Reservoir
Size Calculation

Reservoir size calculation

A reservoir allows storing the water when the faucet of the WP is closed. The storage calculation is based on night storage**. It is useless to calculate storage for more than 14 h** (maximum night closure period of the WP).

As described in the chapter 6 of "network design guideline" document, it is easier to calculate the reservoir size for each WP.

First calculate the total daily need, the daily production and the daytime production **in dry season.**

1) **Total daily Needs (l/day)** $=$ nb of HH $\times$ Need(l/pers/day)$\times$nb of pers per HH$=$nb of HH $\times 90$
2) **Daily production (l/day)** $=$ Inlet yield (l/s)$\times 3600$ (s/hr)$\times 24$ (hr) $=$ Inlet yield (l/s)$\times$ 86400
3) **Daytime production (l/daytime)** $=$ Inlet yield (l/s)$\times 3600$ (s/hr)$\times 10$ (hr) $=$Inlet yield (l/s)$\times$ 36000

- If the total daily needs are superior to the daily production, the spring yield in dry season is insufficient to provide 15 l/pers/day. Find another spring or see with your coordinator for alternative solution.
- If daytime production is superior to total needs: no need of storage. **Open flow** is the best option.

$$V_{Reservoir}\ (l) = \text{Total daily needs (l/day)} - \text{Daytime production (l/day)}$$

Example: Dry season yield = 0.1 l/s Nb of HH = 68

- **Total daily Needs** $= 68 \times 90 = 6120$ (l/day)
- **Daily production** $= 0.1 \times 86400 = 8640$ (l/day)
- **Daytime production** $= 0.1 \times 36000 = 3600$ (l/daytime)

The total daily needs are inferior to the daily production → It is not necessary to find another spring.
The total daily needs are superior to the daytime production → You need to store water at night.

$$V_{Reservoir} = 6120 - 3600 = 2520\ l$$

It gives the following results:

	WP name	1
	Nb of HH	68
①	Total Needs (l/day)	6120
②	Inlet flow_ Dry season (l/s)	0.1
③	Daily prod (l/day)	8640
④	Daytime prod (l/daytime)	3600
⑤	Type of storage	Night storage
⑥	V reservoir calculated (l)	2520

Field format – Reservoir Calculation

	WP name					
	Nb of HH					
①	Total Needs (l/day)					
②	Inlet flow_ Dry season (l/s)					
③	Daily prod (l/day)					
④	Daytime prod (l/day)					
⑤	Type of storage					
⑥	V reservoir calculated (l)					

① Total Needs:

- For community WP: **Total daily Needs (l/day)**$=$ nb of HH $\times$ 90
- For public water point: **Total daily Need (l/day)** $=$ Need per user $\times$ nb of users

② Reservoir inlet flow in dry season from the DB repartition

③ **Daily production (l/day)** $=$ dry season Inlet yield (l/s)$\times$ 86400

- If ① > ③ (Total Needs > Daily production) → Find an alternative spring or refer to your coordinator.

④ **Daytime prod. (l/daytime)**$=$ dry season Inlet yield (l/s) $\times$36000

⑤ Type of storage:

- If ① < ④ (Total Need < Daytime production _Dry) → Open flow
- If ① > ④ (Total Need > Daytime production _Dry) → Night storage

⑥ Volume of reservoir:

$$V_{Reservoir}\ (l) = \text{Total daily needs - Daytime production} = ① - ④$$