

by adopting an appropriate dam structure.

In this project, this problem was solved by selecting the dam site at a point near the confluence of the Kolongo River into a larger river.

(4) Salinization in reservoir area

The subsurface dam is likely to cause accumulation of salt on the ground surface in the reservoir area due to the rise of reserved groundwater to the surface by evaporation. However, this phenomenon occurs only when the highest groundwater level is close to the ground surface. It is thus possible to avoid this problem by setting the highest level of reserved groundwater at a sufficient depth below the ground surface.

In this project, the highest level of reserved groundwater (the depth of the crest of the dam) was thus set at 3 m below the ground surface.

2-4 Requirements for a subsurface dam site

The physical conditions (hydrogeological conditions) required for the site are as follows:

(1) Presence of shallow groundwater with high fluidity

There must be groundwater at the dam site. This groundwater must have high fluidity as well, because reserved water using a “cut-off wall” set up across stagnant water cannot increase.

In addition, it is desirable that this groundwater exists at a shallow depth because, if the groundwater aquifer exists at a deeper depth, determining the hydrogeological characteristics of the dam site would be more difficult, and the cost and technical difficulties of the construction of the subsurface dam would be much greater.

(2) Presence of a porous layer (aquifer) for water storage

The higher the volume of pores (effective porosity) of the geological strata that form the reservoir layer, the more effective the water storage. This is because water is stored in the geological strata. High effective porosity is necessary also for high water fluidity.

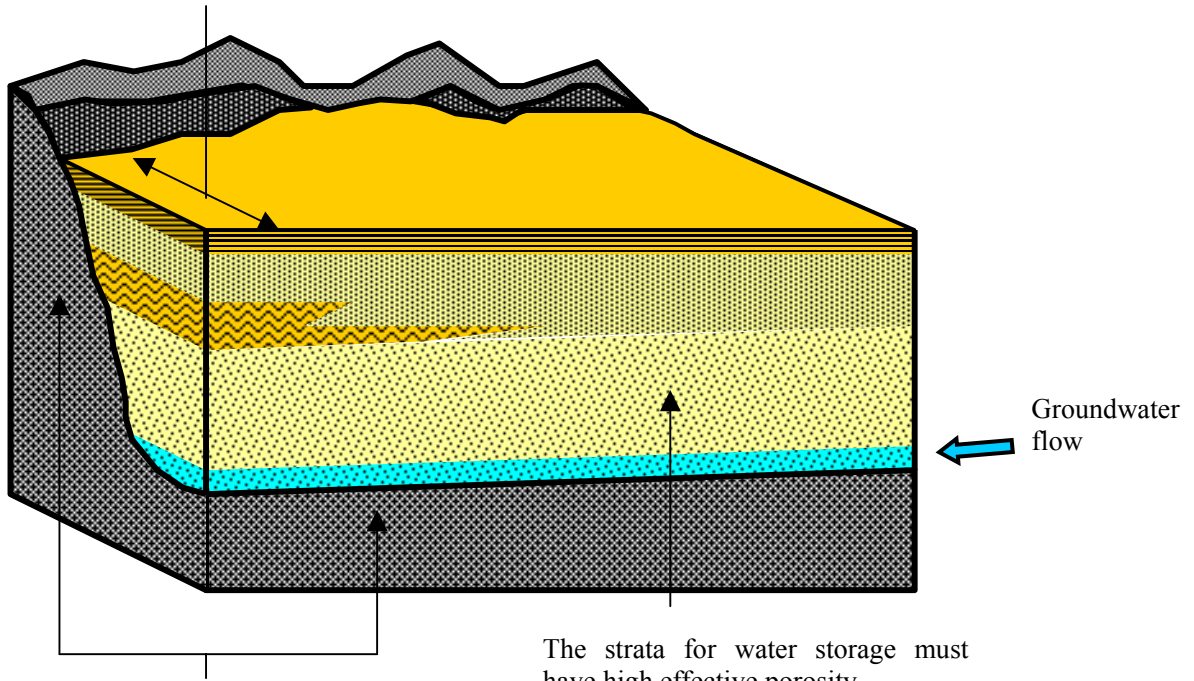
(3) Presence of the surrounding basement rock with low permeability

The sides and the bed of the reservoir must consist of basement rock with low permeability. If there are big water bypaths, the dam cannot store water effectively.

(4) Presence of a gorge of basement rock with low permeability

To construct a subsurface dam effectively, it is desirable to set up the dam at a bottleneck point, where basement rock with low permeability make a gorge with a vast aquifer upstream, as in the case of a surface dam.

A gorge in the geological structure is suitable for the subsurface dam site.



The basement rock must be impermeable or almost impermeable.

The strata for water storage must have high effective porosity.

Fig. 2.2: Requirements for a subsurface dam site