Annex 3.5

Review of the indicators on agricultural water management in the monitoring framework of the Ministry of Water Resources

Federal Democratic Republic of Ethiopia

Ministry of Water Resources

Food and Agriculture Organization of the United Nations

Project "Strengthening national water monitoring capacities, with emphasis on agricultural water management" (GCP/GLO/207/ITA)

Review of the indicators on agricultural water management in the monitoring framework of the Ministry of Water Resources, Ethiopia

In Ethiopia, the MoWR is in the process of developing an information system on water resources which will be based on the monitoring of indicators to describe the state of water resources and water resources management. 26 core indicators have been defined which are grouped in four domains and 12 clusters. Out of the 26 core indicators, six are related to agricultural water use.

Domain	Cluster	Indicator
Resources	Pressures	
	State	Proportion of annual freshwater consumption to renewable freshwater resources (*)
	Response	Area of the watershed developed under soil and water conservation practices / measures *3. Index characterizing the impact of seasonal rainfall variability on agriculture production (**)*
Infrastructure	Inventory	Ha of land under irrigated agriculture or under improved rainwater agriculture per capita
	Performance	*Income differential between farmers having access to irrigation and farmers not having access by type of produce (**)* Actually irrigated area as percentage of area equipped for irrigation (***)
	Financing	
Governance	Decision Making	
	Institutions	
	Tools	
Capacities	Education	
	Research	
	Technology	Irrigated area using advanced practices as % of total irrigated area by type of technology

(*) only agricultural water withdrawal is calculated by the AWMISET information system
(**) indicator not considered in the AWMISET information system due to lack of data

(***) proposed additional indicator on irrigation performance

The project task force reviewed the indicators identified by MoWR relevant to agricultural water management (see table below). For four indicators, the consultant for water resources survey has prepared methodological sheets which were reviewed by the TA (see annex 6). The indicator sheets were reviewed during the mission. Two indicators (No. 4 and 13) were considered as relevant, but it was decided not to include them in the project as further research is needed on how they can be calculated.

Indicator	**Disaggregation by**	**Scale**
1. Proportion of annual freshwater consumption to renewable freshwater resources	-	Basin
3. Area of the watershed developed under soil and water conservation practices / measures (%)	type of measure	Basin
4. Index characterizing the impact of seasonal rainfall variability on agriculture production (to be studied)	*type of produce*	*Basin*
5. Ha of land under irrigated agriculture or under improved rainwater agriculture (per capita)	type of system	Basin
13. Income differential between farmers having access to irrigation and farmers not having access (per Ha)	*Produce*	*Kebele*
24. Irrigated area using advanced practices (% of total irrigated area) by type of technology	-	Basin

Indicator 1: There is a considerable difference between water withdrawal and consumption particularly in the case of irrigated agriculture, where as little as 30 % of the water withdrawn may actually be consumed. Since the pressure on surface water and groundwater resources is better expressed by water withdrawal than by actual water consumption, it is proposed that withdrawal for agriculture be used as a basis to calculate this indicator. Considering water withdrawal is also in line with the MDG indicator 7.5.[1] Agricultural water withdrawal will be determined according to the methodology developed under result 1. It is proposed that two sub-indicators will be calculated: 1. Agricultural water withdrawal as a percentage of total renewable water resources, and 2. Agricultural water withdrawal as a percentage of total water withdrawal by all sectors.

Currently, all water for agricultural use in Ethiopia is withdrawn directly from surface or groundwater, so the proposed indicator provides a good measure of the pressure on water resources from irrigation. In the future, however, alternative water sources such as reused wastewater or desalinisation may become more important for the provision of water for agricultural uses. In this case, the indicator should be revised.

[1] See: http://unstats.un.org/unsd/mdg/Host.aspx?Content=Indicators/OfficialList.htm

Indicator 3: The baseline survey will assess data on areas covered under different soil and water conservation measures as well as the total area of the catchments at woreda level. The numbers can be aggregated to basin level to calculate the indicator. However, the significance of the proposed indicator is problematic: The indicator aims at quantifying the efforts to preserve groundwater and surface water resources in terms of quantity (eg. through maintaining/increasing infiltration capacity) and quality (e.g. through reducing sediment concentration in surface runoff). However, it is impossible to make general assumptions about the effectiveness of SWC measures in achieving these aims, as they can vary largely as a function of the type of measure, the properties of the soil and other site-specific factors. Furthermore, to increase the significance of the indicator, the area under SWC in a given watershed should not be expressed as a percentage of the entire watershed area, but as a percentage of the watershed area which is degraded or at risk of degradation. However, currently no data exists in Ethiopia to quantify the degraded areas.

Indicator 4: No data is currently available to calculate this indicator. It requires historical research on the relationship between rainfall and production in rainfed agriculture. It was therefore decided not to consider this indicator under the current project.

Indicator 5: As determined by the project task force, "improved rainwater agriculture" is meant to include non-conventional irrigation such as rainwater harvesting, spate irrigation and runoff farming.. To calculate this indicator, total irrigated area according to system (surface, sprinkler, drip) will be assessed for each basin through the baseline survey, and population figures will be determined from current figures of the CSA.

Indicator 13: Farmer's income depends on many factors (soil, rainfall, access to seeds, fertilizers, pest control, access to markets, irrigation, etc.) In order to establish the impact of access to irrigation on farmers' income with regard to different crops, reference plots for the main crops in each agroecological zone must first be identified which have similar properties except regarding access to irrigation. As discussed during the project launching workshop, the indicator may be simplified by considering yield instead of income differential. However, reference plots must still be identified and monitored, as data on yields are typically not available. It was therefore decided not to consider this indicator under the current project.

Indicator 24: "Advanced irrigation practices" refers to localized and sprinkler irrigation which may have higher application efficiencies than surface irrigation. To calculate this indicator, irrigated areas by type of system must be determined, as well as total irrigated area basin. All of these data will be available in the database.

As an additional *indicator on irrigation performance* which can be determined with relative ease from data collected in the baseline survey, the percentage of actually irrigated area over area equipped for irrigation will be calculated from the data at the basin and regional levels. It may be a useful indicator to include at the national level, as a measure of the performance of agricultural water management structures.