

1-4 Outline of the facilities for the demonstration studies

The facilities for the demonstration studies in this project were as follows:

(1) Subsurface dam

A subsurface dam with the following characteristics was constructed on the Kolongo River at the Koulikare Quarter in Nare Village:

Type: earth dam

Crest length: about 210 m

Depth of dam: 3.0 to 11.4 m (maximum) below the ground surface

(2) Other experimental facilities

- Water-pumping station operated by solar energy: with 3 water-pumping wells (about 20-m depth) located in the reservoir area, with 1.76 kwp of solar power
- Multi-purpose water-supply stations: water-supply stations for domestic, agricultural and livestock uses
- Pilot farm: 0.25-ha area, located in Kombangbedo Village for cultivation tests of cereals and vegetables by methods such as drip irrigation
- Small-scale surface dam with water gates: 33-m width with 23 water gates, maximum water level being 1.2 m, utilizing the bridge piers of a main road located 1.2 km upstream of the subsurface dam site to recharge groundwater

(3) Facilities for groundwater observation

- Facilities for groundwater observation with automatic water level recorders: at 5 points (The water level recorders were removed in 2001 due to decrepitude.)
- Wells for groundwater observation: 3 boreholes and 2 large-diameter wells
- Wells for water pumping and groundwater observation: 2 boreholes and 4 large-diameter wells
- Sets of piezometers (wells for observation of the hydraulic head): 16 pipes located at 4 points

(4) Meteorological stations (mainly of rainfall)

- Meteorological station in the Koulikare Quarter in Nare Village: a station for the observation of rainfall, evaporation, temperature, humidity, etc.
- Rainfall stations in the Kolongo River basin: 3 stations (the Kossonkore Quarter in Nare Village, Ouanobian Village, and Noka Village)

1-5 Evaluation of the results of the project and prospects

(1) Water storage state

The subsurface dam constructed in this project stores water in the reservoir layer consisting of "fossil valley sediment" and heavily weathered basement rock. According to the calculation using a simplified reservoir model, the extent of the reservoir area, the groundwater level and the volume of the reservoir at its maximum storage capacity are as follows:

- Width of the reservoir area: about 150 m (lowest estimate)
- Length of the reservoir area (upstream distance to which the reserved water extends): 13.4 km
- Maximum groundwater level: -3.0 m (depth below the ground surface)
- Water storage capacity: about 1,800,000 m³ (with the effective porosity of the reservoir layer estimated to be 20%)

Up to the end of 2002, the groundwater level (depth below the ground surface) varied from -7.0 m at the end of the dry season to -4.2 m at the end of the rainy season, and had not yet reached the maximum level. The reservoir area probably extended 5 or 6 km upstream of the dam, and the volume of reserved water was thus estimated to be about 400,000 m³ at the end of 2002.