Experiences from the WWF
TA TRACH RESERVOIR
Mitigation and Options Assessment

Background

The Ta Trach reservoir is planned to be created on the southernmost branch of the upper Huong River (also known as “the Perfume River”) in Thua Thien Hue Province, Central Vietnam. The reservoir, although largely justified on the grounds of flood mitigation, is seen as a multipurpose project and expected to supply water for agricultural, industrial and domestic consumption, generate electricity and help prevent salt intrusion into the lower section of the Huong River during the dry season. The Government of Vietnam asked for a US$ 170 million loan from the Japan Bank for International Cooperation (JBIC) to finance this project. The Government of Vietnam had already produced a feasibility study that was validated by the Prime Minister of Vietnam.

JBIC accepted to study the proposal and undertake studies to comply with its own regulations. Given the current level of public focus and negative press surrounding dam construction, JBIC was keen to attempt to follow World Commission on Dams (WCD) guidelines and formed an advisory committee for the project consisting of three Japanese academics and Mekong Watch Japan (a Japanese NGO acting as a watchdog for Japanese Overseas Development Aid in the Mekong region).

The Initial Involvement of WWF

WWFs Living Mekong Initiative (LMI) first took part in the Ta Trach reservoir project by attending consultation workshops which gathered representatives of affected communities, local and central government, Vietnamese mass organizations, JBIC, and NGOs in August and September 2002. At these meetings, the results of a study financed by JBIC and implemented by consultants under the name of Special Assistance for Project Formation for the Ta Trach reservoir project, phase 1 (SAProF I) were presented. It was clear from this workshop that the SAProF I report and the consultation process had significant limitations. There was also clear evidence of the need for a conservation NGO to play a role in the process.

The LMI made comments on areas where there was a clear lack of compliance to the WCD recommendations and on major gaps in the SAProF I study; mainly the options assessment and the lack of attention given to the impact on sediment transport. This latter issue was raised with particular respect to potential destabilization to the lagoon complex downstream that sustains the livelihoods of some 300,000 people.

From subsequent meetings, it was admitted that there were gaps in the study and that the risks might have been underestimated. The comments made by the LMI contributed to the Terms of Reference (ToR) of a second SAProF study that would focus on the impact of the reservoir on sediment transport. JBIC also proposed to fund the LMI to produce an independent study to propose alternatives and parallel mitigation measures for the Ta Trach reservoir project.

Whilst the Ta Trach River lies outside the Mekong Basin (the defined geographic focus of the LMI), the LMI viewed this as an important opportunity to engage with one of the major financers of infrastructure within the Mekong basin on one of WWFs global freshwater priority issues (the implementation of WCD guidelines) in the context of a Mekong basin country. Following discussions regarding the risks and potential benefits of undertaking such work, the LMI agreed to identify and hire a team of consultants comprising an academic geomorphology expert, a hydraulic engineer working for an organisation that has constructed and manages 19 dams on the Rhone River and provides expertise worldwide, and a conservationist with expertise in River Basin Management.

The Role of WWF

The specific roles of the WWF study in the Ta Trach reservoir project were defined as follows:

- The WWF team will work within the time frame of the ongoing JBIC/ Government of Vietnam grant schedule. This was particularly pertinent because delaying the process would run the risk of WWF taking some responsibility for damages caused by floods that could otherwise have been mitigated.
- Work on the basis of the requirements of the Government of Vietnam
- Comment on and complement the SAProF II report
- Not only point at problems, but propose alternative and practical solutions.
- Provide technical advice as support for stakeholders in the project.

The reasons behind LMIs stance to not blankly oppose the Ta Trach reservoir project were:

- Working with JBIC and the Government of Vietnam to improve the project was viewed as a more constructive and effective approach to achieve conservation and sustainability successes.
- The floods are a serious and major issue for the development of Thua Thien-Hue province (the 1999 flood killed some 400 people and many thousands of livestock, as well as flooded several hundred thousand homes and caused damage to the tune of several million US$). The LMI was keen to support the courage of local authorities and JBIC to try to tackle this very complex issue.
- JBICs efforts to follow the WCD recommendations, by inviting an independent advisory committee and in requesting an independent WWF study, represent significant efforts that should be acknowledged and supported.
- A completely alternative option, that would still meet the requirements of the project, was not possible within the timeframe of the study.

As a result, it must be stated that the LMIs involvement in this project by no means represents its full endorsement of the project. The aim of the study was to provide recommendations to improve the project within the constraints imposed.

"The floods are a serious and major issue for the development of Thua Thien-Hue province."

Results and Recommendations of the WWF Study

The WWF team formulated its study using information from the SAProF II draft reports in conjunction with field visits, meetings with senior staff of JBIC and experts of the SAProF II team, and meetings with Government of Vietnam representatives.

The WWF team's core task was to ensure the integration and consideration of their conclusions and recommendations and make the necessary subsequent changes to the SAProF II report and presentations at the series of stakeholder consultation workshops.

The main recommendations were:

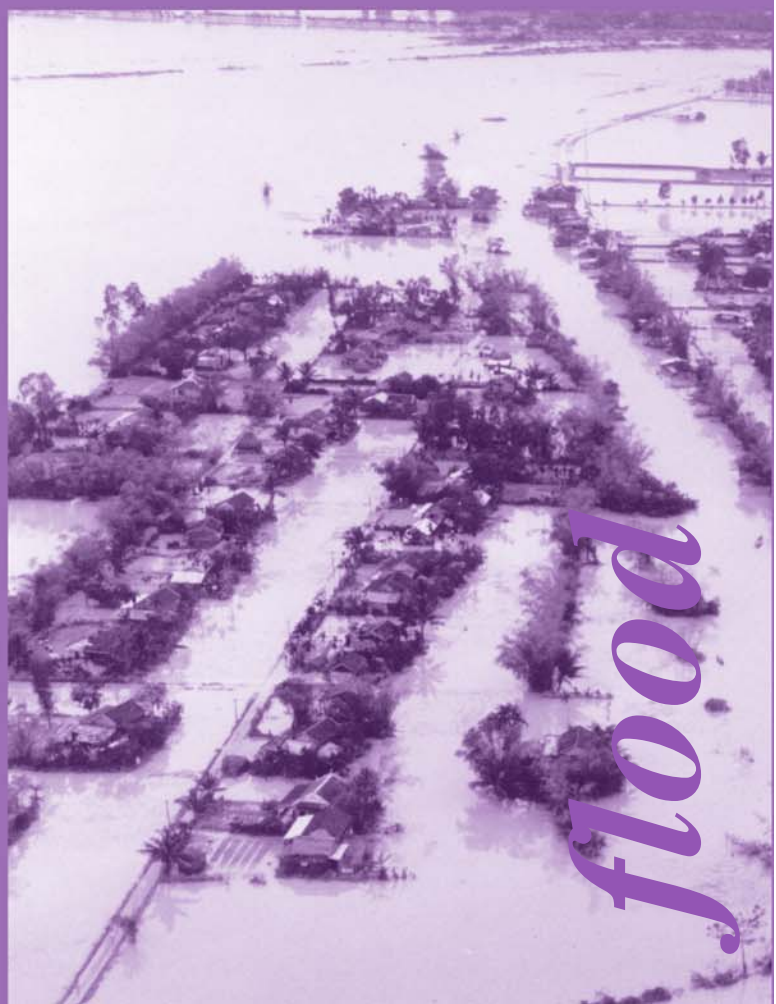
Putting less emphasis on the mathematical model

The mathematical model that was used as the basis on which most of the assumptions were made has its limitations, not least because of the very limited amount of data available to input to it. In addition to providing recommendations on how to better calibrate and improve the model, the WWF team stressed that less focus should be placed on the model, and argued for a more qualitative approach on the basis of a lack of data.

Reconsidering the Huu Trach reservoir project

The environmental assessment was conducted for the Ta Trach reservoir only, but the hydrological assessment (giving the rationale for the Ta Trach reservoir) included a second reservoir, on the Huu Trach River. Hence, the environmental assessment for the Ta Trach reservoir could not be used to justify two reservoir projects (the Ta Trach and the Huu Trach reservoirs), if two reservoirs are planned, a comprehensive environmental assessment addressing both rivers is needed.

Construction of the Huu Trach reservoir would induce a stronger disequilibrium in river behaviour. The risk of disturbing the balance of the sediment in river beds and on the seashore is too great without necessary data and an adequate assessment of the impact of the two reservoirs.



destruction

There is also less need for a second reservoir since the effectiveness of the Ta Trach reservoir in preventing and controlling floods was found to be greater than stated in the SAProF II report.

Preserving the Huu Trach River in its natural state would not only compensate for the geomorphologic disequilibria caused by sediment trapped in the Ta Trach reservoir, but it would also help maintain the presence of migratory fish populations in the Huong River basin, and serve as an environmental compensation measure for the alteration of the Ta Trach River.

Establishing a complete environmental monitoring network

The purpose of the environmental monitoring network is to collect data on relevant environmental parameters to provide information on possible changes affecting fluvial and coastal morphology, as well as aquatic ecosystems (in rivers and in the lagoons). Establishing such a system will require a well-trained interdisciplinary team to properly understand the interactions between environmental parameters.

The main objective of the monitoring network is to provide a sound assessment of trends in environmental changes in order to allow a fast and, if possible, preventative reaction to critical events. Of particular importance is the collection of data in relation to sea dynamics (such as fluctuations in sea level and erosion patterns). Among the expected changes are alterations in the coastal erosion patterns due to changes in sediment transport from upstream, an increase in salinity of the lagoons and detrimental changes in ecosystems, bed degradation, and siltation of gravel beds along the reaches of the Ta Trach River downstream from the planned reservoir.

Implementing a flood warning system

It is commonly considered necessary to implement a flood warning system before constructing a reservoir. Usually data needs to be processed for at least 30 years. A modern warning system should be developed as soon as possible in the Ta Trach watershed to partly compensate for the current lack of data. The monitoring of changes in sea levels mentioned above should be considered as an important component of such a warning system.

It will also be necessary to maintain the monitoring network after the construction of Ta Trach reservoir because the reservoir will not solve all the difficulties arising from floods. The information provided by such a system will facilitate effective management of the Ta Trach reservoir and of the water released downstream during floods to prevent any artificial flooding downstream.

Improving the design of the Ta Trach reservoir project

The type of dam and the type of spillway should be calculated in order to minimize the risk of the dam collapsing in the eventuality of a flood larger than the short hydrological series can predict. Furthermore, special gates (both bottom and half bottom gates) for flushing sediment trapped in the reservoir (effective only for fine sediment transported in suspension), limiting geomorphological changes downstream, and increasing lifespan of the reservoir, should be included in the dam's design. These flushes must ensure that the sediment concentrations released are compatible with the ecology of the river.

The development of a power plant at the site is questionable because of the risk of conflict over the reservoir's management. Furthermore, a hydropower dam adds one major additional impact by creating frequent and sudden artificial fluctuations of water level that affect both human populations and aquatic life. The addition of a small compensation dam downstream from Ta Trach reservoir could be one solution to mitigate this problem, and, if the power plant is constructed, the conditions for multipurpose management should be considered very carefully, with full priority on management decisions given to security rather than profit from electricity generation.

Limiting sedimentation of the reservoir
Implementing a reforestation programme in the upper catchment (particularly in areas prone to soil erosion) and employing resettled people to grow vegetation that survives seasonal submersion on the banks of the reservoir are measures which would prolong the life and effectiveness of the Ta Trach reservoir.

Ceasing gravel excavation from the Huong River
Because it would exacerbate the shortage of bedload downstream of the Ta Trach reservoir, the excavation of gravel should be halted or strictly controlled according to the results of the environmental monitoring. Social consequences of this action (i.e. the livelihoods of gravel extractors) would have to be taken into account. The SAProF II team also understands the importance of this conclusion and has formulated recommendations to address its social implications.

Improving management of the Ta Trach reservoir
Additional measures to manage the reservoir more efficiently are as follows:

- Floods should be mitigated using a "real time" data network and tools
- The reservoir should be flushed annually at the start of the rainy season, with releases paying strict attention to environmental issues and requirements (especially sediment concentrations)
- Downstream environmental discharge and seasonal variation in environmental discharge should be considered and tested in order to mitigate any impact on fish fauna
- The Ta Trach reservoir and Thao Long barrage (an anti salinity dam) should be managed jointly
- An independent company should manage the reservoir with flood management as the primary concern, including being responsible for maintaining the monitoring network under strict terms of reference
- The minimum flow during the dry season should be calculated from biological studies, not only hydrological statistics

Implementing additional non-structural measures
The construction of the Ta Trach reservoir will reduce hazards downstream in Hue city. However, as the reservoir will not solve all the problems associated with floods (e.g. extreme floods and surges), sound town planning is needed and urban development must be controlled as there will still be a risk.

In addition, the population must still be informed about potential floods because small floods will occur less often and, if not informed, the collective memory will fade leading to increased vulnerability. This includes promotion of both awareness of the risk of floods and preparedness for floods.

Ensuring the sustainability/longevity of the Ta Trach reservoir
The reservoir is designed to be built to last for at least 100 years, so a "sustainable reservoir" has to be constructed. In order to achieve this, long-term factors, such as the rise in sea levels due to the green house effect, must also be taken into account.

Effects of the WWF Recommendations

JBIC has expressed and demonstrated its support towards incorporating the study's findings into the SAProF II report and the project as a whole, and in many cases has requested more detailed information and specific examples to lend weight towards the arguments. The Government of Vietnam representatives also invited WWF to take an active role in the consultation workshop and open/frank discussions on comments in tripartite JBIC/Government of Vietnam/WWF meetings.

On one of the WWF study's main findings - the problems associated with the mathematical model - JBIC agrees that less focus should be placed on the model and a more qualitative approach should be considered on the basis of a lack of data. This was also reflected in the PowerPoint presentation at the consultation workshop, to show the limits of models and that a lack of data leads to uncertainty and therefore recommending that results should be taken with caution.

Because the need to place less emphasis on the model and more on qualitative assessments stems from a lack of data, the LMI strongly supports the establishment and maintenance of a data collection network. Such a network is not only vitally important to decision making regarding dam and other development planning, but is also essential to the effective management of the Ta Trach reservoir itself.

In relation to another of the WWF study's major recommendations – that the Huu Trach River be maintained in as natural a state as possible – it was agreed that the second reservoir was not mentioned in the SAProF II report or at the consultation workshop and to correct the underestimation of the hydraulic benefits of the Ta Trach reservoir and the overestimation of the benefits of the second reservoir.

Further concessions in relation to protecting the Huu Trach as a compensatory measure should also be implemented, and significant leverage in support of this is available through the recently approved "Green Corridor" GEF project, for which the Huu Trach watershed is an important component.

This aspect of the project will now form the focus of WWFs attention and involvement. There appears to be significant potential to establish this kind of environmental compensation measure, with support already gained from a number of parties, and there is also significant risk (with potentially limited benefits) to construction of a reservoir on the Huu Trach River.

Conclusions

Although the development process for the Ta Trach reservoir project is far from complete (with a series of approvals and agreements from the Japanese government required for JBIC to provide funding), the experiences gained from engaging with JBIC, the SAProF team, and the Government of Vietnam on the Ta Trach reservoir project have been extremely beneficial to learning how three such institutions can collaborate on an infrastructure development project. Whilst the project outcomes may not represent an ideal situation and should not be construed as WWFs categorical approval for the Ta Trach reservoir project, the results achieved to safeguard the environment, protect the population of Thua Thien-Hue province, and prolong the life of the reservoir are arguably all greater than would have been the case without the collaboration. As a result, the LMI views this experience as a useful first step, that has provided several valuable lessons and demonstrated the capacity and willingness of a conservation NGO, a development bank and a Mekong country government to work together on such issues. It is hoped that this work will lead to further and greater involvement in infrastructure development projects at an earlier stage in the planning process to allow full and open discussion of all potential options, mitigation measures and requirements.

Although the circumstances will differ between specific projects and partners, the LMI believes that many of the lessons learnt can be transferred or adapted for use on other projects or with other partners both within and beyond the Mekong region.

Green Corridor - meeting global conservation targets in a productive landscape

The Green Corridor is an area of forest stretching between Bach Ma National Park and Phong Dien Nature Reserve.The global conservation significance of the Green Corridor has been demonstrated through a systematic assessment of conservation priorities in Indochina. The results of the assessment confirmed the remarkable global significance of the Greater Annamites ecoregion and identified the Central Annamites as a landscape supporting biodiversity of critical significance to the overall conservation value of the Greater Annamites Ecoregion. An area, labelled as the Green Corridor, was identified as the highest priority for immediate conservation action due to the following reasons:

- It represents one the last remaining lowland Annamite wet evergreen forests (under 700m), now exceptionally rare and threatened due to large-scale habitat loss from expansion of human settlements and agricultural land. The area includes some of the longest stretches of lowland river within intact forest habitat remaining in Vietnam including the Bo and Huu Trach river systems.

- The forests support significant populations of threatened species as listed by IUCN (2000) including tiger *Panthera tigris,* saola *Pseudoryx nghetinhensis*, Edward's pheasant *Lophura edwardsi*, douc langur *Pygathrix nemaeus*, Annam partridge *Arborophila merlini*, Annamite striped rabbit *Nesolagus timminsi*, white-cheeked gibbon *Hylobates leucogenys*, Truong Son muntjac *Muntiacus truongsonensis*, large-antlered (Giant) muntjac *Muntiacus vuquangensis*.

The primary objective of the project is to protect and maintain the conservation value of the productive landscape in the Green Corridor, an area of globally significant conservation importance presently under extreme threat from conservation neglect. The secondary objective is to establish a replicable model for protection and maintenance of high global conservation values in multiple use forest landscapes of strategic importance for biodiversity conservation.

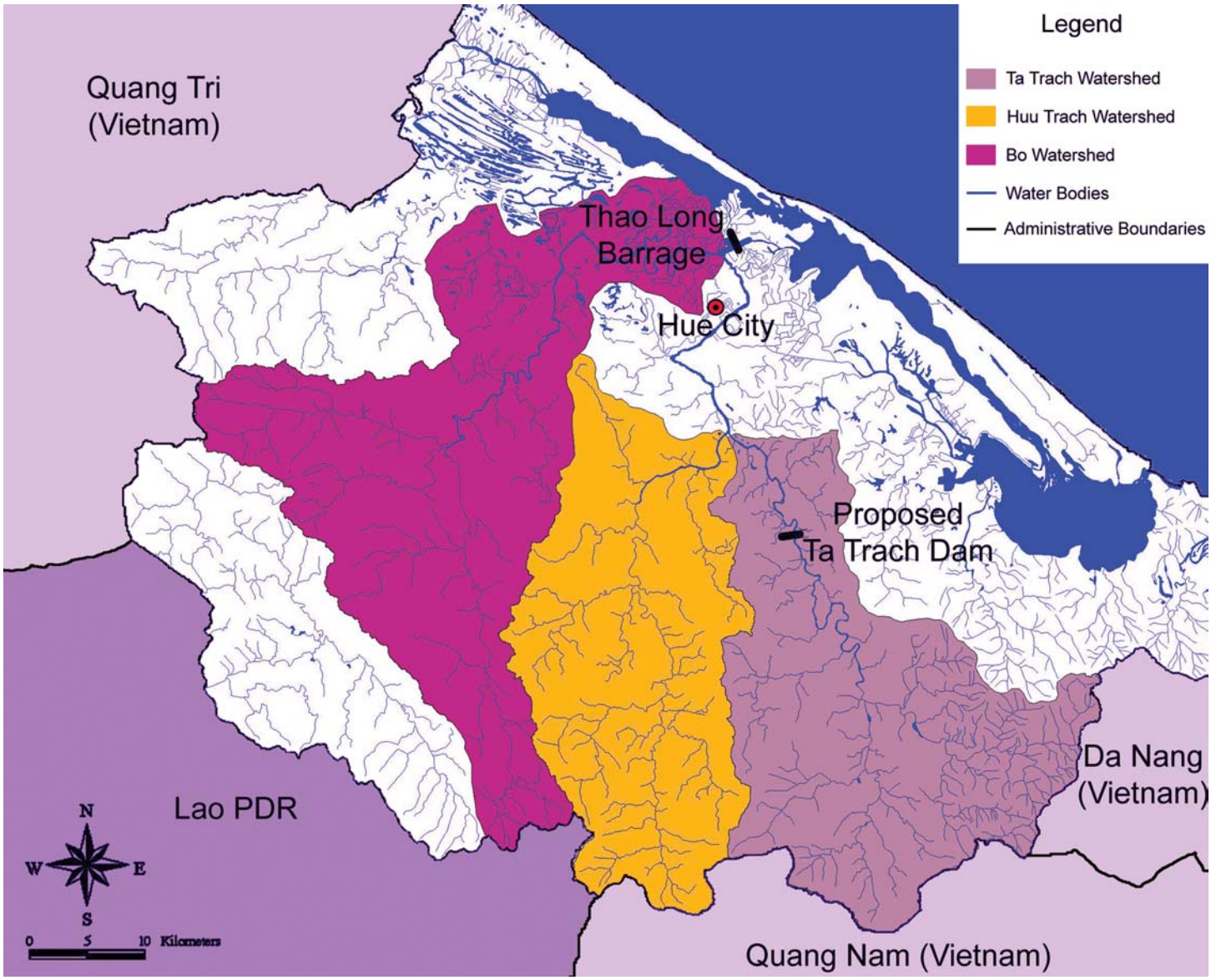


Figure 1. The three main watersheds of the Huong River basin in Thua Thien - Hue Province, and proposed location of the dam for the Ta Trach Reservoir

"Preserving the Huu Trach River in as pristine a state as possible is necessary to maintain the ecological balance of the Huong (Perfume) River Basin as an environmental compensation measure to mitigate the adverse effects of the reservoir on the Ta Trach River."

WWF

WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by

- conserving the world's biological diversity
- ensuring that the use of renewable natural resources is sustainable
- promoting the reduction of pollution and wasteful consumption.

Conserving the source of life

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