**Sustainability and Unintended Impact Assessment of WSW and Establishment of Long-term Monitoring Site in Afar**

**Checklist**

**for**

**Module 1: Hydrological and sediment monitoring and technical performance of WSW**

It was assumed that event runoff depth will be measured at selected outlets of the catchments/location of water spreading weirs using Mini Diver Data loggers and sediment load of the flood will be measured using Automatic sediment sampler installed in one water spreading weir. But, due to COVID 19, it was not possible to install these data loggers and automatic sediment samplers. Hence, the team has come up with an alternative methodology to collect data using local partners with remote but close supervision by the study team. The following checklist is, therefore, prepared to generate data on hydrology, sedimentation and technical performance evaluation.

**1 Salient features of the water spreading weir (WSW)**

* Width of the water spreading weir \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Maximum height (above ground) of the water spreading weir \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Width of the apron \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**2 Meteorological data**

* Meteorological data from nearby station (which are not managed by the Ethiopian Meteorological Agency)

**3 River cross sections and longitudinal profiles**

* Cross sectional and longitudinal profile of the existing WSW will be collected from GIZ regional offices (including sectional and longitudinal profile before construction)

**4 Flood data collection**

This data will be collected using steel tape meters and watch upstream of the WSW.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Date** | **Flood depth** | | **Flood duration** | | | **Flood amount** | | |  |
|  | Min (cm) | Max (cm) | Start (hr) | End (hr) | Time to peak (hr) | Small | Medium | Large |  |
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**5 Flood historical data**

Historical data of floods can be generated by consulting elders in the area and we intend to collect this data through focused group discussion. We will try to collect these data using our local partners but it might prove a bit difficult because of its subjectivity. This will best be collected by the study team and verifications will be made once travel restrictions start to ease.

* Depth of flow/ water level
  + - Small flood average water level at known cross-section (u/s)\_\_\_\_\_\_\_\_\_\_\_\_
    - Small flood average water level at known cross-section (weir)\_\_\_\_\_\_\_\_\_\_\_
    - Small flood average water level at known cross-section (d/s)\_\_\_\_\_\_\_\_\_\_\_\_
    - Mean flood average water level at known cross-section (u/s)\_\_\_\_\_\_\_\_\_\_\_\_
    - Mean flood average water level at known cross-section (weir)\_\_\_\_\_\_\_\_\_\_\_
    - Mean flood average water level at known cross-section (d/s)\_\_\_\_\_\_\_\_\_\_\_\_
    - Large flood average water level at known cross-section (u/s)\_\_\_\_\_\_\_\_\_\_\_\_
    - Large flood average water level at known cross-section (weir)\_\_\_\_\_\_\_\_\_\_\_
    - Large flood average water level at known cross-section (d/s)\_\_\_\_\_\_\_\_\_\_\_\_
* Frequency of floods
  + - Expected frequency of small floods in a dry year \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Expected frequency of small floods in an average year \_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Expected frequency of small floods in a wet year \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Expected frequency of medium floods in a dry year \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Expected frequency of medium floods in an average year \_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Expected frequency of medium floods in a wet year \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Expected frequency of large floods in a dry year \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Expected frequency of large floods in an average year \_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Expected frequency of large floods in a wet year \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Frequency/ Number of small floods in the current rainy season\_\_\_\_\_\_\_\_\_\_
    - Frequency/ Number of medium floods in the current rainy season\_\_\_\_\_\_\_\_
    - Frequency/ Number of large floods in the current rainy season\_\_\_\_\_\_\_\_\_\_
* Duration and time to peak of floods
  + - Average time to peak during small flood \_\_\_\_\_\_ and duration to end of flooding\_\_\_\_\_\_\_\_\_\_\_
    - Average time to peak during medium flood \_\_\_\_\_\_ and duration to end of flooding\_\_\_\_\_\_\_\_\_\_\_
    - Average time to peak during large flood \_\_\_\_\_\_ and duration to end of flooding\_\_\_\_\_\_\_\_\_\_
    - Time to peak during dry year \_\_\_\_\_\_ and duration to end of flooding\_\_\_\_\_\_\_\_\_\_\_
    - Time to peak during average year\_\_\_\_\_ and duration to end of flooding\_\_\_\_\_\_\_\_\_
    - Time to peak during wet year \_\_\_\_\_\_\_\_\_and duration to end of flooding\_\_\_\_\_\_\_\_

**6 Sediment data**

* + Previous sediment measurement data collected by GIZ (Level rise; size and types of sediment, dredging volume, etc)
  + Collection of sediment sample during the flood time using small containers \_\_\_\_\_\_\_\_\_\_\_\_
  + What is the composition of the sediment transported by the flood? Is it more of coarse or fine?
  + Collection of soil samples for particle size distribution analysis from representative sample areas both from the irrigated area as well as the d/s river flow section \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Potential and risks associated to sediment transportation and deposition \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**7 Technical performance evaluation**

* + Yield and related data collected by GIZ and ICRISAT
  + Current agricultural practice
    - Irrigated land use (Crop, forage or mixed)
    - Area covered
  + How has the WSW changed the agricultural productivity of the area?
  + Is the water supply sufficient to meet the crop water demand? If not, what should be changed?
  + Is there any change in groundwater recharge due to the construction of the WSW?
  + What is the change in flood hazard after the construction of the WSW?
  + Spacing between successive WSW
  + Damage to crops/ fodder if any
  + Damage to WSW structures and command area
  + Perception of the agro/pastoralists on the scheme efficiency (In terms of transition in cultivation methods, moisture availability, cropping patterns, greenness of the area, flood hazard reduction, etc)

**8 Validation of satellite data**

The data collected in this section is used to validate (ground truthing) of satellite data used to delineate the potentially rehabilitated area from vegetation index and the temporal change at the delineated area on actual evapotranspiration and interception (AETI) and total above ground biomass (TBP) come at the area after the construction of WSW. If collecting those data from all WSW is not possible, it is possible to collect from some WSW (from sample WSW may be from 3 or more WSW).

* Duration of flooding season at the WSW. (Minor flooding season)

From \_\_\_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_\_\_ (day/month/year)

* Duration of flooding season at the WSW. (Major flooding season)

From \_\_\_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_\_\_ (day/month/year)

* For how long the moisture stay at the area after the flooding season during minor flooding season?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* For how long the moisture stay at the area after the flooding season during major flooding season?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* Potentially rehabilitated area (area where get moisture due to flood of WSW)

\_\_\_\_\_\_\_\_\_\_\_ Hectare or square meter

* Global position system (GPS) coordinates of rehabilitated area (at least reading from 4 points in order to get one polygon). In UTM (X, Y) or Lat/Long.

(X1\_\_\_\_\_\_\_ Y1\_\_\_\_\_\_\_,) (X2\_\_\_\_\_\_\_Y2\_\_\_\_\_\_\_\_\_)

(X3\_\_\_\_\_\_\_\_ Y3\_\_\_\_\_\_\_\_,) (X4\_\_\_\_\_\_\_Y4\_\_\_\_\_\_\_\_\_)

**9 Photo and video documentation**

As much as possible, the flood events, the sedimentation data collection, cropped area, interviews should be documented by the local contact persons.