



DREAM - Learning Event II

Educational institutionalization of the Dry Valley Rehabilitation and Productive Use Approach

Wednesday 28 April 2021

Capacity Building in Flood-based Farming Systems: *Experiences and Materials from the Flood-Based Livelihoods Network in Creating Capacity*

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1 The Challenge in ASAL Areas: Food Security, Resilience and Sustainable NRM



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The ASAL Areas of Horn/Sub-Saharan Africa

- Huge arid- and semi-arid land mass in HoA: 63% Ethiopia, 80% Kenya, 42% Uganda, almost 100% in Somalia
- 30 million (agro-)pastoralists live in the Horn of Africa's ASAL areas
- Low and erratic rainfall (<350 mm), very limited perennial water resources, high temperatures (max. 50 °C)
- Climate change effects: droughts, floods, degradation of natural resources
- Probably most vulnerable region to food insecurity
 - 2010/2011 drought: 13 million (agro-) pastoralists affected and in need of food, loss of livestock and crops
 - 2016/2017 drought: 15 million (agro-) pastoralists faced food and water shortages, loss of livestock and crops
- Endowed with numerous rivers that bring huge seasonal, short and heavy floods
 - Often unpredictable and can be destructive if not managed properly
 - Eroded and degraded river valleys, depletion of soils, loss in arable and pasture land



2 Effects of Poor Flood Water Management

Rainfall can neither be retained nor delayed



Catchment degradation



Erosion and gully formation



Gully erosion, degraded valley bottom



Water table reduction, little drinking water



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Loss of arable/grazing land



2036/06/20



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3 Flood-based Farming System (FBFS): A Significant and Suitable Approach that Works

- FBFS
 - ▶ **The use of:** often unpredictable and occasionally destructive flood from ephemeral streams;
 - ▶ **For multiple use:** Crop, rangeland and agro-forest production, domestic and livestock water supply, recharging groundwater, soil conservation and rehabilitation of degraded land;
 - ▶ **Through:** spate irrigation, flood recession and inundation, flood-spreading weirs.
- Flood-based farming system is the only option to transform floods from **forces of destruction to sources of livelihood** for the most vulnerable ASAL community
- FBFS is quintessential adaptation to climate change and variability

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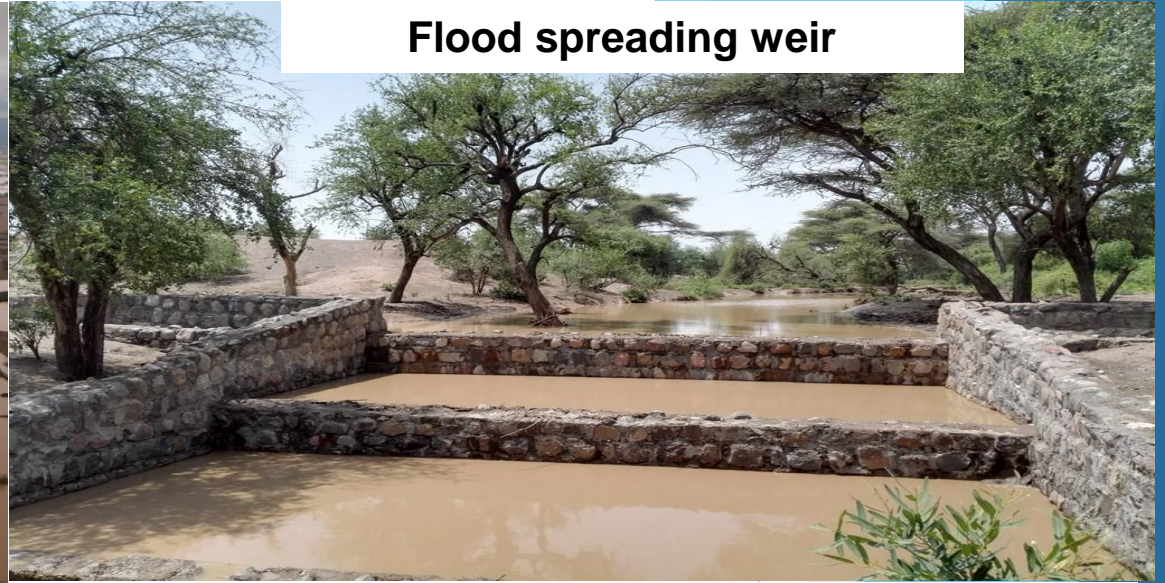
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Flood recession



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Flood spreading weir



Modern intake, canal head of spate irrigation system



Traditional intake and water distribution in spate irrigation system



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- **FBFS is significant contributor to food security**
 - ▶ Account for over 30 million hectares across the world;
 - ▶ Covers 15 million ha in Sub-Saharan Africa supporting 75 million most vulnerable segments of society;
 - ▶ Supports the livelihood of around 12 million people in ASAL of Ethiopia.

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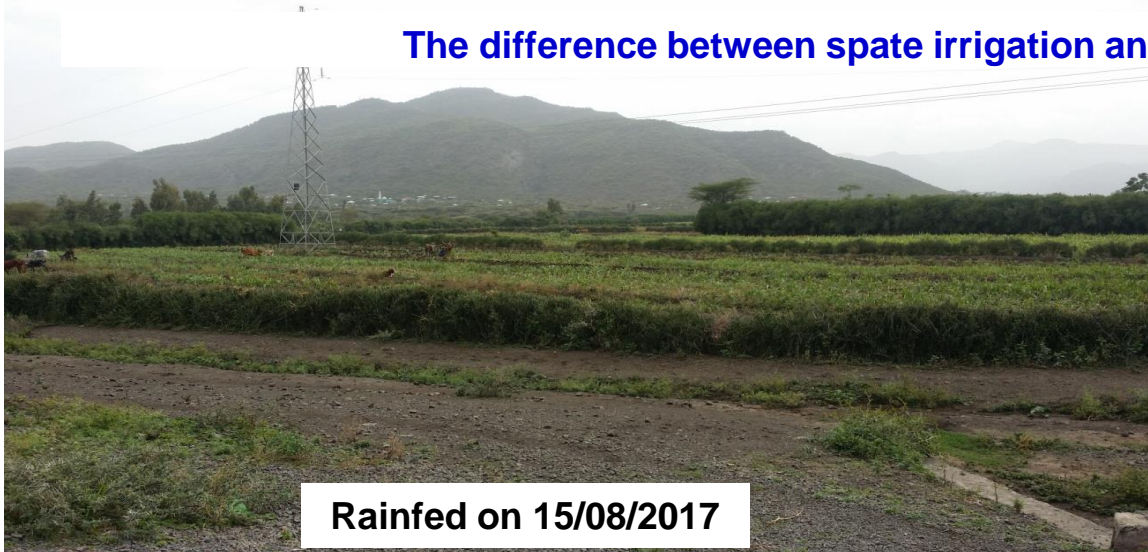
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FBFS is WRONGLY perceived as subsistence!!!!

The difference between spate irrigation and rainfed agriculture in Raya Valley (Tigray)



Rainfed on 15/08/2017



Spate on 15/08/2017

The miracle of flood spreading weirs in Afar, Ethiopia (GIZ SDR-ASAL): Sheqay Boru (Chifra)



13.01.2016 11:55



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4 Capacity challenges to promote and implement successful FBFS

- A lot of substantial local wisdom and knowledge has developed in organizing flood based farming systems
- However, gap of knowledge, experience and skills remains a challenge:
 - ▶ The conventionally educated water and agriculture professionals can not cope with the unique characteristics of FBFS;
 - ▶ Lack of capacity in integrated watershed-wide approach for the development of FBFS system;
 - ▶ Limited participatory planning, implementation and monitoring.
 - ▶ *Acute shortage of FBFS system designers, managers and researchers.*



- >> Capacity on FBFS in ASAL areas is insufficient to successfully disseminate the technology locally and regionally
- >> Need for human capacity development and training

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Impact of insufficient capacity

Raya Valley, Ethiopia

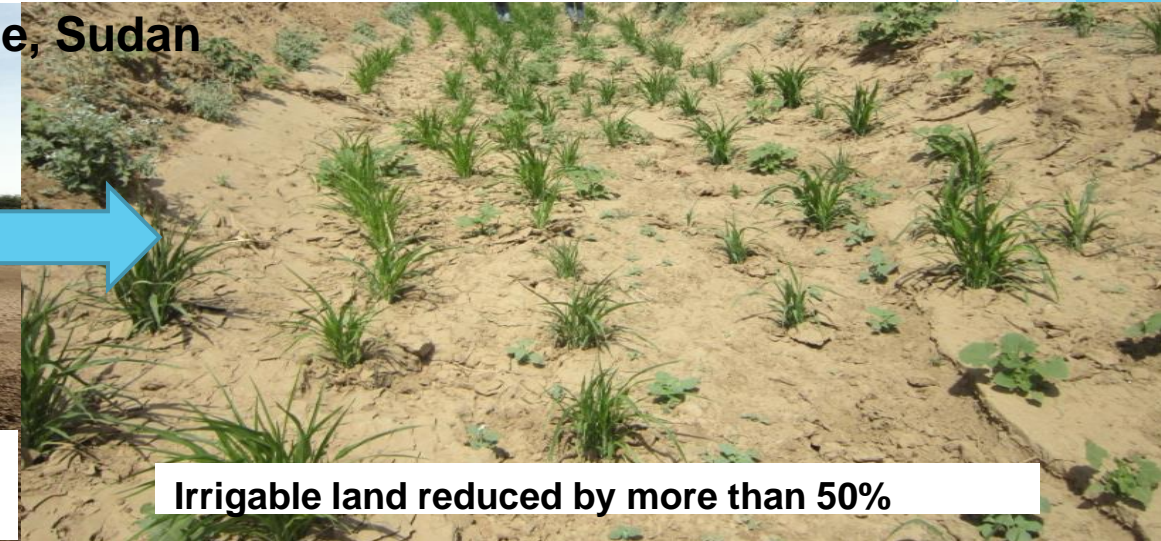


Pipe off-take before and after it was filled with sediment

Gash Scheme, Sudan



Intake blocked with sediment deposit; discharge abstraction reduced by 70%



Irrigable land reduced by more than 50%



5 Response to capacity building challenges in FBFS

- Since 2012 the German government (BMZ), through GIZ, has been supporting capacity development initiative for FBFS in the Horn of Africa, in cooperation with Mekelle University, Flood-Based Livelihoods Network, MetaMeta, IHE-Delft Institute for Water Education and IFAD
- A regular annual international short course on “**Integrated Watershed Management and Flood-based Farming Systems**” was launched in 2013 at Mekelle University following extensive field research in ASAL areas of Ethiopia in 2012. The course was designed to:
 - ▶ Reduce acute shortage of FBFS planners, designers, managers, researchers;
 - ▶ Support participatory planning, implementation and maintenance of FBFS;
 - ▶ Develop capacities in watershed approaches for the development of FBFS;
 - ▶ Reduce the failures, make better use of potentials of FBFS and investments.
- It is demand driven and relevant

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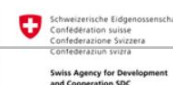


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Short Course Content – 6 Modules with clear Focus

Module 1	Module 2	Module 3	Module 4	Module 5	Module 6
Introduction to Flood-based Farming Systems	River basin approach for flood-based farming development	Participatory planning, implementation and monitoring	Water and Land management	Participatory design of flood based farming systems	Field Visit
<p><i>Provides an comprehensive overview of FBFS</i></p> <ul style="list-style-type: none"> – History, status and potential – Differences with conventional irrigation systems – International and regional examples (Sudan, Yemen, Pakistan and Ethiopia, Kenya) 	<p><i>Provides the bigger, territorial picture</i></p> <ul style="list-style-type: none"> - IWRM - Participatory water allocation - River basin water balance - River basin development phases - Irrigation demand calculation - Impact of watershed management on sustainability of FBFS 	<p><i>Provides concrete awareness and skills</i></p> <ul style="list-style-type: none"> – Target group participation - concepts and practice – Setting up and resourcing participatory management process – Techniques and methods (stakeholder mapping, PRA and triangulation) 	<p><i>Provides skills for the command area development</i></p> <ul style="list-style-type: none"> – Water governance – Water rights and rules – Field water management – Soil moisture conservation – Modelling tools – Institutional development and strengthening 	<p><i>Provides technical skills for the design</i></p> <ul style="list-style-type: none"> – Spate irrigation design approach and principles – Flood analyses – Design for intake, operation, maintenance – Hydrology – Sediment control and management – Design of FSW – Impacts of FSW (groundwater recharge, rangeland rehabilitation, agricultural productivity) 	<p><i>Provides practical experience and learning in the field</i></p> <ul style="list-style-type: none"> – Good examples and failed systems – Practical knowhow through discussions with experts, farmers, (agro-)pastoralists, engineers, development planners and extension workers – Practical group exercise

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All modules use interactive, modern training methods, including [lectures](#), [videos](#), group exercise, practical field work



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6 Results achieved, lessons learnt and actions taken

6.1 Successful capacity building

- Curriculum and training materials prepared, continuous amendment made
 - *Ecosystem services of watershed management and FBFS added recently*
- 8 rounds of regular international short course held
 - More than 220 professionals from different governmental and non-governmental organizations from East and West Africa trained
 - Countries include Ethiopia, Kenya, Djibouti, Somalia, Somaliland, Uganda, Sudan, Mali, Nigeria, Ghana and Burkina Faso
- Knowledge and technology transfer between West and East Africa, Middle East and Pakistan

6.2 Roll out of improved FBFS in East Africa

- Ethiopia
 - Improved hybrid spate irrigation systems design and construction in Tigray (Mekelle University, TBoWR and IFAD)
 - Flood spreading weir design and construction in Afar (GIZ SDR-ASAL)

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- Kenya
 - Spate irrigation systems design and construction in Turkana County (Ministry of Agriculture, Pastoral Economy and Fisheries and GIZ DRP II)

6.3 Increased interest of countries for feasibility study and design of FBFS

- Ethiopia
 - Assessment and identification of appropriate soil and water conservation activities for Hadew watershed, Somali Region
 - Assessment and identification of appropriate soil and water conservation activities for Goora Guba watershed, Somali Region
- Kenya
 - Potential bright spots for flood-based irrigation systems in Marsabit County
 - Potential bright spots for flood-based irrigation systems in Turkana County
 - Feasibility study and detailed design of Kakongu spate irrigation scheme, Turkana County
 - Feasibility study and detailed design of Malgis spate irrigation scheme, Marsabit County

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- Somaliland
 - Feasibility study and detailed design of Beeyo Qalocan spate irrigation scheme, Upper Biji catchment
 - Feasibility study and detailed design of Gedabera spate irrigation scheme, Upper Biji catchment

6.4 Increased demand of partners for hands-on on-job training of experts

- There is an increased demand by partners for an on-job training of their experts in the feasibility study and detailed design process of FBFS
- In this modality, experts are engaged in actual feasibility study and detailed design of pilot FBFS scheme with Mekelle University professionals serving as trainers, coaches, supervisors and evaluators:
 - Identification of pilot scheme and preliminary on-field training
 - Theoretical and practical training on major capacity gaps
 - Joint feasibility study and design of pilot spate irrigation scheme

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- This approach:
 - Tested in Kenya, Somaliland and partly Ethiopia
 - Trained about 35 experts
 - Proven to be effective

6.5 Spin off impacts of the FBFS short course

- Design of FBFS is included in the curriculum of the MSc program in Irrigation Engineering and Management being offered at Mekelle, Bahir Dar and Arba Minch Universities
- Collaboration initiative between Mekelle University and Turkana University College (Kenya) in dryland farming systems and FBFS
 - Joint short term, diploma, undergraduate and postgraduate capacity building programs
 - Collaborative research programs and projects
 - Faculty exchange programs
 - Student exchange programs

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7 Outstanding challenges and way forward

7.1 Outstanding challenges

- Variation in the implementation of acquired knowledge, skills, methodologies and tools by trainees on implementation of FBFS
- Lack of follow up tracer study on trainee and employer performance and satisfaction

7.2 Way forward

- Carry out follow up tracer study of the impacts of the Mekelle University international short course on FBFS
- Organize pilot hands-on on-job training programs in major FBFS potential areas in East Africa in collaboration with relevant partners
- Establish an international task force led by FBLN/IHE-Delft to lead the vigorous institutionalization of capacity building in FBFS across the Horn of Africa and beyond
- Organize regional conference on the **“Potential and prospects of FBFS for the socio-economic enhancement of the Horn of Africa under the prevailing and predicted climate change and population pressure scenarios”**
- Develop regional MSc program in **“Dry Valley Development and Management”** in collaboration with relevant partners

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What we do (Partly)



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Thank you



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