Certificate Course on Participatory Irrigation Management (CCPIM)

Module 11- Water measurement, Water Accounting, Water Audit, and estimation of water losses.

Topic 11.4- Water accounting, Water audit and estimation of water losses



Introduction:

One of the main objectives of establishing Water Users' Associations is that the sharing of water between the canal sub-systems and the farmers should be equitable. For equitable distribution of water, the flow or discharge measurements are necessary.

Water Accounting at the Canal Head: Scheduled supply vs actual supply

The WUA receives water from Water Resources Department as per the roster of canal / contract. Accounting helps WUA to record shortfall / surplus in the agreed supplies.

The knowledge of shortfall / surplus in the agreed supplies is helpful to WUA in preparing the roster for the outlets.

Water accounting helps in maintaining the transparency in water distribution and minimizes conflicts.

SI	Roster running time		Actual flow duration (days)	Gauge reading		Average Gauge Reading (Meter)	Discharge (cumec) based on average	Quantity of water received (cubic	Remarks
	Date / time	Discharge (Cumec)		Date / time	Reading (meter)		gauge reading	meter)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)

The format for water accounting of minor canal is given below:

Water Accounting at the Outlets : Water Distributed to Outlets

Every outlet has different irrigation water requirement depending upon the sown area, type of crop and soil. The water accounting is the first step for matching the allocated water with the realistic requirement thus promoting the best use of water.

The total water received at the head of minor and total water passed / discharged through the outlets gives a fair idea of leakages, wastages in the minor which can be tackled in due course.

Water accounting at outlet level helps in maintaining the transparency in water distribution to the farmers and minimizes conflicts.

The format for maintaining water account at the outlet level is given below:

SI Nr	Outlet Number	Open (date /time)	Close (date/ time)	Outlet discharge (cumec)	Running Time (day) Col (4) – Col (3)	Running Time in seconds Col (6)* 86400	Total Quantity of water passed (cubic meter) Col (7) * Col (5)	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

Water Audit: Tool for understanding system performance

A comprehensive water audit gives detailed profile of irrigation system ,water users & facilitates effective management of resources with improved reliability.



A water audit report consists of:

- Amount of water proposed in the roster and actually delivered.
- Amount of water use envisaged versus actual utilization.
- 3. Water losses / efficiency of the system along with reasons for water losses

Once water accounting is place on a system, the next step is water audit which determines the amount of water lost from distribution system due to leakage and other reasons (unauthorized withdrawal, unsuitable cropping pattern etc)

A daily water audit form is given below:

Date	Water Released at Canal Head	Water measured at Sub-System Level	Water loss in the main canal (2-3)	Water delivered to the field at the outlet level	Water loss in Sub System ,i.e., up to outlet level (3-5)	Crop water requirement (NIR)*	Water loss in the field (5-7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total							

Practical Example: Assessment of water losses through water accounting & water audit.

SI	Item	Quantity of Water (cusec day)	% of Total withdrawl
1	Total supply at Minor head	400	
2	Seepage losses in the Canal (empirical / field observation)	30	7.5
3	Total discharge through outlets	300	75.0
4	Discharge measured at Tail Wall	10	2.5
5	Water losses (wastage etc)	60	15

Exercise on Water Audit

Date	Water Measured at Canal Head (cusec)	Water measured at Sub-System Level (cusec)	Water loss in the main canal Col (2)-Col (3)	Water delivered to the field at the outlet level cusec	Water loss in Sub System ,i.e., up to outlet level Col (3)- Col (5)	Crop water requirement (NIR) / day (cusec)	Water loss in the field Col (5)- Col (7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	12	11		9		7	

Solution:

Water loss in the Canal = Col (2) – Col (3) = 12-11= 1 cusec

Water loss in the Sub System = Col (3) – Col (5) = 11-9 = 2 cusec

Water loss in the Field = Col (5) – Col (7) = 9-7 = 2 cusec

Total losses in the canal system = 1+2+2 = 5 cusec (that is around 42% of head discharge)

Do it yourself?

If the water measured at Canal Head is 13 cusecs, at Sub-System Level is 10 cusecs, water delivered at the outlet level is 9 cusec and crop water requirement is 8 cusec, what will be the total losses in the canal system