DAMS AND DEVELOPMENT
Philippines in-country workshop

ADB RETA 5828
LARGE DAMS AND RECOMMENDED PRACTICES

PRESENTATION TEXT
by
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INTRODUCTION

The studies by the World Commission on Dams (WCD) were funded by a number of international agencies, national governments, private companies and NGO's. However the ADB's constitution did not permit it to provide direct financial support, so it undertook instead to carry out its own study, to terms of reference specifically suited to its activities, but to provide the factual data compiled in their study to WCD to increase its Knowledge Base.

The ADB had, of course, since the early 1980's developed its own policies in relation to environmental and social aspects of infrastructure projects.

(SLIDE 1)

Accordingly, ADB sought proposals early in 1999 from qualified international consultants to fairly detailed Terms of Reference, and appointed the consortium of Consultants shown in Slide 1 to carry out the study.

ADB also appointed an Advisory Panel of four specialists in different relevant areas of expertise, also shown in Slide 1, to assist and review the work of the Consultants:

TERMS OF REFERENCE

(SLIDE 2)

The mandate of the WCD and the main thrust of the terms of reference for the ADB study are both shown in Slide 2. It will be noted that, although there are slightly different emphases in the two studies, there is really no conflict.

The detailed terms of reference in the ADB study required the consultants to carry out the following activities:

- a literature review to record the impacts of dams on society and the environment, and the institutional processes employed to implement them;
- selection of projects for the case studies;
- field visits to collect data from the case study projects;
- analysis of the data collected; and
- finally, to find a pattern of good practice in the development of dam projects.

To avoid unintentional conflict with the WCD, it was scheduled to finalise the ADB report after the WCD report was issued.

CHOICE OF CASE STUDY DAMS

The following procedure was adopted in selecting the projects to be studied:

- The Consultants first prepared a list of some 150 dams from 15 countries in the Asia-Pacific region, including PR China, Japan and Australia.
- For each such dam, 40 attributes were listed, such as dam height, hydropower capacity, area irrigated, reservoir parameters, people displaced, funding source, completion date, availability of information, etc.
- A scoring system was then devised, with qualitative weighting in relation to the project's suitability for study.
- A long list of the highest scoring 20 dams was prepared for further consideration.
- A decision was taken by the Consultants and Advisory Panel together that the available resources for the study only permitted 4 projects to be studied – any less would not have given a sufficient spread of experience, and any more would not permit a sufficiently detailed study to be carried out.
- The Consultants and Advisory Panel working together, using value judgement, selected four first preference dams giving a reasonable geographical and age spread, with four alternates to each in case permission from the country concerned was not given to carry out the study – SLIDE 3. Only in one case was permission not given by the country concerned to study a first preference dam.

CASE STUDY METHODOLOGY

The dams were studied sequentially in the order presented in SLIDE 3.

Each case study commenced with obtaining literature available outside the country concerned.

Local consultants were then appointed to collect data available within the country, and to identify the stakeholders and arrange meetings with them and the international consultants.

The international consultants then made a field visit to verify the data collected and to hold discussions with all the stakeholders.

Immediately following each visit, the international consultants prepared a report analysing the information collected. These Case Study Reports formed Annexes to the Final Report of the study, after review by the Advisory Panel.

CASE STUDY FINDINGS

The Final Report of the study discussed the comparative findings of each case study in some detail. These comparative findings are summarised in the following two slides.

SLIDE 4 summarises the expected and actual technical, cost and economic performance of the four projects studied. Some of the main findings in these categories as follows:

- **Project purpose.** All four projects developed hydropower, and all but Linjingtan in China developed irrigation although only at Magat dam in the Philippines was irrigation a primary purpose.
- **Capital cost**. In each case expected and actual costs are given to the same base date. The actual cost for Magat is substantially as expected. In the case of Nam Ngum and Linjingtan dams the increase in costs are largely due to actual installed generating capacity being greater than those planned. At Victoria, the increase in cost was almost wholly due to a gross under-estimate of the number of people to be resettled, the cost of the engineering works being only about 6 per cent higher than estimated.
- **Construction period.** No planned construction period is available for Nam Ngum. The construction periods at Victoria and Linjingtan are only marginally greater than expected. At Magat, the much greater construction period was almost entirely due to delay in completing the irrigation extension works. Because of their nature, irrigation works often drag on after the dam construction works are completed.
- **Energy output.** The average annual output at Magat is very close to that expected, and the large increase at Nam Ngum matches the increase in installed generating capacity and was made possible because of much larger export opportunities to Thailand than expected. At Victoria, the gross shortfall in output of about 60 per cent is due to two causes: the river flow is some 20 per cent lower than estimated at the planning stage due to inaccuracies in gauging; and also because diversion to another irrigation scheme upstream of the dam was in practice about 20 percent greater than advised at the planning stage. Linjingtan is not fully operational as yet.
- **Irrigation.** The expected irrigation area at Nam Ngum was slightly greater than actually achieved but irrigation was not a primary purpose of the project. As Victoria is one dam in a complex system of dams and irrigation developments, it was difficult to identify exactly what area it was expected to or actually served. At Magat, where irrigation was a major purpose, the actual area served is much lower than planned, largely due to inadequate investigation of the viability of the area to be served.
- **Sedimentation.** The actual sedimentation rates at Nam Ngum and Victoria are comparatively low, and at Linjingtan a large dam upstream traps most of the sediment. The sedimentation rate at Magat is twice as high as even the very high expected rate, due to large landslides in the catchment following a major earthquake in 1990. In none of the projects are there any measures in hand to deal with sedimentation.
- **Economic internal rate of return (EIRR).** The higher than expected rate at Nam Ngum is entirely due to exports to Thailand. At Magat, the low rate is entirely due to the much lower area actually irrigated than planned – power generation is as expected. At Victoria, the actual rate does not include irrigation benefits, for the reasons mentioned before, whereas the planned rate included such benefits, but the low rate is also due to energy output being less than planned. Linjingtan is not fully operational as yet.

SLIDE 5 summarises expected and actual social and environmental performance of the case study projects.

The major impact relates to **resettlement.** In the three cases where expected and actual figures are available, the actual number of people (or families) who had to be resettled was appreciably greater than expected. This was generally due to the planning being based only on people directly displaced by the engineering works, whereas in practice people whose livelihoods were adversely affected also had to be resettled or compensated.

With regard to other social and environmental aspects of the projects, whereas there are significant adverse impacts in many cases, inadequate pre-project studies, except at the most recent project, Linjingtan, have largely been responsible for the lack of any planned mitigation of these impacts.

ANALYSIS

The Consultants initial analysis of the case studies taken together took the form of a matrix of **lessons learnt** and related **recommendations** for dealing with each of them. A review of these indicated that the basic cause was the inadequacy of the **processes** employed in the development of the projects.

To illustrate this, an ideal or model **Project development and Decision-making Process** was prepared in the form of a flow chart (SLIDE 6), which depicted the various stages that should be adopted in developing a project as the central spine of the flow chart, with the inputs required at each stage shown on the left side, and the decision points on the right side. In the Final Report, for each case study, a version of this flow chart was produced in which the actual activities, inputs and decisions taken were identified by shading. These dramatically illustrated the deficiencies in the processes employed in each case. In this presentation, a comparative summary of the processes actually adopted is shown in SLIDE7, where the shading indicates activities undertaken.

The following observations can be made:

- **No comprehensive options assessments were carried out at any of the projects, except that hydropower was compared with thermal generation in all studies.**
- **System analysis was only done at Victoria and Linjingtan and than only for power generation.**
- **Public consultation was carried out only at the most recent project, Linjingtan – at the others, at most, only public discussion was held.**
- **No environmental studies were carried out at Nam Ngum, they were very late and limited in extent at Victoria, better at Magat, and fairly thorough at Linjingtan, largely due to ADB involvement in the latter stages.**
- **No post-construction monitoring has been done to date at any of the projects.**
- **However, there has been a progressive increase in the comprehensiveness of the project development and decision-making process with time.**

CONCLUSIONS

SLIDE 8 shows the Final Report's conclusion on the **Main Lesson Learnt.**
SLIDE 9 shows the Final Report's conclusion on the **Main Recommendation.**

Both are supported in the study's Final Report by some 80 **Supporting Lessons Learnt** and related **Supporting Recommendations.** These are reproduced in the Executive Summary of the ADB RETA 5828 study report given to each participant.