Flood-based Farming Systems
Significant Contributors to Water & Food Security & healthy ecosystem

Leadership Course in Flood-Based Farming
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Floods could surprise you
Floods bring huge sediments: A blessing, but also a challenge

Annual average field rise: 3 cm

Up to 10% sediment concentration in floodwater
In some fields sediment deposition reaches up to 3 m

Farmers trying to raise canal water level to irrigate fields
Flood-based Farming is an Innovation?

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

- Increased cropped area and higher yield: cereals, oil seeds, pulses, fruit trees
- Preserving biodiversity, rehabilitation of degraded environments
- Better groundwater recharge
- Domestic and livestock water supply
- Mitigating climate change impact and variability
More reasons why we should invest in FBFS

- They constitute poverty pockets - central to our effort to lift 700 to 800 million people out of poverty and into prosperity.
- They are significant: 15 Million ha in arid and semi-arid regions in SSA - 30 million ha worldwide.
- Much of the potential is still unharnessed - they are orphans left-out between rain-fed and conventional irrigated Agriculture.
Most countries in Africa

- majority of population is farmer (> 50%)
- low productivity
- lack of inputs and resources to increase productivity
- weak institutional capacity
Most countries in Eastern Europe, in Central and South America and in Asia, including Russia, Brazil, China, India, Indonesia, several countries in Africa

- growing economy driving farmers from their land to urban areas
- increasing demand, increase in production
- increase in farm sizes, mechanization
- higher-value crops to make a living on a relatively small plot
- part-time farming, in combination with a job in industry or service sector
Population in Countries with (Flood) Spate Irrigation

![Graph showing population in countries with (flood) spate irrigation over time. The x-axis represents years: 2010, 2030, 2050, 2070, 2090. The y-axis represents population in millions. The graph includes bars for Medium and High, Low, and Total populations.]
Cereal data in Countries with (Flood) Spate Irrigation
Methods of Flood-based Farming

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

Foot of mountain range

Plain

- Three crops
- Two crops
- One crop
- Occasionally one crop

Plain

Tube-wells
Flood-plain agriculture - recession
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
Floodwater spreading weir
Niger: Floodwater spreading weir = Roads (Giz, Dieter Nill)
Harvesting floodwater from roads
Chick pea - yield

- Rainfed: 400 to 600 Kg/ha - rain fed
- Irrigated: 2000 - 5200 kg/ha -

Fogera Flood plain - Flood recession: North West Ethiopia, East of Lake Tana
First harvest:
4 ton/ha

Second harvest (ratoon):
2 ton/ha

Third crop:
water melon

We should invest – FBFS are productive
Spate systems are Depositories of local biodiversity - Natural species of vegetation are often of considerable value and may provide additional source of income to local communities.
We should invest in FBFS: Gash river fed reservoir in Sudan

Flood is the only source
We should invest in FBFS: Gash river fed wells in Sudan.
Flood is the only source.
We should invest in FBFS: Cotton production in Toker, Sudan
Rehabilitate degraded land, improve groundwater recharge and agricultural productivity.
Preventing landscape degradation
### Economic benefits: Harvesting water from roads

<table>
<thead>
<tr>
<th></th>
<th>USD/km</th>
<th>% annual damage</th>
<th>% caused by water</th>
<th>Water damage USD/year</th>
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</thead>
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<tr>
<td>High way</td>
<td>1,250,000</td>
<td>6</td>
<td>30</td>
<td>22,500</td>
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<tr>
<td>Feeder road</td>
<td>180,000</td>
<td>10</td>
<td>35</td>
<td>5700</td>
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<tr>
<td>Gravel road</td>
<td>40,000</td>
<td>20</td>
<td>40</td>
<td>3200</td>
</tr>
</tbody>
</table>

**Investment:**
- Water harvesting structures: USD 5,000-10,000/km
- Modification to road design: USD 8,000-80,000/km

**Return - benefit**
- Pay back in reduced road damage: 1-4 years
- Reduced erosion and flooding: ++++
- Water harvesting benefits: ++++
The need for overflow structures

No overflow control structures

Open field intake with stop blocks

Orifice with settling basin for sloping fields
FAO GUIDELINES ON SPATE IRRIGATION

More detailed Design guidelines are under preparation
"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."


THE SPATE IRRIGATION 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
Thank You!