen exchanged experience in the Gash Scheme in Sudan

# Investing in local champions



**Model Farmer from Ethiopia**


**Model practitioner from Sudan**



**Local political leader (Pakistan)**



# Regional and international leadership courses



AFRICA TO ASIA: TESTING ADAPTATION OF FLOOD-BASED FARMING SYSTEMS (FBFS) PROGRAMME

## LEADERSHIP COURSE IN FLOOD-BASED FARMING AND WATER HARVESTING

DATES: 29 FEBRUARY TO 11 MARCH, 2016.  
NAIROBI-KENYA & ARUSHA TANZANIA

**Course Background**

The leadership course in flood based farming and water harvesting shall be organized annually in East Africa. This course will serve as a platform for the exchange of new and innovative ideas, experiences and knowledge among young and mid-career professionals.

**Key learning objective**

- Contribute to nurturing development leaders with a good understanding of the bigger picture related to participatory approach, watershed management and climate change and variability.
- Develop practical know-how and specific skills for sustainable development and management of FBFS and Water Harvesting systems.

**Course content**

The 1st week will be covered at ICRAF in Nairobi and shall entail the introduction of FBFS and RWH systems; flood diversion & distribution; flood hydrology & sediment management; and multiple use of floods including: road water harvesting, ground water recharge, rangeland management, agroforestry, as well as adaptation to climate change. Fifty percent of the time will be set-aside for group exercises and discussions.

In Week 2, participants shall proceed for a field excursion by road to the Pangani Catchment at the slopes of Mt. Kilimanjaro in Tanzania. They will interact and share their experiences with the farming community of Makanya Catchment.

**Target Group**

The course targets 30 participants who are policy and decision makers, mid-career and young professionals, flood irrigation practitioners, as well as farmer leaders from Governmental agencies, NGOs, Consulting firms, Academia and the farming community. These participants should already be directly or indirectly engaged in land and water development with special bias to FBFS. They shall be drawn from countries with current practice or potential in Sustainable Irrigation. Each of these

### Regular Short Course Sustainable Development of Flood-based Farming Systems in Arid and Semi-arid Regions

Mekelle University, Ethiopia



**Regular Short Course Sustainable Development of Flood-based Farming Systems in Arid and Semi-arid Regions**

**Demands drivers and relevant:**  
This short course was initiated in 2013 in Mekelle following an extensive field research to the arid lowlands of Ethiopia in 2012. The varied stakeholders consulted justified the need for the short course as follows:

- Acute shortage of flood based farming system (FBFS) designers, managers and researchers
- Limited participatory planning, implementation and monitoring of FBFS.
- Lack of capacity in basin-wide approach for the development of FBFS

**Key learning objective**  
Produce professional leaders with a broader understanding of a participatory and river basin approach and specific skills to design and manage FBFS.

**Course delivery**  
It follows practical approach where key experts present their case studies and share their best practices for extensive discussion with the participants. It is tailored at generating new ideas and practical elements of a technical, economic, environmental, social and managerial nature.

**Course duration**  
In 2014: 11 – 22 August

**Registration fee**  
600 USD

**Location**  
Mekelle University  
PO Box 231, Mekelle  
Tigray, Ethiopia

**Course content – six modules with clear focus**

MODULE 1	MODULE 2	MODULE 3	MODULE 4	MODULE 5	MODULE 6
Introduction to flood-based farming systems	Participatory planning, implementation and monitoring	Land and water management	Participatory design	Watershed management	Field visit
Gives comprehensive overview and clear out differences with conventional irrigation systems.	Provides concrete skills to Participatory Rural Appraisal (PRA).	Focuses on command area development, water rights based on-farm water management, FBFS relevant soil moisture conservation practices and existing tools.	Proposing key differences with conventional design concerning design, cost-benefit, soil analyses, make and canal design, sediment management.	Gives the bigger picture measures on the sustainability of FBFS and river basin.	Conducts in light talks and field systems, gain practical know-how through observation and discussion with local experts – farmers, site engineers, managers and extension workers.

**Implementing Partner Institutions**



- ❖ Regional course in Ethiopia has run for the 7<sup>th</sup> time in 2018
- ❖ The Intentional FBLS course is being organized for the 3<sup>rd</sup> time - to be an annual event in Kenya



# Consultative workshop to identify priority investment areas in FBLS - 12 and 13 March at Voi, Kenya

---

## Two objectives

- ❖ Identify the priority areas of investment and the varied fronts of targeted support required to harness the potential of FBLS
- ❖ Prepare a working list of such investments along with indicative technical capacity and financial requirements

## Four discussion sessions followed by investment defining groups

- ❖ Background paper: unlocking the potential - targeted investment in FBLS
- ❖ Synthesis of this week (4 to 8 March) knowledge and experience sharing symposium
- ❖ Examples of successful targeted investment programmes
- ❖ Donors perspectives





Global Resilience Partnership:

“Floods are not always a hazard. They may also sustain aquatic life and riverine biodiversity, recharge aquifers, enrich soils and in some of the world’s poorest areas they are the main source of irrigation.”