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In its capacity of contractor within the official framework of the Czech Republic Development Cooperation with Ethiopia

EFFECTIVE IRRIGATION FOR SUSTAINABLE AGRICULTURAL PRODUCTION

Kelema and Adancho Irrigation System in Angacha Woreda

Kembata Tembaro Zone

SNNPR

Ethiopia

Methodology for replication of irrigation system

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1. Methodology purpose

Methodology describes the extent of the implemented irrigation system, its costs, sustainability, impacts, recommendations for possible replication and SWOT analysis.

2. Angacha irrigation system

2.1. Irrigation system description

The irrigation system captures rainwater running down the sloping terrain at the top of the hill with farmlands. The captured water flows through two sedimentation tanks and then, through a plastic water conduit, it fills a reservoir system with a total volume of 250 m^3. This accumulated irrigation water is used to irrigate a 625 square meter area.

- Small irrigation system
- Collection of 250 m^3 rain water
- Purpose: irrigation of 625 m^2 of demonstration site

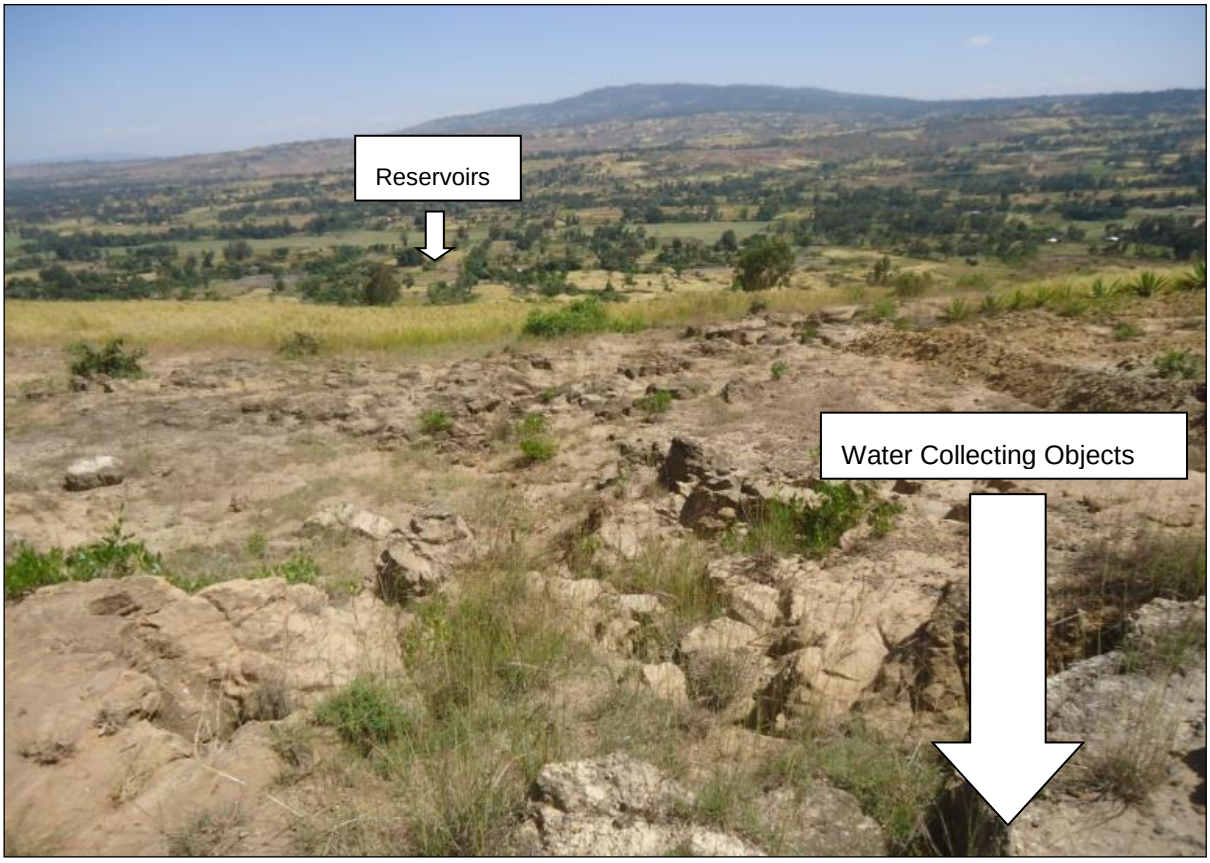

Figure 1- Topography Along the pipe line to the command Area

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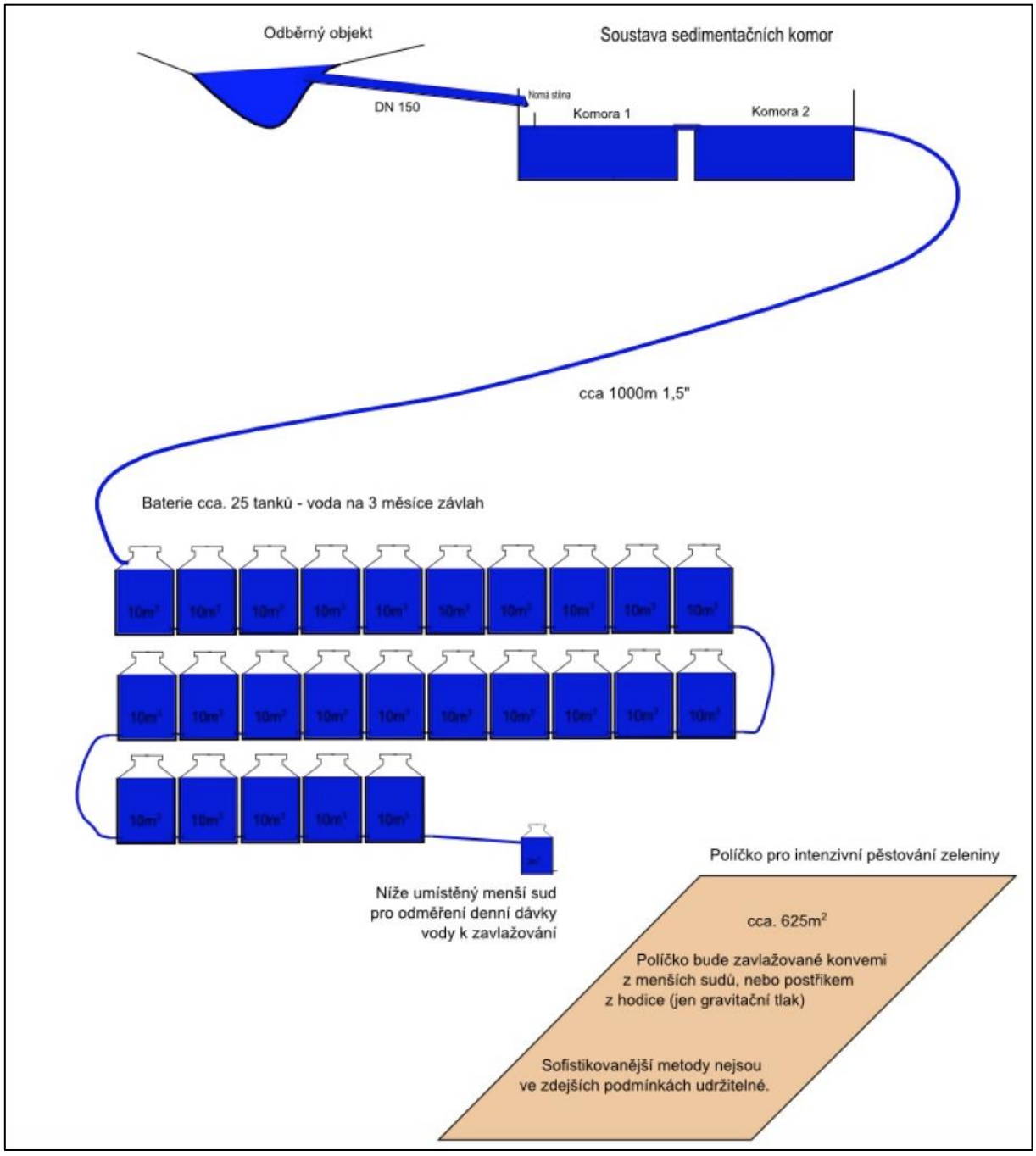

Figure 2 - Scheme of irrigation system

2.2. Location and Accessibility

Kelema and Adancho kebele demonstation irrigation system is located in Southern Nations, Nationalities and Peoples Regional State (SNNPRs) Kenbata Tembaro Zone, Angecha Wereda in the boundry of Kelama and Adancho kebele (See Location Map, Figure 1 and 2). It is located at a

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distance of 160km from the regional capital Hawassa and 30km from the zonal town Durame and 7km from the woreda town Angacha.

The 5km road leading to the project site from Angacha Hossana road is a dry weather road.

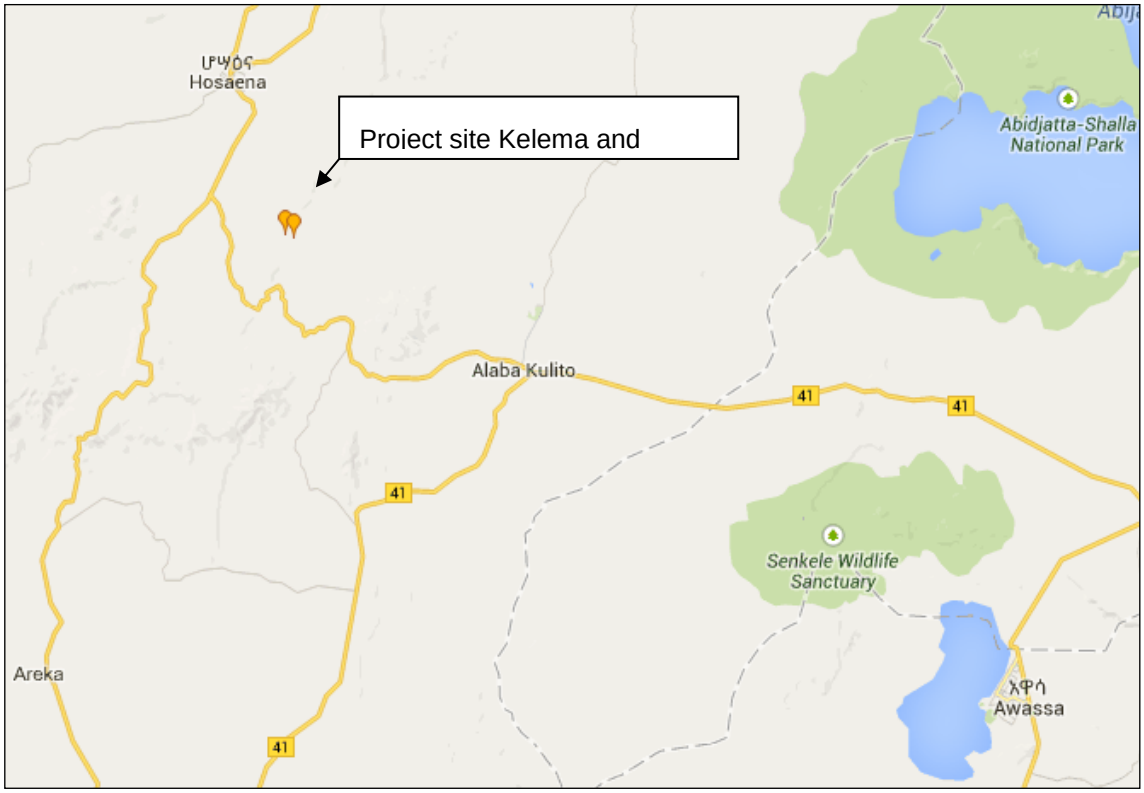

Figure 3- Depicting of project site in zonal level

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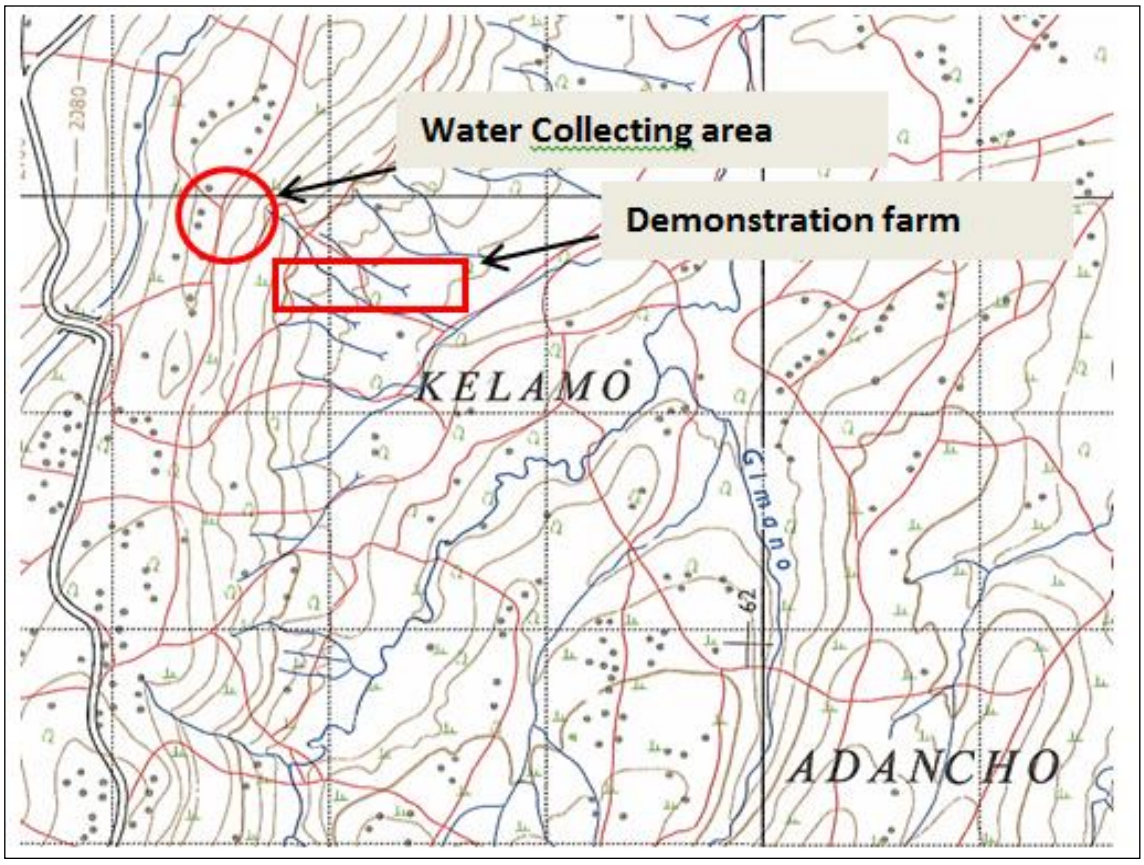

Figure 4 - The location map of Kelema and Adancho

2.3. Supply and Demand of Irrigation water

For a surface of 625 m^2 it is necessary to accumulate 250 m^3 of irrigation water for dry season. The irrigation system is adapted to accumulate enough rain water in 25 pcs of plastic reservoirs of capacity 25 x 10 m^3.

2.4. Irrigation Schedule

2.5. Constructions on the irrigation system

In irrigation system there are different structures which help us proper utilization of water therefore through those structures we can manage direction and velocity of water.

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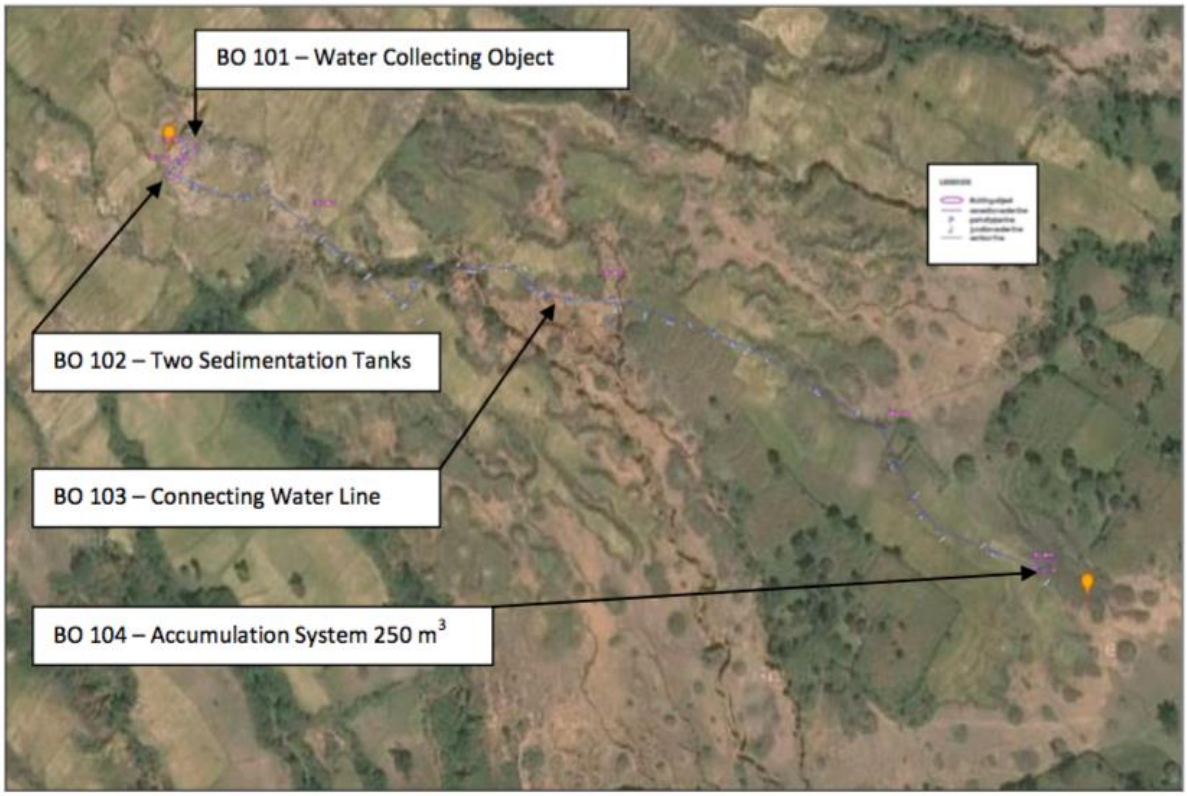

Figure 5 - Position of building objects

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Structures of this small scale irrigation system are listed below:

BO 101 – Water Collecting Object

BO 102 – Two Sedimentation Tanks

BO 104 – Accumulation System 250 m^3

BO 103 – Connecting Water line

3. Expenses

Total expenses for the irrigation system realization were 1,945,986,47 ETB. The costs were affected by prices increased during project realization. For the future project replication it would be important to cosider rising prices and inflation.

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Summary of Project Cost

S/N	Description	Amount
1	Water Collecting (Pond) Structure	159 448,00
2	Sedimentation Tank	182 975,00
3	Drainage Outfall/Spillway/ Strucutre	103 200,00
4	Pipe Work	280 960,00
5	Supply and installation of Plastinc Tanker including clearing , leveling, gravel base shutoff valves	885 000,00
	Total carried to summary	**1 611 583,00**
	Contingency (5%)	**80 579,15**
	Overall Total	**1 692 162,15**
	VAT (15%)	**253 824,32**
	GRAND TOTAL	**1 945 986,47**

4. Sustainability and maintenance

4.1. Sustainability

For the sustainability and functionality of the newly built irrigation system, communities need to be trained for the proper management and operation of the system. Following was done:

- Irrigation systems will be taken care of by the trained water committee.
- Irrigation maintenance trainings were organized.
- Manuals for irrigation systems maintenance were handed over to the project partners.
- Errors found in irrigation maintenance - training has been done to correct the defects.

4.2. Maintenance

Utilization and maintenance are not separated each other. If there is utilization there should be maintenance. Therefore, proper management and maintenance of irrigation system will increase durability and sustainability of the system further more ease for use and maintenance. However, improper management of irrigation system will reduce sustainability of the system and the maintenance become complicated.

Knowing following points helps for proper management of irrigation system:

- Proper amount of water requirement
- Stepwise water flow
- On time irrigation

Checking all irrigation systems constructions:

- The operation system of irrigation should be maintained according to the manual

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- Keep the irrigation system in order to avoid complicated maintenance.

Avoid problems which affect proper utilization of irrigation system such as:

- There must be no vandalism and breakage of structures.

Therefore, the production land should be balanced with the amount of water supplied by irrigation system.

Improper management of irrigation system can cause damage on crop as well as on surrounding natural resource.

For example due to unexpected increment of water at the source over filling of the canals may occur this may result over irrigation or flooding of farm land. During this time drainage of excess water from the field is very important.

5. Impact of irrigation system

The introduction of the irrigation system has resulted in the following positive changes in the farmer's management in the project site:

- Irrigations cover an area of over 625 m^2 of land for training activities and demonstration.
- The co-operative for the irrigation system can train watering and new plants planting.
- Improved cooperation with the local authorities. Communication has also improved among farmers.
- Irrigation has contributed to improving the living standards of the local population.

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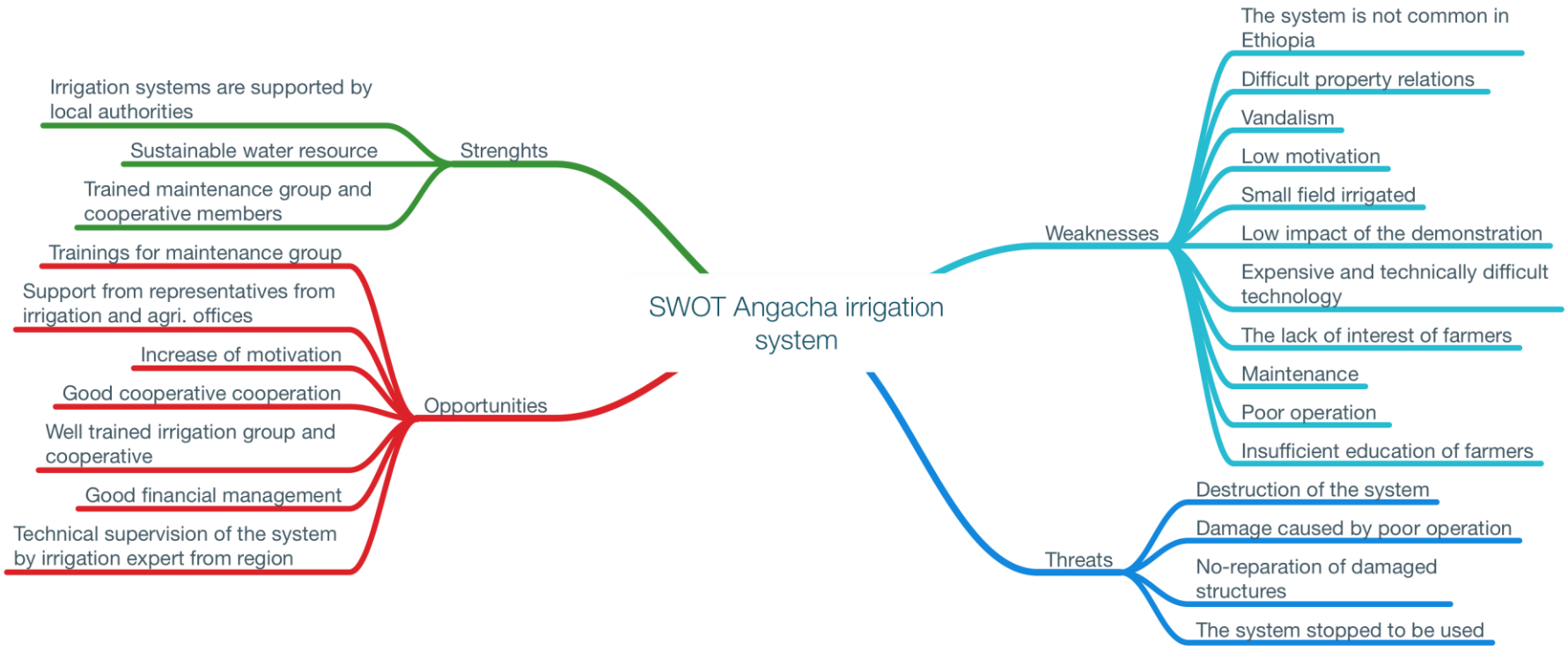
6. SWOT analysis



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7. Conclusion and recommendations for replication

The Innovative Rainwater Irrigation System is an unusual system in Ethiopia that has the potential to improve the ability of farmers to store rainwater for their fields and to mitigate the negative effects of surface-draining water on their fields and causing erosion. This exemplary system, however, faces many complications from unclear property relations in terms of land, despite the small incentive for farmers to maintain a relatively small field of irrigation due to the small benefit of irrigation. The system is also relatively expensive to local circumstances. This system would be appropriate to replicate in locations where water accumulation and its transfer to reservoirs will be easier technically and financially with a shorter water pipe that will not intersect the fields of different farmers who do not want water line in their fields.