

3. Survey to select the subsurface dam site

This chapter describes the survey methods of selecting a subsurface dam site and the results.

3-1 Outline of the survey methods

Generally, a subsurface dam site is selected according to the following procedure:

- 1) Interpretation of satellite images and aero-photographs
- 2) Geological and topographical survey by preliminary exploration
- 3) Estimate of the geological structure by geophysical surveys such as electric soundings
- 4) Verification of the geological structure by test drillings and permeability tests
- 5) Estimate of the flow mechanism of groundwater by observation of groundwater level

Hydrological and meteorological data, such as rainfall and rate of streamflow, are also collected to determine the need and feasibility of a subsurface dam.

On the other hand, management and maintenance of a subsurface dam requires the active participation of the local community. Therefore, it is necessary to undertake a socio-economic study to understand the potential for the participation of the local people. Once the site has been decided, it is also important to encourage their participation from the planning stage.

3-2 Selection of the project area

(1) Selection of the country for the project

The United Nations Convention to Combat Desertification notes in its preamble that serious drought and desertification has tragic consequences particularly in Africa. Originally, the UN started to deal with the desertification issue, with the serious drought in the Sudan-Sahel region at the end of 1960s to the beginning of 1970s as a trigger. For these reasons, it was decided that this model project be carried out in the Sahel region. Burkina Faso (in particular, the central and the northern part of this country) was finally selected as the site country because it met the following conditions:

- 1) A country seriously affected by desertification
- 2) A country with relatively large areas with aquifers of shallow groundwater
- 3) A country whose political situation is stable

The climate in the northern part of Burkina Faso is characterized by two seasons:

- Dry season (8 months from October to May)
- Rainy season (4 months from June to September)

There are two temperature peaks in a year in this country; the hottest is March to May with a maximum temperature of about 40 degrees centigrade and a minimum temperature of 25 to 28 degrees, and the second hottest is October to November with a maximum temperature of 36 to 39 degrees and a minimum temperature of 22 to 23 degrees. In addition, there are two coolest seasons; December to January with a maximum temperature of 30 to 34 degrees and a minimum temperature of 14 to 16 degrees, and July to September with a maximum

temperature of 30 to 34 degrees and a minimum temperature of 21 to 24 degrees.

Going north in this country, rainfall decreases. Ouagadougou, the capital of Burkina Faso located in the central part of the country, has an annual precipitation of 733 mm (annual average between 1990 and 1994), while Dori, a city located in the north-eastern part of the country, has annual precipitation of 474 mm. Most of the rainfall is concentrated in the rainy season.

A total of 80% of the land of the country is on the old rock of the Precambrian.

The main industries of the country are agriculture and livestock farming. A total of 11% of the country is used as farmland, on more than 80% of which millet, sorghum, maize and rice are cultivated. However, the production of these cereals is not stable due to their sensitivity to land conditions and climatic conditions.

(2) Requirements for the selection of the model project site

In particular, the following are taken into account in site selection from the viewpoint of executing the model project:

- 1) The construction of a subsurface dam of appropriate scale as a model project is feasible at the site.
- 2) There is a relatively large village near the site to facilitate the participation of local people in the model project.
- 3) Access to the site from the capital, Ouagadougou, is easy.
- 4) There are no other projects near the site, to assess the result of the model project properly.

(3) Procedure for the site selection in this project

In this project, the subsurface dam site was selected according to the procedure shown in Fig. 3.1. Equipment and machinery available in Burkina Faso were used as much as possible for the project, avoiding the use of special equipment or machinery.

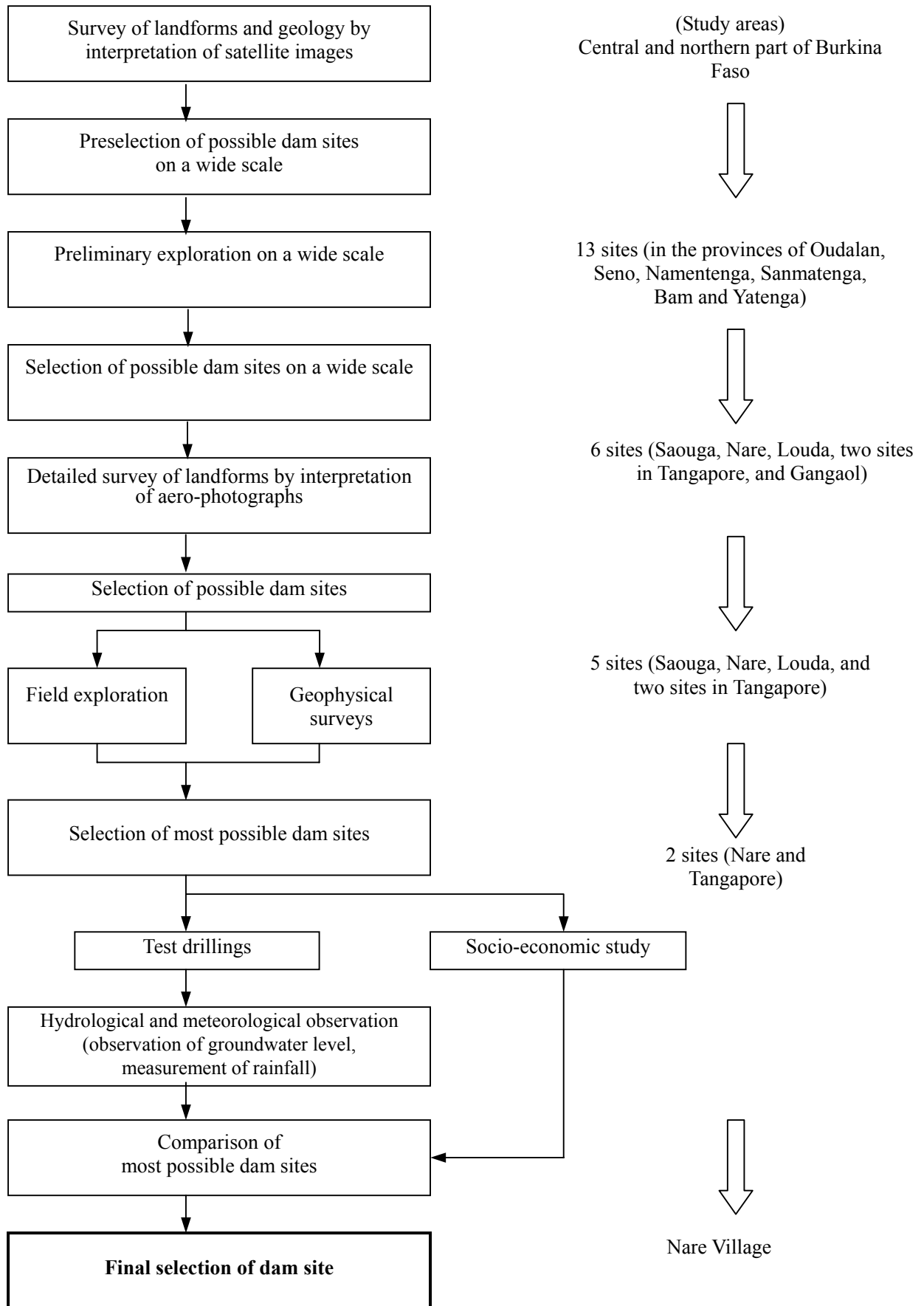


Fig.3.1: Flowchart of the site selection for the subsurface dam