Cost and Benefit of Catchment Management and Regreening in Tigray, Ethiopia

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Outline

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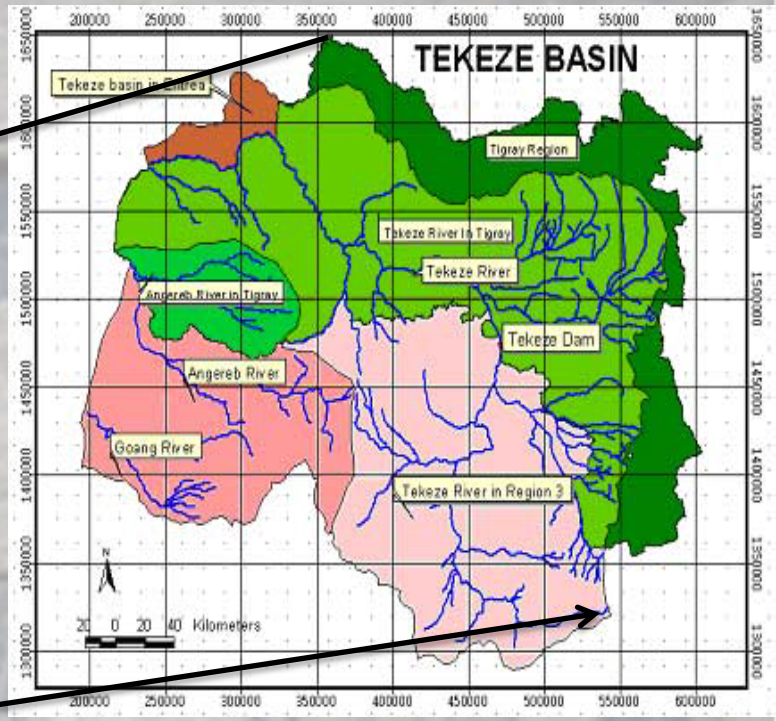
1. Background

Ethiopia is part of the Nile Basin drainage network.

Tigray represents the northern part of Ethiopia.

The World Bank, Environmental change and security program (ECSP, 2007).



Tigray Region:

Population: over 4.4Million.

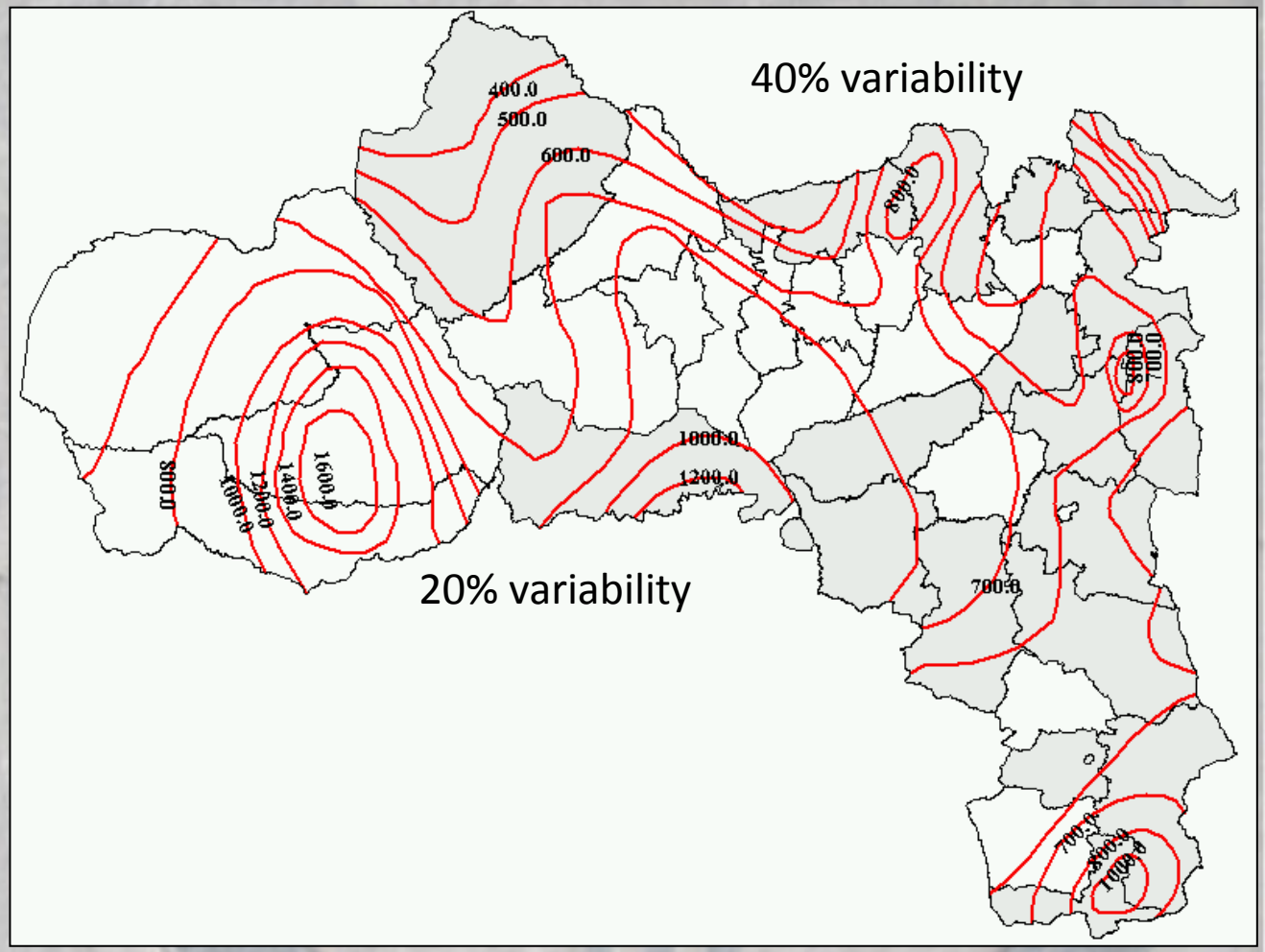
Total area: About 50,000Km^2

Topography:
70% …… > 1500 m asl.
40% …… > 2000 m asl.

MANAGING THE WATER BUFFER

Food security status of Tigray:

- Tigray is one of the food insecure regions in Ethiopia.
- About 1.4 Million people are under the Productive Safety Net Program.



Mean Annual Rainfall in Tigray, mm

Reasons for food insecurity:

- Land degradation mainly erosion and reduction in soil fertility,
- Short rainy season coupled with high rainfall variability between seasons,
- Small land size that rarely exceeds 0.5 ha per family, and
- Limited and in most case absence of irrigation practices.

To ensure food security, a number of programs have been implemented since 1971.

History of Watershed Management in Ethiopia:

- 1971: First SWC by USAID.
- 1974: UN/FAO (under WFP).
- 1976: The derge regime tried to implement SWC.
- 1988-1990: TPLF (Under REST) started natural resources management.
- 1991-2001: The current government was involved in SWC; focusing on cultivable land (in order to convince the people).
- 2001-2009: A new shift in SWC where by: cultivable land was done by individual farmers and uncultivable land was through public mobilization.
- 2010: SWC measures was given the top priority of the region and massive mobilization was done.
- 2012: In addition to SWC, irrigation development through public mobilization has started.

2. Approaches used for Watershed Management in Tigray

Watershed management has been carried out in two public mobilized systems:

- **Free labour**: every member of a community who has “able body” spent 20-40 days per year in SWC activities free of any payments, and
- **Productive Safety Net Programs (PSNP)**: designed to provide employment for chronically food insecure people who have “able-bodied” labour.

Organization of Watershed management

- The federal has developed guidelines and coordinates national activities.
- The regional state gives trainings and support to Woredas.
- Woredas give trainings and support to Tabias.
- Tabias (in coordination with Woreda representatives) give training to sub-catchments.
- Different organizations and institutions (farmers unions, women's associations, youth associations, schools, and religious institutions) are involved in the planning and implementation of watershed management activities.

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3. Progress made in Watershed Management in Tigray

Different soil/water conservation, water recharging, and water harvesting structures have been constructed in Tigray.

- More than 80% of the region is now covered.

- The whole activity is moving from soil/water conservation to water harvesting, and other natural resources management.


Hillside stone terraces


Checkdams


Stone bunds


Trench bunds

Area closure

Eyebrow basins

Hillside stone terraces with trenches

Stone bunds

Deep trenches

Contour ploughing and pits

Integrated gully treatment

Terraces


Stage I


Stage II


Stage III


Stage IV

Stage V

Stage VI

3R
MANAGING THE WATER BUFFER

4. Benefits of Watershed Management

Benefits (noticed by all, including farmers):

- Infiltration enhanced and moisture stress within the soil reduced.
- Fertility of the soil improved.
- Flooding reduced and in many cases fully controlled.
- Sedimentation reduced.

A watershed with zero flood

Dams which were constructed before catchments were treated have been suffering from siltation problems.

With proper watershed management the lifetime of our dams/reservoirs is improving.

- Groundwater improved (quality and quantity).
  - GW irrigation on top of the agenda of the gov.
- New springs emerged and discharge of existing ones improved.
- New irrigation schemes started to be developed with the availability of water.
- Biodiversity is regenerating and wild animals are emerging.
- Micro-climate around the treated watersheds is improving.

A shallow well which was to dry shortly after the rainy season is now used throughout the year after the gully and catchment treatment was done.

Check-dam constructed to harvest stream flow

- *A stream used to be dry before ten years.*

- Attitude of people towards natural resources management and irrigated agriculture is changing.
  - Migration to other areas (including middle east countries) is reducing.
  - One of the greatest achievements in the whole process.
- Livelihood of the people is improving and in some cases completely changing.
- Productivity has improved: up to 3 fold.
  - Food security is highly linked with water security.

A 68 years old farmer in Tigray, Ethiopia:

I came to know about irrigation only in the last 10 years.

I wish I would have been a 30 years old young man.

Young generation farmers

New generation: agents of positive change.

Young, relatively educated, urban ones (who are even from other places) leasing land from old generation farmers who own the land.

5. What is the cost for Watershed Management?

It is difficult to quantify the cost for the Watershed Management due to the fact that:

- Most of it is done through public mobilization;
- The rate for payments who involve in the Productive Safety Net is very low.

No	Type of SWC	Cost (in birr or in Kg grains)
1	Terracing in soil (5m long)	10birr or 3kg grain
2	Terracing in rock (3m long)	10 birr or 3kg grain
3	Stone bund (4m long)	10birr or 3Kg grain
4	Deep trench (1m deep)	10birr or 3kg grain
5	Eyebrow basin (2 l brow)	10birr or 3Kg grain
6	Micro-basin (4 micro-basin)	10birr or 3Kg grain
7	Half moon (4 half moons)	10birr or 3Kg grain
8	Pit (for tree planting) (15 pits)	10birr or 3Kg grains

Cost of SWC activities under the Productive Safety Net Programs (TBoARD, 2011).

6. Opportunities for up-scaling

- Tigray is considered as the most degraded region in Ethiopia.
  - Despite this, a number of positive changes have been recorded.
- There is a great opportunity that the efforts made in Tigray could be scaled-up to other regions of Ethiopia and beyond for a number of reasons:
  - Less degraded land;
  - Better experience in the country.
- Other regions of Ethiopia have started massive watershed management.

6. Concluding Remarks

The experiences in Tigray supports the following ideas.

1. Despite a number of challenges (less fertile soil, highly variable rainfall, and highly degraded land) through integrated community owned watershed/natural resources management it is possible:
    - To ensure food security, and
    - To create an environment that is resilient to droughts/climate change.

2. Many of the soil and water conservation structures constructed in Tigray are non-engineered (constructed by local communities with some technical support by experts) and fully owned by the communities.
    - This has contributed towards ensuring their sustainability.

3. The watershed management in Tigray evolved through trial and error, with no proper documentation, and more driven by decision makers. There is a need for more research into the following:

   - The efficiency of the different technologies introduced: at much faster rate than the normal scientific approach;
   - The effects of watershed management was found to be vary from place to place.
     - Why is a certain method working best in some places and not in others?
     - Which method works where?

4. The interventions made in Tigray and their effect is a clear validation for the **3R concept**.
   - This calls for revisiting the definition of water harvesting which need to include watershed based in-situ soil/water conservation measures as a tool for creating a water buffer.


Thank You!