

Demand Driven Action Research (DDAR)
on
Performance Assessment of Traditional Spate Irrigation
Systems in Raya Valley, Southern Tigray, Ethiopia
(PATSIR)¹

Partner Institutes

Mekelle University
Tigray Bureau of Water Resources

¹Project leader: Eyasu Yazew (PhD), Mekelle University, eyasuet@yahoo.com

1 Background

Spate irrigation is one of the traditional practices employed by farmers in Tigray in general and the Raya Valley in particular to supplement rainfed agriculture. The Raya Valley, located in the Southern Zone of Tigray (Ethiopia), is an agriculturally potential area for crop production and livestock rearing (**Figure 1.1**).



Figure 1.1 Geographical location of the study area

The low land areas of the valley are surrounded by mountains and characterized by deep and fertile soil suitable for agriculture as a result of ages old alluvial deposition. The Valley is characterized by bimodal and unreliable rainfall ranging from 486 mm to 693 mm per annum. On the other hand, it benefits from seasonal flow of more than 15 streams and rivers. These streams and rivers come from the western and eastern highlands and produce about 170 million m³ annual surface runoff that drains to the Denakil Basin if not utilized. Farmers in the foot hills of the valley attempt to overcome the moisture stress they face by traditionally diverting flood water that comes from the nearby hills and mountains using temporary traditional diversion structures such as tree branches, stone and earth bunds (**Figure 1.2**).



Figure 1.2 Temporary traditional diversion structures used in the study area

Contrary to the huge land and water resources potential, however, food insecurity is the major problem. The major causes of the food insecurity, among others, are:

- Low and unreliable yield as a result of moisture stress; and
- Poor crop selection in view of market value.

The overall problem and the major underlying researchable causes that are planned to be addressed in this study are presented in **Figure 1.3**.

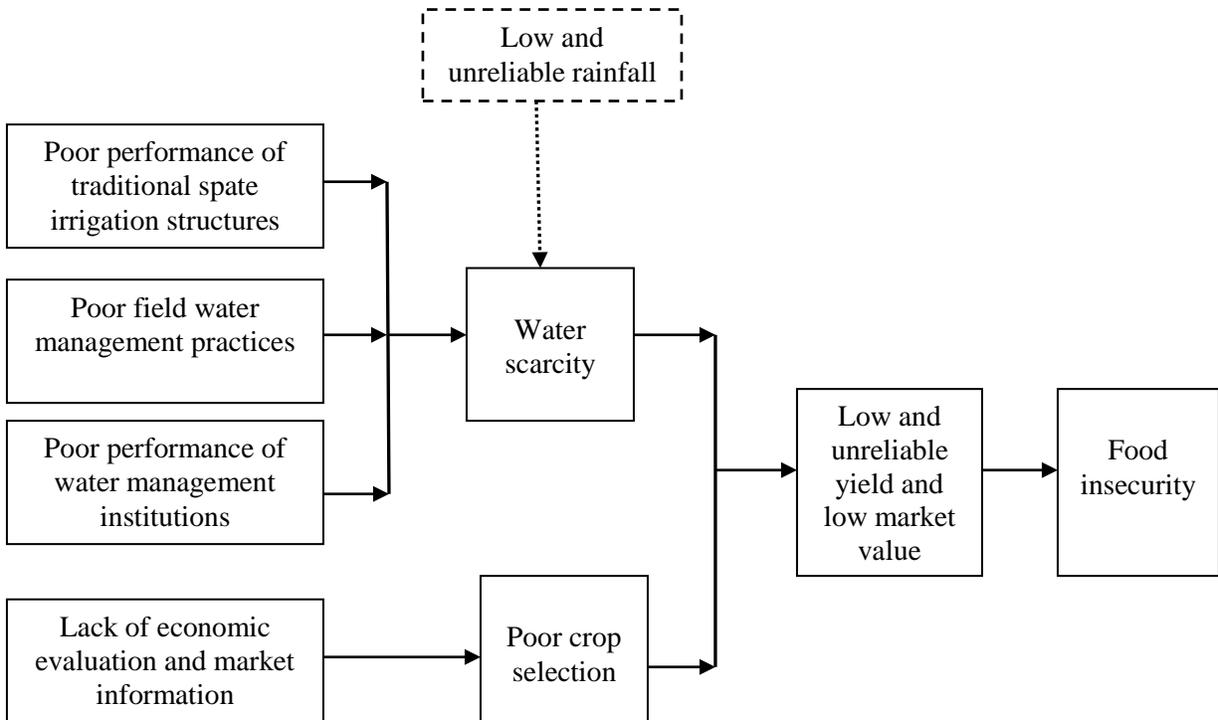


Figure 1.3 Problem tree designating the overall problem and the root underlying causes

2 Objective of the research

As it can be seen in **Figure 2.1**, the ultimate objective of this research is to contribute towards improved food security of the Valley in particular and the Region in general. The specific research activities that will be carried out to fulfill this objective include:

- Evaluate the social performance of the schemes in relation to participation of users, equity, operation and maintenance of the schemes, conflict and its resolution, and role of women in the entire process;
- Assess the impact of traditional spate irrigation systems on income of households;
- Evaluate the technical performance of the various traditional water diversion structures including durability, sedimentation, canal intake erosion and water diversion efficiency;
- Evaluate the cropping pattern and field water management practices of selected areas;
- Propose recommendations that could improve the efficiency and sustainability of the traditional spate irrigation systems in the Raya Valley.

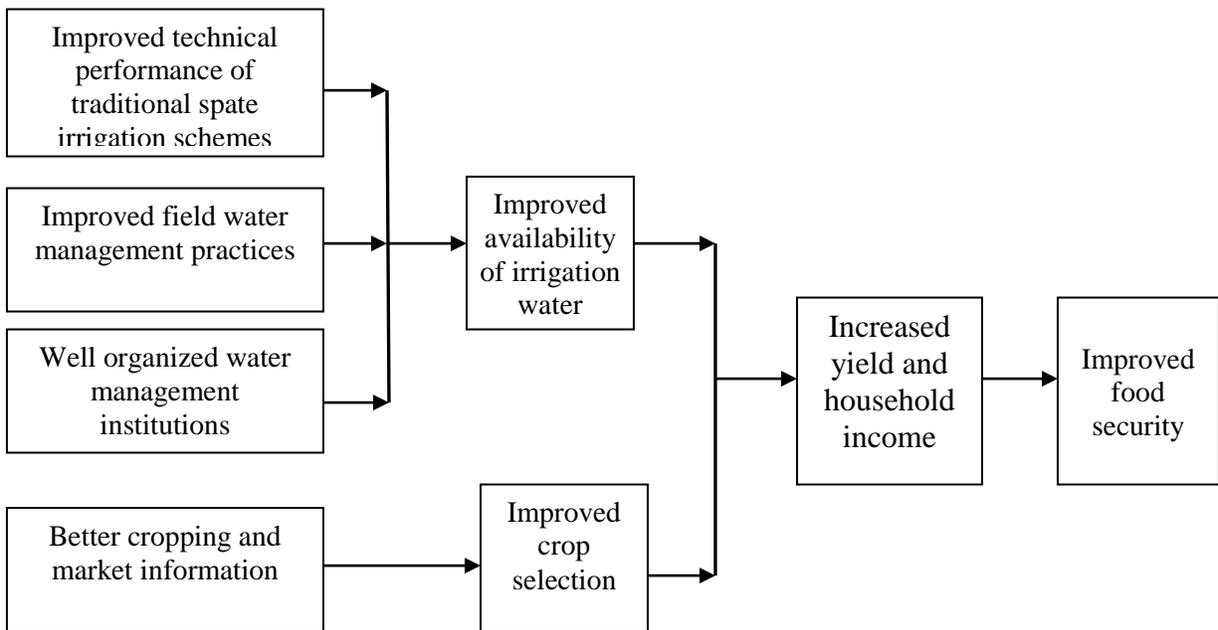


Figure 2.1 Objective tree designating the specific and overall projected research objectives to be met

3 Anticipated outputs of the research

The major outputs of this research include:

- Digitized map of spate irrigation of the Valley including type, location and area covered;
- Comprehensive final report addressing the research objectives;
- Training manuals and guidelines, photos, video and other documents that can be used for dissemination of results;
- Workshop involving next and end users;
- Clear and participatory procedures for the future monitoring and evaluations of agreed results and recommendations of the research.

4 Research team members

Since this research is demand driven, all relevant stakeholders will take part in the study. At regional scale experts from the Tigray Bureau of Water Resources are teamed-up with staff of Mekelle University in leading the investigation. An MSc student from Mekelle University is also attached to coordinate the day-to-day data collection and subsequent analysis. Local resource persons will be involved in consultation, data collection, identification and testing of improved options and analysis. Farmers will be involved in interview, group discussions and provision of participatory solutions. Last but not least, the consortium members from the Netherlands will also participate in experience sharing and advisory. The lead researchers of the project are listed in **Table 4.1**.

Table 4.1 Lead researchers of the research project

No.	Name	Profession	Responsibility	Address
1	Dr. Eyasu Yazew	Land and Water Development	Project leader	Mekelle University
2	Dr. Solomon Habtu	Irrigation Management	Member	Mekelle University
3	Mr. Temesgen Gebru	Tropical Land Resources Management	MSc student	Mekelle University
4	Mr. Abraham Haile	Irrigation Agronomy	Member	Tigray Bureau of Water Resources
5	Mr. Tesfa-alem G/Egziabher	Hydraulic engineering and River Basin Development	Member	Tigray Bureau of Water Resources
6	Dr. Frank van Steenbereggen	Water Resources Management	Project coach	MetaMeta
7	Dr. Flip Wester	Irrigation and River Basin Management	DDAR coordinator	Wageningen University Research

5 Funding

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