Indigenous ON-Farm Flood Management Practices in Ethiopia lowlands

Examples from Ethiopia Lowlands

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The field research team composition

- Spate Irrigation Network: Knowledge center
- The Government: Ministry of Water and Energy
- UNESCO-IHE, Haramaya and Mekele Universities: Research and Capacity building centers
- GIZ and IFAD: Donors and development organizations
- Metameta: Private company

The team members age ranged from 25 to 55

The team members position ranged from MSc student to Director
The arid lowlands – some facts

- 12 million estimated inhabitants - as many tropical diseases are being brought under control, the population is expected to grow significantly
- Erratic and insufficient (<350 mm) rainfall and very limited perennial water resources
- Is probably most vulnerable region to food insecurity – the 2011 drought is a living testimony
- Endowed with numerous seasonal rivers

What is flood-based farming?

The use of: often unpredictable and occasional destructive water supply
From: interminent and seasonal, semi perennial and even perennial rivers
Through:
- spate irrigation – direct diversion of flashy foods
- Flood inundation and recession: rivers overflow their embankment and flood huge adjacent areas
- Flood spreading weirs
For multiple use: Crop, rangeland and agro-forest production, domestic and livestock water supply, recharging groundwater
Relevance of flood-based farming

- Across the world: accounts for over 30 million ha
- In Ethiopia: estimated at 740,000 ha
  - 140,000 ha – spate irrigation (Taye, 2008)
  - 600,000 ha – Flood recession and inundation (Woody Biomass Inventory and Strategic Planning Project – Forest resources Ethiopia, 2012)
- Support of agricultural production and livelihoods of marginalized populations in many arid regions.
- By their nature - using flood water rather than perennial flows - they are quintessential adaptations to climate variability

The scope of the field research

- Detailed observations and discussions in 13 flood-based farming systems in five regions: Afar, Oromia, Amhara, Tigray and SNNP?
- Consultation with over 200 stakeholders:
  - relevant government officials at regional, woreda (district) and kebele (municipality) level,
  - Pastoralists and agro-pastoralists
  - Staff of Semera, Arba-Minch and Haramaya Universities.
  - Local and international development organizations
- National workshop in December 2012 to discuss and enrich field research findings
Development organizations: Increasing interest

- GIZ, Germany: main sponsor of this field research and plan to follow it through with a comprehensive development programme
- IFAD: Co-sponsor of this field research: single most committed donor and development partner in flood based farming systems – supporting SpN activities in four countries including Ethiopia
- NUFFIC, Dutch Embassy: Sponsored some training programmes in spate (flood based) farming; 3R and food security programme for the Horn of Africa
- World Bank: supporting Pakistan Spate Irrigation Network
- Several NGOs, including (SORDU, ADA): are already operating on the ground in the lowlands of Ethiopia

Each farmer has at least 0.25 ha in areas designated with high, medium and low probability of receiving floodwater

While field bunds are common in some other countries, they are not practiced even in the most promising spate irrigation schemes in the country including in Aba’ala, Afar
Pre flood cultivation, field bunds and land leveling key to high production

Two irrigation turns: 4.2 ton/ha Maize yield

On-farm ponds: Source for high value horticultural crops such as Papaya, Mango, Banana, Vegetables, Guguf, Ethiopia
Flood-spreading weir (slide Heinz Bender)
Opportunities for development within Konso

Light machinery for field bund construction, land leveling, soil mulching, and soil moisture conservation

Opportunities for development: Overflow control structures

Settling basin, Pakistan 300 to 600 USD; large difference in level between adjacent fields

Stone Pitch, Yemen: 50 to 100 USD; Small difference in level between adjacent fields
Smart land sharing arrangement for fair flood-water sharing

**Basic facts:**
- 68 land holders (12 female), 210 beneficiaries, 310 ha cultivable area

**Unique land distribution arrangement**
- Dry flood season: each household is allocated 0.125 or 0.25 ha.
- A land owner should share his/her irrigated fields in return for an equal piece of rainfed land.
- A land owner can refuse to share his/her land, but the WUA can deprive him or her of any spate flow.

**Main problem:**
- Spate flow coincides with rainfall period and as there are no ponds and other storage facilities, it is being wasted.

**Chairman of the WUA summarized the development needs as follows:**
- We have water, labour; what we need is know-how and financial resources to construct on-farm ponds so as to harvest the large spate flow during the rainfall season that is passing by and joining Lake Shala.
Guguf Scheme, Raya, Tigray

Basic facts:
- 800 households (one third female headed)
- 650 ha

Exemplary water sharing and conflict resolution
- Upstream have no absolute right
- Lottery decides who should irrigate first
- Water Masters irrigated
- Own legally recognized traditional court for settling conflicts

Guguf farmers shared experiences in Regional workshop in Sudan
Guguf farmers: Certificate awarding - Regional workshop in Sudan

- 2008 estimate: 38,000 in Aba’ala wereda and 20,000 in Aba’ala plain
- 10,000 ha irrigable land, and probably about the same area unutilized
- Silt loam soils: good infiltration and water holding
- Two perennial - May-shugala and May Aba’ala - and two seasonal rivers, namely Murga and Liena - under utilized
- Upland area average rainfall: 800 mm, lowland area: < 300 mm
Aba’ala Scheme, Afar Region

Flood water distribution

- Complete utilization of diverted flood by gradually dissipating its energy through a series of distribution canals

Aba’ala Scheme, Afar Region

Well defined cropping pattern

The Agro-pastoralists have a well defined cropping pattern designed to adapt to different climatic conditions and increase the probability that there will be at least one harvest at any given year:

- April 1st to May 10: Sorghum
- May 10 to June 10: Maize
- June 10 to 30: Teff and barley
- August 30 to sep. 15: special beans locally called Quaya or Sebere
**Aba’ala Scheme, Afar Region**

**Developent opportunities**

- Rangeland development by retaining a portion of the river flows that is being lost at Megulele (only 75 m wide) outlet - there is huge land laying ideal
  - Pastoralists travel more than 12 hrs
  - Frequent conflicts among pastoralists and agro-pastoralists
- Organizing pastoralists

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**Awash Fantale, Afar Region: Agro-forestry management**

**Acacia Ehrebergiana**

- Named Miracle tree, spate irrigated, important contributor to rural livelihood in Yemen – underutilized in Awash, Afar
- Resilient to drought: Grows in areas with RF < 150 mm/year
- Moderately tolerant to salinity; high regeneration capacity
- Lifetime: 10 to 15 years; tree height: 3 to 5 m, length of thorns: 8 cm
Awash Fantale, Afar Region: Agroforestry management
Acacia Ehrebergiana: benefits

- **Flowers:** loved by bees
- **Honey:**
  - Arguably the best
  - Cost: USD 30/liter in Yemen

- **Leaves and thorns**
  - Best feed for goats
  - Rich in proteins
  - Effective in goat fattening

Awash Fantale, Afar Region: Agroforestry management
Acacia Ehrebergiana: benefits

- **Stem - wood**

  **Charcoal production:**
  - Arguably the best
  - Lits quick and stay lit long
  - USD 5 per sack (about 20 kg)

- **Keteran:**
  - Fluid extracted from charcoal
  - Cure for animal (goat, sheep, camel) skin diseases
Afar and other Regions:
Managing Prosopis: the green ‘scourge

Observed

- In many of the lowland area prosopis juliflora has spread widely – probably upwards of 1 M ha (as in other arid lowlands in the last thirty years)
- Degrading rangeland and invading/distorting dry riverbeds
- Some productive uses (charcoal) but limited

Experiences:

- Charcoal making in Afar in the end discouraged as it also triggered charcoal production from acacia
- Intensive land use (agricultural, managed rangeland) and systematic protection works – but there is scale issue – better to focus on designated agro-pastoralist areas
Afar and other Regions:
Managing Prosopis: the green ‘scourge

What is required is:
- Large co-ordinated initiative focussing on (1) productive use (2) selected conversion in high intensity areas using cost-effective and sustainable control
- Prosopis management and lowland agroforestry (there are many unused useful tree species) requires far more attention in mainstream education, research and policy

Development programmes: suggestion for next steps:

- Thematic packages
  - Appropriate mechanization
  - Develop and exchange command area development and agronomic practices
  - Prosopis Juliflora management initiative
  - Pastoralist women empowering activities: Small scale irrigation for vegetable and fruit production; small ruminant fattening
Thank you

Namesegnalen