Intensification strategies for Ethiopian Watersheds: Incentives, Niches and Policy Implication

Tilahun Amede and Team
- Genetic gains & dissemination of dryland crops
- Sustainable intensification
- Climate-resilient strategies
- Agribusiness incubation
Watershed management under changing climates: Different things to different people

For agronomists, it is seen as a means of scaling out technologies, primarily those for soil and water conservation or environmental protection more generally;

For engineers; it is a strategy to protect headwork, weirs, canals from siltation, boulders; A means to increase water quality and quantity for downstream users

For environmentalists; means for enhancing environmental services, improving system productivity emanating and developing CC resilient systems
For social scientists/Anthropologists

- A way to coordinate cross-boundary cooperation of diverse user groups
- A way to think about NRM issues that cannot be addressed by working with single farmers or plots
- A way to coordinate co-management of common property or public lands
- A way to look at the interface between diverse social and biophysical processes (i.e. water, soil, livestock, crops, pests) on the landscape.
Incentives for managing watershed and roles of research

✓ Assist local actors to identify marketable enterprises fitting to local conditions (market information, facilitators, processors)

✓ Facilitate integration of climate smart options with win-win effects (food, feed, cash, conservation) through policy support

✓ Facilitate communities and district officers in identifying niches, what fits best where (guides, tools, methods)

✓ Develop policies to combine short term with long term and resilient systems
**WSM effect on water flows, Current and future scenarios**

- Hay production; cut and carry; high feed quality, woody biomass and fodder trees
- Hay production: 1.2 t DM ha\(^{-1}\) upto 3.5 t
- Grazed biomass: 1.6 t DM ha\(^{-1}\)
## WSM for reducing water loss under changing climates

<table>
<thead>
<tr>
<th>Canal type</th>
<th>N</th>
<th>Average flow rate (l/s)</th>
<th>Loss (l/s/100m)</th>
<th>% loss per 100m*</th>
<th>% loss/100m/30l/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main canal</td>
<td>121</td>
<td>43.21&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.58&lt;sup&gt;a&lt;/sup&gt;</td>
<td>6.46&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4.49&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Secondary canal</td>
<td>57</td>
<td>33.03&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.59&lt;sup&gt;b&lt;/sup&gt;</td>
<td>4.40&lt;sup&gt;b&lt;/sup&gt;</td>
<td>4.00&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Field canal</td>
<td>49</td>
<td>2.88&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.39&lt;sup&gt;c&lt;/sup&gt;</td>
<td>2.49&lt;sup&gt;c&lt;/sup&gt;</td>
<td>25.94&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
</tbody>
</table>
WSM for converting water to productive use

High unproductive water losses = Low system productivity;

[Graphs showing flow per HH (m3) for Lenche Dima and Kuhar Michael cropland, with categories for livestock, crops, evaporation, transpiration, runoff, and deep percolation.]
Case Study 1: AZGO Watershed
Market Incentives

E.g. Azgo watershed; transformed landscape
Benefits

Average HH net cash income $5400 USD

- Community response to 1984 Ethiopian famine
- Market opportunities; fruits, Chat
- Self developed water harvesting model (Tree shade, careful management of plastics)
- Individually managed but collective marketing
- Community level quality control of products
- Unlike Abrha Atsbeha, less known, little outside support but successful
Case study 2: Yewol Watershed
Degraded Landscapes, Extreme Changes (landuse, rainfall and temperature events)
Management Zonation within the Watershed

- Hillslope
- Midslope
- Footslope
Capturing and productive use of water
Effect on livestock and crop productivity..

- Feed production increased by 35-60% (grazing and crop residue)
- Reduction of walking distance to access water: from 9 km to 2 km
- Energy for walking is reduced from 1956 MJ ME / TLU to 584 MJ ME / TLU / year
- Milk equivalent of 1372 ME MJ saved: extra 352 liter of milk per lactation period / TLU
- Water: no change in water depleted for feed production
Nutrient Zonation

Footslope

Midslope

Hillslope
Emerging springs and other sources
Home gardens and high value crops
In Foot slopes, access to irrigation increased from 240 ha to 970 ha
Foot slope intensification
(e.g. Seed systems)
Economic benefits of watersheds

• Almost every farmer has grown at least two improved crop varieties of some sort
• Crop diversity has increased from three to seven crops in 6 years time;
• Crop yield increased by 30% to 200%
• Mountain irrigation for home gardening & high value
• New sheep breeds, ready for sell two months earlier than the locals
• Getting attention by NGOs, Universities, government.
• Woreda has received 1 million birr to continue with the watershed work;
• Dignitaries visiting the watershed...
Implications

- Moving from ‘Reversing degradation’ as a goal to sustainably improving productivity and livelihoods through integrated watershed management

From a negative to a positive goal

- Integration of landscape components to improve production and productivity;
- Move from fixed ‘packages’ towards a menu of possible interventions and let clients “mix and match” & adapt according to their needs
- Link research to stakeholders needs
Thank you!