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MINISTRY OF AGRICULTURE

# Community guide on Checking Water Spreading Weirs and Dry Stone Measures and Preparing Plan For Maintenance

# Introduction

This community guide has been designed as a tool to, together with the community, discuss the maintenance of the Water Spreading Weirs. This guide proposes the steps to take and the aspects of the structure of the WSW that need to be taken into account. Lastly the guide provides tables that can be used to document the findings of the assessment of the structure and the maintenance that needs to be carried out.

## 1. Preparation

Maintenance and repairs of Water Spreading Weirs (WSW) is important. Small repairs need to be done in time to make sure the systems stay in use and that small damage does not become larger. Similarly, debris like trees and shrubs need to be removed after each flood. Larger damage needs to be assessed and take up together with the experts from the Woreda office.

Checking on the performance of the WSW structures shall be done in two ways. The first and main arrangement is to do annual inspection of all structures. The second arrangement is to do continuous monitoring and reporting, especially after flood events, by assigned supervisor or scheme care group, selected from the user community. Reports of both inspections shall be submitted within a week after the event to Woreda Agricultural Development Office or Kebele Head for action (a draft report can be shared with the Kebele Head after the inspection, before submitting to the Woreda Agricultural Development Office ).

The community is recognized under the Kebele administration. For practical reasons it is valuable that a community management group is established for each scheme, being a cascase of WSWs in one area. Such groups in a Woreda may elect their representative to regularly communicate with the Woreda Agricultural Development Office and the kebele office.

*Picture 1: Election of community group.*

### A. Annual Assessment

An annual check of all the structures should be organized. This should be done by a team consisting of the Pastoralist and Agricultural Development Officer, the head of the Kebele (or someone representing the head) and the community management group. The check and

inspection is advices to be organized immediately after crop harvest with in December, well in advance of the belg rains, so that repairs can be made in time. In this period the temperature to work is convenient and water may be available , in small impoundments or as wet sand, to be used in the repair work. However, the most appropriate time for the inspection can be decided upon together with the communities, taking into account the pastoralist context.

**Step 1 – community meeting**

The annual check should involve two steps. The first step is a community meeting to discuss how the water spreading weirs and the dry stone measures performed in the last season. In this meeting all persons whose land is served by the system are invited. The meeting should discuss the following points:

- Evaluate the decisions made in the annual inspection of the previous year.
- How did the water spreading weirs and dry stone measures perform, what land was served (provided with floodwater), what land was not served and how does it compare with the area designed to be served?
- What were the main problems and how can those be prevented in the coming season?
- Where is the main damage to the water spreading weirs and the dry stone measures?
- Where are structures that look weak and that maybe damaged soon?

*Picture 2: Village meeting to discuss performance of the WSWs and DSMs.*

**Step 2 – systematic walk through**

The second part is a systematic walk-through of the systems. Here all structures are visited, in particular all the main structures and the places were damage is reported. The Woreda Agricultural Development Office, head of Kebele and the community management group should all be presented during the walk-through.

It is important that someone keeps notes of all damages that are observed. A list should be made on the repairs that need to be carried out. A map can be made of specific locations with damages or photos can be made.

*Picture 3: Transect walk to assess the state of the structures.*

Below is an example of the record to note the damage, both for the WSWs and the DSMs:

*Table 1: Sheet to record the findings of the annual walk-through on the WSWs*

| **Water Spreading Weirs** | **Overall performance of the structure (Satisfactory/ unsatisfactory)** | **Repair of masonry** | **Removal of trees, shrubs and sand** | **Repair of erosion and earthen structures** | **Others** |
|---|---|---|---|---|---|
| **Water Spreading Weir 1** | | (damage and what needs to be done) | (damage and what needs to be done) | … | … |
| **Water Spreading Weir 2** | | … | | | |
| **Water Spreading Weir 3** | | … | | | |
| … | | | | | |
| | | | | | |

*Table 2: Sheet to record the findings of the annual walk through on the DSMs*

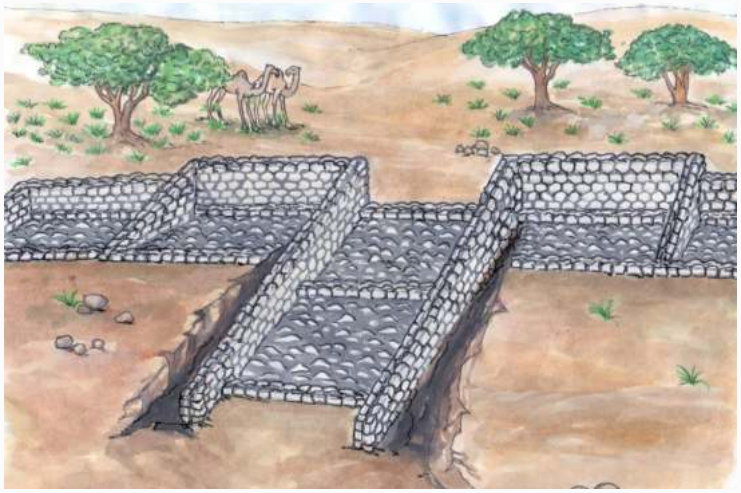
| Dry Stone Measures | Overall condition of the structure | Repair stone pitching including adding more stones | Remove debris, trees and sand carried by floods | Take additional measures in area where DSMs have been silted up | Others |
|---|---|---|---|---|---|
| **Area 1: Dry Stone Measures** | | damage and what needs to be done) | damage and what needs to be done) | ….. | |
| **Area 2: Dry Stone Measures** | | damage and what needs to be done) | …. | | |
| **Area 3: Dry Stone Measures** | …. | … | | | |
| … | | | | | |
| … | | | | | |

## Points to consider for WSWs

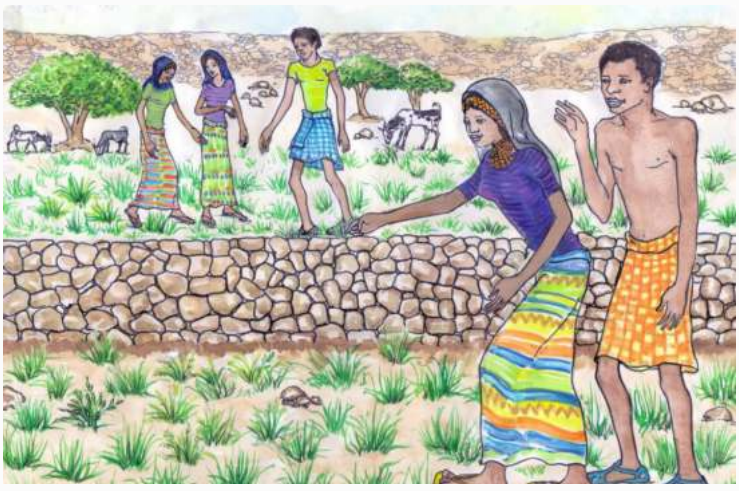
There are a number of special points to consider in the maintenance of the water spreading weirs:

1. Masonry work on the Water Spreading Weirs. Small repairs (<2 m3 in total) on masonry work are the responsibility of the community. Large repairs of >2 m3 are the responsibility of the Woreda Agricultural Development Office. The Woreda Agricultural Development Office may use several programs such as PSNP at his control to undertake the damage repair.
2. Piping. Around the water spreading weirs and the dry stone measures small holes may develop, especially where the soil is clayey. These holes are created by the force of water or the action of rats. These holes may take water underneath the water spreading weirs and the dry stone measures. They can become bigger. This may destabilize the structures. Such holes need to be filled and plugged with a compacter. Where there are rats, they need to controlled.
3. Sedimentation. Over time the dry stone measures may be filled up with sand or even be fully covered with it. If needed you can build an additional Dry Stone Measure in between or take additional biological protection measures.
4. It is also important to ensure areas with structures remain accessible for vehicles, especially in the case of newly constructed WSWs/DSMs or in case the major repairs require the transport of materials by truck. In case of DSMs special over passages made with masonry work may be prepared to use them to cross a gully.
5. Recurrent problems. Some damage may come back every year and are recurrent. In that case the structure may be modified to make it stronger and avoid the same problem in the next season.

*Picture 4: Maintaining the masonry work by trained village men.*



*Picture 5: Water Spreading Weir with erosion that needs backfilling and expert advice on how to carry it out.*



*Picture 6: Biological measures can help to recurrent problems.*

*Picture 7: Piping hole being filled and closed with compacter.*

*Picture 8: Soil over passage to allow vehicles to pass the structure.*

## B. Maintenance plan

The annual check should be followed by a community maintenance plan. This plan describes who does what and when it is expected to be ready. The plan includes both the annual inspection and repairs as well as the inspection and repairs that need to be carried out after every flood event.

In principle:

- The community members benefitting from a certain structure are responsible for the maintenance
- Community maintenance work can be organized in several ways:
    - An (annual) collective day is organized during which all attend and much of the work is done
    - Special sections of the system are allocated to groups of people who will do the work
    - Money/small animals may be collected to pay for special workers to do the repairs on behalf of the community, in case the community member cannot volunteer him/herself, or to purchase cement,.
- For larger repair works – in particular damage to masonry requiring supply of cement or other materials, support of the Woreda Agricultural Development Office can be asked.

*Picture 9: Community members developing the maintenance plan.*

## Developing the planning

A time should be set for all repairs to be done, taking into account the pastoralist context and (yearly) events. The community managed group should coordinate and supervise. Another joint check is organized at the agreed time for all repairs to be completed to see whether all work is done.

A calendar of activities can look like this. The final calendar should be agreed upon with the community, and can be adjusted based on the experiences of the previous season.

*Table 3: Example of an annual planning*

| | |
|---|---|
| **January** | Repair work following Annual Inspection |
| **February** | |
| **March** | Small flood season, inspection after each flood and repair work |
| **April** | Small flood season, inspection after each flood and repair work |
| **May** | Inspection and repair work, following small flood season |
| **June** | Main flood season, inspection after each flood and repair work |
| **July** | Main flood season, inspection after each flood and repair work |
| **August** | Main flood season, inspection after each flood and repair work |
| **September** | Inspection and repair work, following the main flood season |
| **October** | Annual Inspection |
| **November** | Repair work following Annual Inspection |
| **December** | Repair work following Annual Inspection |

## C. Inspection after flood events

After each flood event an inspection should take place to assess the damages that require immediate attention and to identify damages that need attention as part of the annual maintenance. To assess the damages the following tables can be used.

The list with the overview of all damages in the year will look like:

*Table 4: Sheet to record the findings of the assessment after flood events for the WSWs*

| Water Spreading Weirs | Overall performance of the structure (Satisfactory/ | Repair of masonry | Removal of trees, shrubs, waste and sand | Repair of erosion and earthen structures | Others |
|---|---|---|---|---|---|
| **Water Spreading Weir 1** | | Damage to be repaired now or as part of annual maintenance) | Cleaning needed and who will clean) | Damage to be repaired now or as part of annual maintenance | … |
| **Water Spreading Weir 2** | | Damage to be repaired now or as part of annual maintenance) | … | … | |
| **Water Spreading Weir 3** | | … | | | |
| … | | | | | |
| | | | | | |

*Picture 10: Removal of branches and trees after a flood event.*

Table 5: Sheet to record the findings assessment after flood events for the DSMs

| Dry Stone Measures | Overall condition | Repair stone pitching including adding more stones | Remove debris, trees and sand carried by floods | Take additional measures in area where DSMs have been silted up | Others |
|---|---|---|---|---|---|
| **Area 1: Dry Stone Measures** | | Damage to be repaired now or as part of annual maintenance) | Cleaning needed and who will clean) | Measure needed during annual maintenance….. | |
| **Area 2: Dry Stone Measures** | | Damage to be repaired now or as part of annual maintenance) | …. | | |
| **Area 3: Dry Stone Measures** | …. | | | | |
| … | | | | | |
| … | | | | | |

*Picture 11: Agro-pastoralists repairing dry stone measure.*

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