



This submission to the World Commission on Dams  
was presented at the Commission's  
*East / South-East Asia Regional Consultation*

**Hanoi, Vietnam**  
26-27 February 2000

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*Dams and Water Resources Management in Vietnam: Some Institutional Aspects*

### **Concept on Dam Development in Vietnam**

Most of Vietnam's water development has been completed since the 1960s. As an agricultural country, Vietnam's policy views irrigation-drainage as the primary means for agriculture development. Heritage from the colonial period was composed of numerous, but small water structures including intake, barrage, diversion, and weir-hydropower. Since the 1960s, the water sector development has been influenced by the concept of integrated utilization of water resources; agriculture, urban supply, hydropower, flood control and navigation. Water resources development planning was then studied for all river basins. Dams-reservoirs started to be built, including those having small, medium and large storage capacity. The flow regulation after forty years, however, was considered as quite low: only 2% of river flow in general or 5.5% of river flow generating from rainfall on Vietnamese sub-basins.

### **Dam classification**

In the classification of WCD, a dam is considered as large if its height is over 15 meters and its storage over 1 million cubic meters. In Vietnam storage's of ten million to hundred million cubic meters and installed capacity of some tens MW are classified as medium, while less than one million cubic meters as small. Storage of billion cubic meters or of hundred million cubic meters with installed capacity of some hundred MW is seen as large. Using this classification of small/medium/large may facilitate the discussion.

### **Medium and small dams**

In Vietnam, small and medium storage reservoirs, single purpose or multipurpose, so far have been more or less undertaken (??) by local people - upstream and downstream people - for the simple reasons that dams had brought social and economic benefits to local people, and that resettlement has had modest scope which permitted the arrangement made within local areas. However, in the context of dam debate, medium dams were also subjected to a long consideration of impact before a final decision is made.

It is not to say that small and medium dams were justified as always economically effective. A recent review of medium and large irrigation dams throughout the country gave a figure that 0.36 hectare of reservoir surface were needed to irrigate one hectare of cultivated land. It, however, is also clear that food production on inundated areas in reservoirs could not match production on those newly irrigated lands which have been transformed from one uncertain crop harvested per year to two-three stable crops harvested on each field per year, thus better meeting the increased food demands of local people.

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## Large dams

In contrast to medium dams, multi-purpose large dams cover much larger areas, in general related to many provinces. The number of beneficiaries from hydropower, flood control and irrigation in delta region is huge. These beneficiaries are strong dam supporters, that's unquestionable. The project is economically effective, so the water development officials and economists are dam proponents, that's also unquestionable. However, since many of these people live in general far away from the project sites, they are not really always aware about unfavorable local changes and consequences of the development. Public communication and discussion is quite needed on these issues.

For dams built decades ago, for example the 1920 MW Hoa Binh hydropower scheme, the affected local people were generally under-recompensed and ecological changes were virtually ignored. There was a lack of effective governmental policy and mechanism in support of local authorities in their mitigation measures, as well as in dam complex management. The earlier fragmented management among ministries and provincial authorities of those multipurpose hydraulic structures and water bodies also often increased negative environmental and social impacts of large dams.

The situation of recent development was different. The case of 720 MW under-construction Yali hydropower could be a good example. Environmental impact assessments were undertaken several times from pre-feasibility stage through implementation stage. Mitigation measures were undertaken in time. Minority resettlers have acknowledged their new improved living conditions, which are in fact much better than their previous poor life of shifting cultivation.

## Dams perspective and options

Since the starting level of development of the country is quite low, primary uses of natural resources are unavoidable. The national overall objectives are rapid poverty reduction in parallel with sustainable economic development and eventually catching up with the more prosperous countries in the region. In comparison to other ASEAN countries\*, the Vietnamese economic level is in general far behind. Regarding electricity consumption and water supply per capita, Vietnamese figures are also very low.

	Malaysia	Philippines	Thailand	Vietnam
Land area (million ha)	32.8	29.8	51.1	33
Population (million hab)	20.5	76.1	59.6	76.3
Electricity (kWh/cap)	3,200	630	1460	280
Water supply coverage (%)				
- urban area	96	85	87	50
- rural area	66	79	72	30
Water use percentage of				

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water availability** (%)	2	29	14	17
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\* *Source: GWP-SEATAC*

\*\* *Water availability from local rainfall only*

In Vietnam today, four large dam-reservoirs are under operation. A forecast study on water development perspective indicated that storage of some ten billion cubic meters more are essential in order to meet increasing demands for water for all purposes. Debate has been active about development of some key mainstream rivers (Da, Lo-Gam, Ma, Ca, Srepok, Sesan and Dong Nai) where large and medium multi-purpose dams are being studied. The debate on large multi-purpose dams, however, requires the water sector to have its clear statement, whether deltas need additional water in dry season and flood protection through new flow regulation by some large dams on mainstems and how the sector balances benefits gained by people living in the lower valleys and deltas and the negative impacts, together with compensation, provided to upstream valley people ? The issue can be solved only in a whole water sector strategy that is badly needed to be formulated and applied as appropriate in each specific river under study.

### **Options assessment**

Concerns on dams have been (??) expressed mainly about large storage cases, but not limited to that. Options to constructing small/local level may be wind, solar, micro hydropower, and biomass for energy production, micro irrigation and household water supply. The benefits provided by such services are important to remote sites such as mountainous rural areas or islands, where central facilities are too expensive or simply impossible to access.

The study of large-scale options are aimed to replace services usually provided by large dam-reservoirs. Options to hydro-generated electricity consist of coal, gas and nuclear power. But the negative impacts of global warming and nuclear risks are substantial too. Irrigation options would include to improve the efficiency of existing schemes, agricultural diversification and introduction of drought-resistant crops. But return flows from existinf irrigation are used and are not wasted and drought-resistant crops cannot produce the food needed by Vietnam. Water supply options may go to groundwater use and wastewater treatment for reuse. However, groundwater is overused in many areas and becoming increasing polluted.

In general, **there is no objection to any options if the options can be made safe, effective and sustainable.** Given Vietnam's limited natural resources valued on a per capita basis, there is little room for choice, and common opinions seem to be that all resources need to be developed, all measures need to be taken. Options to dams are being studied and/or implemented, where appropriate and have their own place dependent on specific or local conditions and possibilities.

Given the basin downstream location of Vietnam and its small share of runoff available from local rainfall (37% of total runoff), a long term vision of water resources management would prudently try to make available local water resources, for replacing any amount of water which may likely be withdrawn for upstream uses.

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As far as water development for mutual and equitable benefit sharing is concerned, the Lower Mekong Basin region seems to be losing the benefits of its mainstream use opportunities. The urgently needed benefits that could be obtained from integrated development of the Mekong's resources are lost as the resources flow undeveloped to the sea. It's really a costly experience and lesson for others to consider. Nuclear and fossil fuel generation have drawbacks just as hydro. But the "do nothing" option is not acceptable either.

### **New framework for dam development and management**

Dam development in Vietnam seems still indispensable. The development however has a new framework for reference which is the Water Resources Law (WRL), adopted in May 1998 and effective by January 1999. The Law gives legal, institutional and financial framework for water resources development and management, including, of course, dams.

### **Legal framework**

The WRL endorses international principles in integrated water resources management:

- Ensure water for people's domestic needs, the economy, social security and protection of the environment, within a framework of sustainable development.
- Water, land and forest resources development in accordance with river basin zoning and planning;
- Integrated use of water resources in an economic, safe and effective manner;
- Water reservoirs to comply with integrated use of water resources and flood control.

### **The Law provides a general institutional framework for the water sector:**

- The Ministry of Agriculture and Rural Development (MARD) has the function of governance (state management/stewardship) over water resources.
- Provincial People Committees have governance function over water resources development and management within their localities consistent with the Vietnam's broader national goals and policies.
- Other ministries have governance functions over water sub-sectors as assigned by the Government.
- Agency responsibility for operation of major reservoirs will be assigned by the Government.

### **Institutional issues**

Institutional strengthening is among the most immediate and critical matters in the implementation of WRL:

***Water resources planning and management at national level:*** WRL is a framework that sets forth principles, policies and procedures for water resources management rather than specific

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regulations. Implementing WRL will therefore require a very large legislative effort before it is operational. Until then, important parts of the water sector remain regulated by a fragmented set of regulations. While MARD, under WRL provisions, has the governance function over water resources and river basin planning management, it has been exercising only an advisory role in large river and dam planning for hydropower purpose. This somewhat confused situation may remain as such for the near term.

***Water resources management requires that resources stewardship governance be separated from service delivery:*** In this connection, debate is on going whether large dam-reservoir operation would be belonging to governance area or service delivery area? It is known that in some developed countries, while hydropower plant, irrigation, water supply services may be assigned to other ministries or beneficiary organizations, large multi-purpose dam-reservoir and flood control operations are often managed by the governmental water department that also has the stewardship governance responsibilities. But in such cases, these are services covering very large multi-provincial areas and usually by sub-units created under special legislation, that create a wall between the stewardship and service functions. How could be a relevant lesson to be learned?

***River basin management is a new concept for Vietnam:*** Only river basin development plan or investment master plans have been so far elaborated based on information on land use, demographics, economic activities and flood control demands. In the river basin management plan which is to be formulated, other features such as watershed management, ecosystem protection, conjunctive operation of surface and groundwater resources, features of management under normal, flood or drought conditions may needed to be considered carefully. Experience in other countries have shown that many different institutional arrangements have proven successful, depending on the specific basin configuration, but even more on the nature and strength of the nation's existing organizational structure. Vietnam will have to devise an approach that best utilizes its strengths consistent with the principles of a sound civil government structure.

***The management of large dam-reservoir complex is fragmented:*** Dam structures are managed by the main water agency, either Irrigation Department of MARD or Electricity of Vietnam (EVN) of Ministry of Industry. Reservoir areas are put under the administration of related local authorities. For some large reservoir whose flood control is among primary functions such as Hoa Binh hydropower scheme, an ad-hoc national committee was set-up every flood season for flood control operation. Some institutional rearrangement should be made; perhaps an independent body to oversee all related activities: allocation of associated storage volume, operation of releases, development activities such as forestry, fishery, recreation, navigation, and protection activities such as erosion control, watershed management, bank protection. The establishment of such a body may be justified as conformed to the river basin approach. However, this will depend in part on how the great many different areas of expertise needed for comprehensive basin management can best be provided to deal with conditions in a specific basin and the role of provincial government.

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***The establishment of inter-provincial river basin organization (RBO)*** is not too new an approach but requires more awareness among central and provincial governmental authorities. The approach is supported by some water professionals and promoted by donors interested with the water sector. Red, Ca, Dong Nai RBOs are being subjected to external assistance. Some believe that unless RBO is established, river basin in general and large dam-reservoir in particular may not be managed in a sustainable manner.

But there also are complications. How can the provinces effectively carry out their resource management obligations to best meet the needs of their citizens if the authority for the primary resources are under an agency that reports to some other level of government. This has the risk of being contrary to the principles of local participation and comprehensive government programs at the provincial levels. Because the wisdom of land-use and water-use decisions are at the heart of effective and responsive civil government. These are issues that call for creative discussion focused on the specifics of each individual situation.

***How far could the community participation be effective?*** For small project development - on farm irrigation and rural water supply - local people and local authorities in many areas have taken their own decisions. For large dam-reservoir, local people were consulted mainly about compensation and resettlement matters that in turn influence project alternatives. According to the current study on the 3600 MW Son La large dam-reservoir, compensation and resettlement costs may amount to an ever-high percentage 14-17% of the project costs, which reflected strong concerns on social benefits in dam development.

## **Financial policies**

***Project costs have to cover resettlement and mitigation costs***, there is no doubt about the policy which was applied recently. The only constraint was that, due to financial deficit or delay, mitigation measures were reluctantly implemented.

***The funding of multi-purpose dam-reservoir*** is so far attributed to hydropower sub-sector only. There are opinions that project costs should be broken down by each water sub-sectors that benefit directly/indirectly from flow regulation: hydropower, flood control, irrigation, water supply, and navigation. Even though the funding of some sub-sectors is provided from the national budget, typically flood control, it is quite necessary to break down the costs and benefits for each sub-sector and make the results very clear to all beneficiaries, for them to be aware how much the budget has subsidized the social security in flood control and every other sub-sector.

***Cost recovery:*** Funding of water projects varies among water sub-sectors. The national policy implies that hydropower and urban water supply sub-sectors would gradually fully recover their capital investment and M&O costs. Concerning irrigation sub-sector, including irrigation served from large dam-reservoir, water users, customers and beneficiaries have to contribute to M&O only. This contribution policy is even for to be implemented nationwide. The WRL

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stipulates the payment of water resource taxes, licensing fees and service charges, but policies on the degree of cost recovery remain to be formulated.

### *Diversification of funding sources*

Hydropower has been, for years, providing 55-60% of the electricity consumed annually. Gas turbine recently emerged as low cost and competitive new possibilities. While hydropower and gas turbine are both major potentials and both create negative environmental impacts, though different in nature and scope, their priority seems balanced. While national energy policies, under development pressure, tend to diversify energy sources and promote any feasible projects, finally, investment opportunities are the driving factors for a decision to be taken. For example, BOT gas turbine projects might be developed by external private sector, while hydropower projects such as the economically feasible and environmentally sound Son La scheme seems difficult in attracting enough ODA funds in addition to local financial sources.

In irrigation and urban water supply sub-sectors, the Government together with ODA funds, has provided investment almost exclusively. Current priorities were given to the upgrading and expansion of existing schemes in views of improvement of cost effective and water-use efficiency (average of 50% actually for both sub-sectors). New infrastructures were especially in service of poor and remote areas. Large irrigation schemes were carefully planned.

The diversification of funding sources has been typical in rural water supply. With its newly formulated strategy, rural water supply and sanitation is the only sub-sector with a tradition for user participation in the capital investment in infrastructure.

### **Conclusion**

While dam development is continuing, many approaches need to be changed; some may even be radical, basing on the Water Resources Law principles.

- Dams have to support growth, stability and equity in the utilization of water and related resources and in accordance to water sector strategy and river basin plans.
- Changes are being made and needed to be largely applied in the planning and preparation process of dam projects, including changes to protect the rights of displaced people and ensuring them a better life in new locations, and changes in environmental considerations.
- Fragmented management needed to be overcome by strong political will and effective participatory approach. IWRM concept may help in the operation of large dams enable an institutional strengthening with active participation of local people and local authorities.

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Hanoi, 4 February 2000

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