

## SPATE IRRIGATION PRACTICAL EXERCISE

The exercise will depict the considerations to be taken while designing, managing and operating improved flood diversion/ intake structures; and ponds. The implementation of such structures is expected to enhance the agricultural, livestock and domestic water supply for the agro-pastoralist community in the low-land areas of Ethiopia.

Two adjacent communities in low-land areas of Ethiopia, community A and community B, have been cultivating crops on their respective command area (refer figure -1) by diverting flood from a wadi that gets flood source from the upper land (micro catchment). The two communities have been sharing the flood almost equally at section **S**, using traditional structure made of soil bunds. Sometimes, conflicts arise while more flood water is diverted in favor of one of the community at section **S** due to: I- larger sediment deposition at one of the intakes and less deposition or scouring to the other intake, II- deepening of the canal bed just after the intake by a community to divert more floods to their field. *Hence, it is required to modernize the structure at the intake (at section S) thereby to minimizing the conflict and ensuring the sharing of the flood at section S equally.*

In the wet season, the flood is let to the outwash - swampy areas that raise pasture for the livestock after irrigating the command area of each community. The flood in the wet season is also a source of domestic and livestock water supply. However, in the dry season the children and women in the community travel long distance (2.5 to 3 hours) to collect water from holes dug in the River bed for domestic and livestock water supply. *To improve this situation, ponds are suggested so that extra flood water can be collected during the wet season and to be used later in the dry season.*

- Based on the given information, you as expert are asked to advice and discuss **the design consideration** for the improved diversion/intake and the pond, and present your findings after lunch. Support your presentation with sketch.
- In this particular exercise; give main focus for the structures to be designed as operate-able, maintainable and manageable by the users; these structures also need to consider the hydrology, sediment, institutions and water rights of the locality.

# Spate Irrigation

## Background of the area

The upper section of the catchment, the source of floodwaters for the low-lying fields is hilly and mountainous with elevations above 2,500 m+MSL (Mean Sea Level). The climate is warm to mild with an average annual temperature of about 22 °C. The annual rainfall at the upper section of the River basin is the source for the flood which is estimated to be sufficient to support the domestic, livestock, agricultural and pasture land requirement of the area.

On average five floods occurs from June to October. Sometimes, heavy rain (one in three years) occurs in March. There is no perennial River at proximity to the community and the groundwater is very deep and for time being fund is unavailable for its exploitation.

At the low-lying land, the average annual rainfall is 450 mm and it is erratic in nature. The potential evapotranspiration at this low-lying land is estimated to be greater than 2,000 mm per year.

Nearby the foot of the mountain the sediment is mainly boulders; however in the lower reach where the flood is diverted for spate system, the sediment deposit is alluvial. The soil type for the command area is Silty loam. The slope in the lower River system is flat (1 to 1.5 in 1 Km), with an average River width and depth of 18m and 0.6m to 1.5 m respectively.

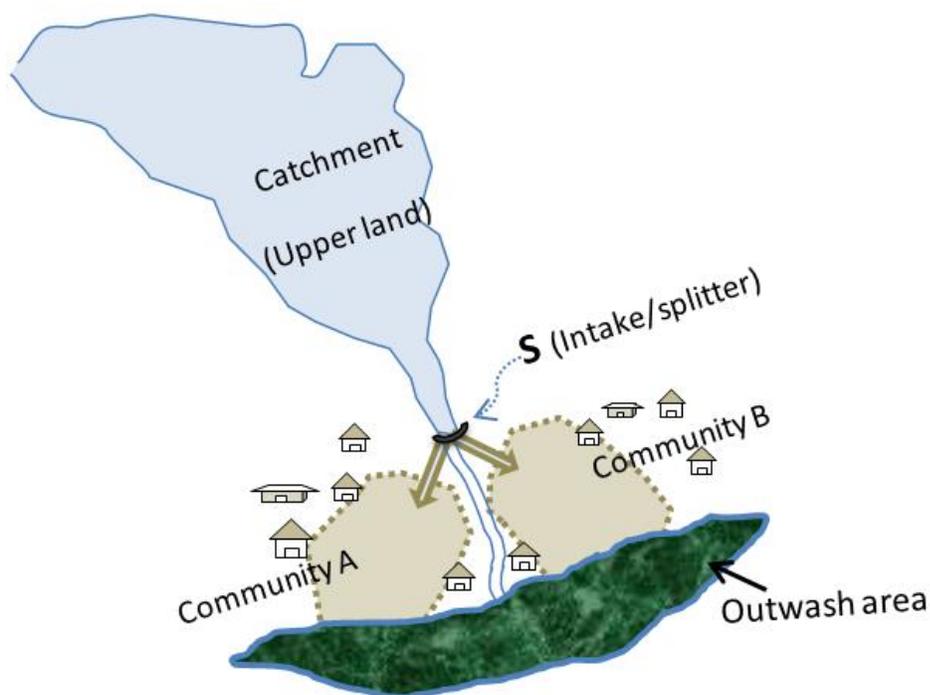


Figure 1: Layout of the micro catchment, village, command area and outwash area.



## **Flood Based farming/ Spate Irrigation Training for woreda water experts of the SNNPR Pastoralist Office**

- Participants: total 30 of which 5 are females
- Venue: Arba Minch University
- Content: Lecture, exercise and participants presentation
- Duration: 15,16, 17 of February 2012 plus one day field visit

This exercise is prepared for: Woreda water experts of the SNNPR Pastoralist Office

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