Water allocation in an economy in transition

Institutional challenges and opportunities in Vietnam

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1. Introduction

It has now been twenty years since the historic reforms outlined at the 6th National Assembly resulted in the decision to transition to a '*market-oriented socialist*' economy which has contributed to rapid socio-economic development and poverty alleviation. However the transition is incomplete in many areas of the political-economy and industrialisation has resulted in significant structural changes in water use, creating a number of new and important management challenges.

One of these challenges is the need to develop institutions for the allocation of water across multiple uses to "*raise water productivity, enhance livelihoods, and increase benefits from existing and new investments in the sector*" (Bruns, Ringler and Meinzen-Dick, 2005). However, a recent internal review of the Asian Development Bank's 'Water For All' policy found that progress towards national level governance reforms in the water sector across all participating countries has been limited (ADB, 2005). It is emerging that institutional change in the water sector is a complex and challenging process which is highly dependent on the existing political, institutional, social and physical conditions (see Bruns, Ringler and Meinzen-Dick, 2005; Saleth and Dinar, 2004).

Therefore, the aims of this paper are to contribute toward:

- understanding the practical institutional challenges in relation to water allocation reform in Vietnam;
- identifying and discussing a number of possible options for Vietnam and discussing the importance of timing and sequence in their implementation; and,
- the broader policy debate surrounding water allocation in developing and other countries whose economies are in transition.

Section 2 begins with a description of the changing socio-economic patterns driving increases in the types and amount of water used in both consumptive and non-consumptive sectors. It then outlines the critical national resource management issues that have developed, provides an assessment of water scarcity and the need for allocation responses, and demonstrates how growing demand and development create new resource management challenges and add to the complexity of developing a sustainable water allocation system.

Section 3 draws on existing institutional analysis frameworks to examine the linkages between external institutional factors, internal institutional structures and water sector performance. In particular, it demonstrates how the incomplete political-economic transition affects policy and decision-making, that this has resulted in changes in the organisational structure and roles and responsibilities of national level agencies involved in water management, and, in turn, this has contributed to ineffective water rights and allocation mechanisms at an inter-sectoral scale.

Section 4 draws on the findings of the institutional analysis as well as key international lessons in water rights reform to outline elements of a phased reform process for Vietnam focusing on: improving coordination and commitment through understanding and inclusion; developing rules for inter-sectoral allocation that allow transparent, adaptive management to take place; and strengthening of institutional networks as a necessary strategy to strengthen rights before market based approaches can even be considered. Emphasis is placed on the need to build capacity in each of the three phases.

Section 5 concludes the paper by summarising the key arguments.

Evidence for the paper is drawn mainly from the experience of the author working for one year in the Bureau of Policy and Planning in the Department of Water Resources Management (DWRM), Ministry of Natural Resources and Environment (MONRE). This included designing and implementing a national level cross-Ministerial consultation process on water allocation and a rapid sub-basin scale case-study conducted from June to November 2005. These activities were funded by the United States Asia Environment Program (USAEP) of USAID and aimed at identifying and exploring the issues and challenges associated with water allocation planning and management in Vietnam. The case study examined the competing demands for water across the six provinces in the Nhue-Day sub-river basin, which is part of the Red River Delta. It aimed to demonstrate how a participatory (bottom up) approach could be combined with economic valuation techniques (top-down) to demonstrate trade-offs to decision-makers and contribute towards identifying equitable, efficient and sustainable inter-sectoral allocation rules.

This paper is based on this experience and extensive discussions with many people. Any opinions expressed are those of the author and any errors and omissions are entirely the responsibility of the author.

2. Background

2.1 Socio-economics of changing water use in Vietnam

Vietnamese women wearing conical hats and tending to rice paddies in ankle deep water forms a ubiquitous image of rural agricultural life in Vietnam. However, this is not the only important water use in Vietnam. This section provides a brief overview of the status and trends across various water uses in Vietnam.

Unsurprisingly, rice production and food security have been critical national objectives following the famine and food shortages in the years immediately following reunification. Investment in irrigation systems, dykes, and channels for supply and drainage means national food security is no longer a threat. In fact, Vietnam is now the second largest exporter of rice in the world, exporting a record 5.2 million tons in 2005 with a value of approximately US$1.4 billion (Thanh Nien News, 2006). Total consumption reached 35 million tons per year in 2004 compared with just 19 million tons in 1990 (GSO, 2006). So it is no surprise that agricultural water use (approximately 66,000 million m^3 per year) is 80 to 90 per cent of national total water use and is expected to grow by a further 25 per cent to 83,000 million m^3 per year by 2020 (Ministry of Agriculture and Rural Development (MARD), 2005).

The political and economic reforms of 1986 known as '*doi moi*' or '*renewal*' have facilitated significant industrialisation and urbanisation especially in the two population centres (Hanoi and Ho Chi Minh City (HCMC)). Total population has increased from almost 60 million in 1985 to 83 million in 2005 (GSO, 2006). Industrial water use is predicted to increase at 7 per cent per year from its current level of 6,000 million m^3 in 2001 to 17,000 million m^3 in 2010 (Vietnam Environment Monitor, 2003) and urban water use will increase from 1,500 to 3,650 million m^3 from 2005 to 2020 (pers. comm. MOC, 2005). Much of the urban and industrial water is obtained from groundwater sources.

In rural and coastal areas, aquaculture is now a major export and domestic industry, with shrimp and fish ponds replacing rice especially in flood-prone and low lying areas in the Mekong Delta. "*The area of fresh water and coastal aquaculture is nearly 1,700,000 ha. It*

is planned that an additional 1,136,000 ha of water area will be used for aquaculture by 2005 and a further 1,400,000 ha by 2010" (ADB TA-3528, 2005).

To enable this rapid industrialisation, energy generation capacity is also growing. As a rule of thumb, every one percentage increase in GDP requires a two per cent increase in energy generation, so annual growth in energy demand is presently in the order of 10-15 per cent (pers. comm. Electricity of Vietnam, 2005). Over the next 20 years energy needs will largely be met by hydropower generation with almost 7,000 MW of new capacity planned for installation by 2015 (EVN, 2003). Some large hydropower dams such as the Hoa Binh reservoir in the north (1,920 MW) have already been commissioned and construction for the 2,400 MW Son La project has recently commenced.

Another critical water use in Vietnam is 'water for living', the phrase used in Vietnam to describe all water used for eating, drinking and sanitation of humans. Again MARD estimates water for living requirements for rural areas at 1,200 million m^3 per year rising to 3,300 million m^3 per year by 2020.

As part of the economic and political engagement with the global economy, total foreign visitors increased from 1.35 million in 1995 to 2.9 million in 2004 (GSO, 2006) while domestic tourism is growing as a result of rising incomes. Domestic and foreign tourists tend to use much more water per day and often stay in areas with inadequate supply leading to localised scarcity issues (pers comm. VNAT, 2005). A large segment of the foreign tourism sector also visits Vietnam to experience its natural beauty and rural lifestyles, meaning that protection of water resources from pollution and degradation has an important economic development dimension.

The social and economic dimensions of transport via inland waters are increasingly being recognised. In the Red River Delta this commonly involves the shipment of building materials and coal, while in the Mekong Delta, a large variety of goods and essential commodities are transported by water. The ecological needs or values of rivers in Vietnam are also beginning to be recognised. Until recently this has been mainly through the *ex-post* identification of the adverse impacts of dams and weirs (pers. comm. Dr. Thanh, Hanoi Water Resources University, 2005). Declining in-stream fisheries are one of the most common forms of evidence used to support the presence of adverse environmental impacts.

2.2 Overview of national challenges in the water sector

The growth in water use associated with Vietnam's rapid modernisation has led to several critical issues including:

- Water scarcity, especially in the dry season (see section 2.3);
- Increasing urbanisation and industrialisation has resulted in significant wastewater discharges to rivers and streams which are largely untreated and cause substantial adverse health, social and economic affects on downstream water users;
- Increased impacts and costs of storms and floods resulting from increased urbanisation of flood prone areas as well as changing hydrology and climate change;
- Adverse social and environmental impacts of storage construction and operation as well as ineffective economic performance; and,

- Increased costs of saline seawater intrusion on agriculture, urban and rural domestic water supply, in-stream ecology, and other dependent uses such as aquaculture.

Olszak and Nguyen (2005) outline how these issues affect the design and practical implementation of water allocation policy and planning initiatives. For example, in national level consultation across eight key Ministries, water quality was frequently identified as the most critical parameter or requirement to be addressed in the development of an integrated water allocation planning process. The same interactions were also demonstrated in the Nhue Day sub-basin case study (Olszak, Le, Phi, 2005) where provincial authorities downstream of major effluent discharges from industrial and urban uses in Hanoi described how poor water quality combines with low flows in the dry season to seriously affect the ability to use the water from the system: destroying livelihoods and creating a long term health risk (see Olszak, Le and Phi, 2005). In fact water quality is so bad in the dry season in Phu Ly town in Ha Nam province that the local water treatment plant is frequently forced to shut down. This means that local households and hospitals are without treated supply for several days at a time. Often residents must revert to groundwater wells that are polluted with arsenic and are more labour intensive.

So, Abernethy (2005) could very easily have been referring to Vietnam in a recent paper which states:

> *The requirements for a sustainable water allocation system have become much more complex. People use water in many more ways, and for many more purposes. The potential for pollution is increasing. Economic activities are diversifying rapidly, and it is not easy to keep pace with the changes that are occurring. Major modern factors that complicate water management are economic development, urbanisation, power generation, and waste emission.*

2.3 Water scarcity and the need for allocation responses

Assessing water scarcity in Vietnam

Viet Nam is commonly perceived to be a country of large rivers and an abundance of water. However, Fitzgerald, (2005) presents a number of reasons to support why this perception is inaccurate. Firstly, based purely on numbers, Vietnam has a per capita annual river flow that is approximately equal to the world average. Secondly, competition over water resources is exacerbated due to the spatial and temporal distribution of water. From a temporal perspective, scarcity is only usually a constraint during the dry season, particularly between February and the end of April, as this coincides with peak agricultural irrigation demand. Spatially, "*the water extraction percentages are much higher in some parts of the country. In the coastal area between Da Nang and Nha Trang, 35 per cent of total flows are already being consumed. In the region between Thanh Hoa and Hue water use is 23 per cent of total flow. Therefore, over approximately 25 per cent of the country, water use is already occurring at rates at which the World Meteorological Organisation (WMO) and the United Nations Education, Scientific and Cultural Organisation (UNESCO) say indicates "careful management is needed to ensure that uses remain sustainable ….. and attention given to ensure that there are flows adequate for aquatic ecosystems*"" (Fitzgerald, 2005).

Thirdly, the storage capacity in Vietnam is low at "*just 5 per cent of the annual runoff generated within the country. By comparison the world average is about 12 per cent of total annual flow. On a per capita basis the picture is much the same. Vietnam stores just 200*

cubic metres per person compared to a world average of about 1000 cubic metres per person" (Fitzgerald, 2005). Storages are also unevenly distributed across the country with a few very large dams forming a large percentage of the total storage capacity.

Considering these factors and the growth in water demand predicted across all sectors, water scarcity is becoming a critical national issue affecting socio-economic development and poverty alleviation. Molle (2003) identifies three types of responses to scarcity: conservation; supply augmentation; and allocation which can operate at the local, basin and inter-basin scale.

Evidence of inefficient allocation and social pressure

In Vietnam, there is significant evidence to suggest that current allocations are economically inefficient and there is growing social pressure for reallocation. The economic efficiency of water allocation is measured by examining the marginal value of water in alternative uses. While data is fairly limited, evidence can currently be provided in two forms:

1. Evidence that water provided to current uses has a low marginal value; and,
2. Evidence that unmet needs pose a high cost on these users (this is an indicator that their willingness to pay for a marginal unit of water is high).

In regard to 1), evidence from Olszak, Le, and Phi (2005) demonstrates that the gross (not marginal) value of water for irrigated rice production is very low at around 1,000 to 3,000 VND. Data on variable costs of production was not collected in this study so marginal values could not be calculated. However, a project on irrigation management and water use involving case studies in the Dan Hoai and La Khe irrigation systems completed more detailed assessments of the gross return and the gross margin of agricultural production, for both rice and other crops (Marsh, Davidson, Le, and Trinh, 2004). This study estimated that the average gross margin per hectare was around $826 USD per hectare (2001 data) based on two rice crops per year in Dan Hoai. Based on total irrigation water use of around 10,000 m^3 per year for two rice crops, this corresponds to around 1,300 VND per m^3 or $0.08 USD per m^3. This estimate of gross margin includes a water fee paid to the irrigation company, but as explored in Davidson, Malano and George (2004) as part of the same project, this amount is insufficient to cover the costs of the operation and maintenance of the system and asset replacement costs. When these costs are considered in the analysis, the gross margin will be further reduced. This analysis provides evidence that irrigated rice production in Vietnam provides a very low return on water resources.

In regard to 2), there is significant evidence to suggest that other uses have a positive willingness to pay for increased water allocations. In the Nhue-Day system, local water shortages over periods of days or weeks have significant impacts on access to rural water for living, urban systems, hospitals, and industry. Alternative supply options may be available but are often costly. In other cases, people are forced to suffer the cost in terms in health and financial terms (Olszak, Le, and Phi, 2005).

3. Institutional analysis for inter-sectoral water allocation

The case for a more comprehensive, effective and integrated approach to management of water resources at the national level is clear to Vietnamese leaders and policymakers, and is constantly reinforced by the international community in the form of international commitments like the Millennium Development Goals. Despite this wide-spread recognition and the legal basis which has been established, effective implementation of reforms remains a

challenge. This section explores some of the complex institutional issues affecting the extent and pace of reform in relation to water allocation and water rights.

3.1 Framework for institutional analysis

Saleth and Dinar (2004) developed the institutional decomposition and analysis (IDA) framework particularly for the unbundling of water institutions. Particular emphasis is placed on the recognition of the importance of both institutional structures (water law, policy, and organisation) and the institutional environment (political system, economy, resources, etc) in understanding institutional change and its affect on water sector performance. The "partial framework" they have developed is outlined in Figure 1 below:

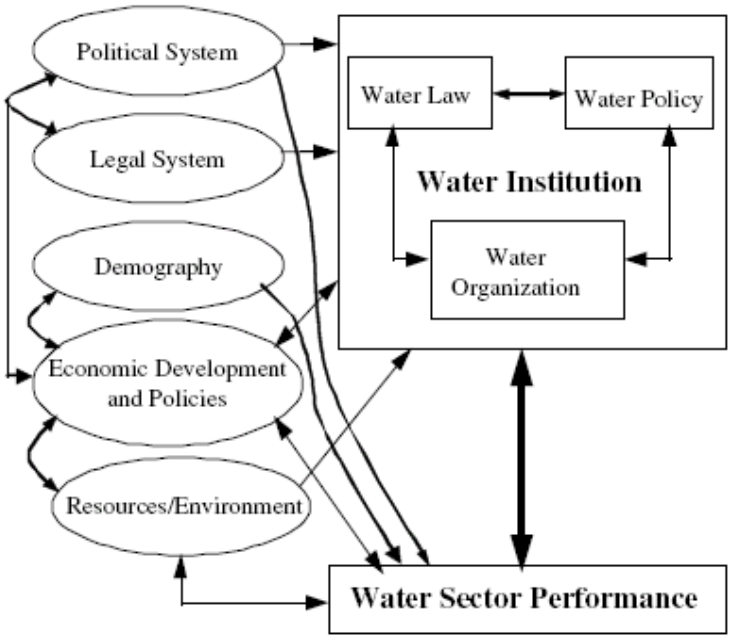

Figure 1: Institutional Decomposition and Analysis Framework (from Saleth and Dinar, 2004)

Drawing on this analytical framework, this section presents a partial institutional analysis to demonstrate how the incomplete transition within the political-economic system has contributed to an incomplete transition in water sector organisational structures and how associated uncertainty has affected the reform of governance mechanisms for inter-sectoral water allocation.

The importance of this inter-relationship is that it demonstrates that water rights and allocation reforms need to be cognisant of the full range of institutional factors affecting the water sector as well developments across the broader political-economy.

3.2 The role of government in transition

An important over-riding external institutional factor affecting water sector performance is that Vietnam's 'transition' is incomplete and the vision of a '*market-oriented socialist economy*' is difficult to define. For policy makers and bureaucrats, implementing this rather

broad philosophy can lead to complex, abstracted and extremely protracted debates between politics, power and principles. For example, the role of government as an independent, transparent and accountable 'regulator' of economy activity, rather than an active participant in it is still evolving. There is a broad governance objective to split state management functions from service delivery and administrative decentralisation is on the agenda. However, change is slow and these initiatives seem to conflict with central planning ideals of the role of government aimed at facilitating and unifying productive forces. These conflicts between the new and old approaches are confounded by strong vested interests and culturally embedded organisational norms in the political and administrative system that are resistant to change.

While this restrained path toward a more open economy is preferable to the 'shock therapy' tactics used in the former USSR in the 1990's, the ambiguous nature of the overarching philosophy results in further compromise, lack of commitment to specific policy positions, inconsistency, and policies which can not be effectively implemented. All of these factors constrain effective water sector performance and, as explored in the following, have resulted in significant impacts on the internal institutions of the water sector.

3.3 Organisational structures in transition

Until recently, state water management was characterised by a sector-specific centralised approach under the Ministry of Agriculture and Rural Development (MARD). MARD were responsible for implementing the state water resource management functions outlined under the Law on Water Resources (LWR) (1998) while also playing a major service delivery role in irrigation, rural water supply, and in the provision of structural works for flood control. Responding to the water sector challenges associated with Vietnam's socio-economic development as well as the broader governance objective to split state management from service delivery functions, the government established the Department of Water Resources Management (DWRM) within the Ministry of Natural Resources and Environment (MONRE) in 2003 and assigned to it the state management responsibility under the LWR. A number of other organisational changes also occurred when MONRE and the DWRM were established. This shift in responsibilities was widely supported and actively encouraged by several important international donors in the water sector.

Like all other Ministries, MONRE's structure is replicated at the provincial level with Department's of Natural Resources and Environment (DONREs) established in each of the 64 provinces. DONREs obtain technical and policy direction from MONRE, however they report directly to their respective Provincial People's Committee's (PPCs).

The DWRM also assists the National Water Resources Council (NWRC) which was established in Vietnam to facilitate cross-ministerial discussion and policy direction. The NWRC has led the development of the National Water Resources Strategy (NWRS) which was recently approved.

While the new structure provides an independent basis to move towards a balanced and coordinated approach across the various water using sectors, there remain a number of unresolved issues associated with the transition. Importantly, the DWRM lacks sufficient capacity at a national level and the situation at the provincial level is even more acute. MARD and its provincial DARDs have many (perhaps thousands) more staff and extensive affiliated research capabilities in hydrology and irrigation management. It is estimated that a substantial proportion of DONREs have a less than two people committed to water resources

while the central DWRM has only 50 - 60 full time staff. This imbalance in organisational capacity and power has created confusion at the provincial level and provoked debate at the national level. This has created uncertainty and has opened the way for calls to again restructure state water management, most publicly in a newspaper article which appeared in a Vietnamese newspaper and the English language 'Vietnam News' in early 2006, where senior figures more or less attached to MARD called for responsibility to be returned to MARD or to a new Ministry of Water Resources. No-one from MONRE was interviewed.

The key area of consternation regarding roles and responsibilities between MARD and MONRE relates to the direction in the LWR to adopt river basin scale planning and management for water resources. Internationally, river basins are seen as the most appropriate scale for the management of water related issues particularly where there are issues that manifest across administrative boundaries. In Vietnam there are a number of inter-provincial river basins where there is little doubt that better co-ordination is required. River basin management is also a powerful integrating tool that could build a more balanced approach to the allocation of water across competing sectors or uses, between the economy and the environment, and spatially, in relation to upstream – downstream interactions.

MARD have pursued the development of River Basin Organisations (RBOs) in three basins with international donor assistance. However, this would seem to be an important area where MONRE as the state manager of water under the LWR and as an organisation that is independent of sectoral interests should act as the lead agency. Accordingly, the DWRM has drafted a Decree on Integrated River Basin Management (IRBM) outlining recommended national planning and management arrangements. Until recently, these activities were supported by the ADB TA-3528 National Coordination of Water Resources Management sub-project. Importantly, the draft Decree on IRBM outlines a planning process for water allocation as a component of an overarching river basin plan. However, for more than a year, the draft has been under consideration by the government and it is yet to be approved and enacted.

Uncertainty regarding the eventual size, role and power of RBOs in Vietnam may be one of the factors influencing the extent of political manoeuvring which only seems to have diverted attention and slowed reform. The debate has also invoked uncertainty among the donor community which leads to further delays in important investments. The conflict is an example of the incomplete transition in the role of government in Vietnam.

3.4 Water rights and allocation mechanisms in transition

The basis of water property rights

Bruns and Meinzen-Dick (2005) describe the three alternative property rights regimes: public (state), private and common property and their application to water rights and allocation where:

- "*In agency allocation, water is treated as public property, with government agencies assuming authority for directing who does and does not receive water in accordance with bureaucratic policies and procedures.*
- *In market allocation, which corresponds with private property held by individuals or organisations, water may be allocated and reallocated through private transactions, with users trading water through short- or long-term agreements, reallocating rights in response to prices.*

- *In user-based allocation, water users join together to coordinate their actions, managing water resources as a form of common property.*"

In Vietnam, the LWR (1998) sets out several key provisions which develop a state based approach to water property rights and allocation. Firstly, Article 1 paragraph 1 of the LWR clearly states that the "*water resource comes under the ownership of the entire people under the unified management of the State*". Paragraph 2 of the LWR states that: "*Organisations and individuals are entitled to exploit and use the water resource for life and production. At the same time they have the responsibility to protect the water resource, prevent, combat and overcome the harmful effect caused by water as prescribed by law*". Article 24, paragraph 1 states that "*Organisations and individuals that exploit and use water resources must get permission from the competent State agencies*" except under certain specified circumstances. Attempts are made to protect these rights in a provision which states "*The State protects the legitimate interests of organisations and individuals in the exploitation and use of the water resource"*.

The LWR prioritises water for the protection of access to meet basic needs through the 'water for living' policy. The LWR states that "*in times of shortage, priority should be given to water for living*" where water for living is defined as "*water used for eating, drinking and sanitation of humans*". It is the only specification regarding allocation priorities. Provisions in Article 20 and 21 of the LWR set out that use "*must be based on the planning of the river basin and the real potential of the water source and must ensure the principle of fairness, reasonability*".

There is no legal basis for market based allocations or transferability of allocations in the LWR and individual entitlements are not likely to be considered for at least 10-20 years. In regard to user-based allocation, some progress has been made in relation to the decentralisation of irrigation management (see Fontenelle, 2000; Cheesman and Bennett, 2005). However, these are sector-specific user organisations operating at a local scale rather than inter-sectoral and river basin scale institutions, for which two key institutional challenges have been identified.

1) Inadequate co-ordination across sectors

Of the eight national agencies consulted in 2005, five specified inadequate coordination mechanisms at the national, provincial, and local levels as a key challenge in the development of a process for sustainable water allocation (Olszak and Nguyen, 2005). Several identified that overlaps in legislation and responsibilities led to conflicts and ineffective management while the majority identified information requirements in relation to water resources management which they needed to improve their sector specific management and planning.

2) The absence of explicit and transparent rules

The other critical gap in the current system of rights relates to Article 20 on '*regulating and distributing the water resource'* which states that "*the Government shall make concrete provisions on the regulation and distribution of water resource*". As the type and number of resource uses are diversifying and increasing, this need for certainty is significantly increasing. However, as revealed in national level interviews with key Ministries (Olszak and Nguyen, 2005) and in the sub-basin case study (Olszak, Le, and Phi, 2005), '*concrete provisions*' in the form of consistent, robust, and transparent rules for water allocation are lacking and this has resulted in significant uncertainty and reduced security of access.

For example, during national level interviews, senior officials were asked to comment on what they thought were the key challenges in the development of a process for sustainable water allocation. While many people focused on the primary need for better coordination and communication across the uses, others talked about the need for a '*harmonised process*' or a '*mechanism to assist in integrated water resources planning and to manage the trade-off between development and conservation*'.

In the Nhue-Day sub-basin, a number of provincial authorities were asked to describe the rules that were in place and explain how the system was operated. This revealed that even though the system is partially regulated by a sluice at the junction between the Nhue and Red rivers, little control is actually exercised. The most concerted intervention occurs after serious pollution events in the dry season when extra flow diversions from the Red River are attempted, although there are no explicit criteria by which these events are triggered. Many officials essentially described an open-access system (both in regard to use and wastewater discharge) where appropriation occurred if the need was there and if it was physically possible. This has reduced access for some users in some parts of the system during the dry season and combined with poor water quality, has resulted in significant impacts on the economy, human health, livelihoods of the rural poor and the environment (Olszak, Le, Phi, 2005).

The Hoa Binh reservoir on the Da River provides an interesting case study in the way in which early steps are being made to develop a more rule based approach to water resources. The reservoir has three key uses: hydropower, irrigation, and flood control for Hanoi. It is a critical piece of national infrastructure completed in the early 1990's and operated by EVN (Electricity Vietnam), a state owned enterprise. Irrigation and flood control downstream of the reservoir are managed at the highest level by MARD.

In the wet season, flows are carefully managed to reserve some storage capacity to provide some flood control in the event of a major rainfall event. This means that some water which could have been stored is released toward the end of the wet season. Often, this means that the dam is not at full capacity at the end of the wet season which, in turn, contributes to EVN's difficulty meeting electricity demand in Hanoi and the north of Vietnam at the end of the dry season. For example, in May 2005 storage levels dropped below the dam's dead storage level resulting in rolling electricity supply interruptions throughout northern Vietnam. While an indicator of the need for an increase in energy supply, from a property rights perspective, rules for releases are in place based on the expected rainfall, the current water level in Hanoi and the current storage level. Each morning during the wet season, new forecasts are modelled by an institute associated with MONRE and are used to determine storage operation and releases. The hydrologic basis of the rules and alternative operation options are being investigated in an attempt to continuously improve operation.

This example demonstrates that more robust rule based systems are possible and is a considerable step in the right direction. However, the operational rules for Hoa Binh are incomplete. Just recently, in February 2006, EVN agreed to release a significant amount of water to allow thousands of hectares of crops to be irrigated. While this decision essentially helped many poor farmers, it was a highly politicised negotiation which was not based on specific release rules, and undermines EVN's investment confidence and ability to operate as an independent commercial enterprise. If EVN is to continue to grow and supply electricity to meet Vietnam's growing demand, it will require a greater certainty in the flow that their turbines will receive rather than ad hoc deals that affect their allocations and business performance.

Emerging government policy responses

As mentioned, the DWRM and MONRE are developing their approach to water allocation planning for inter-sectoral allocation at the river basin scale through the Draft Decree on Integrated River Basin Management. According to the Draft Decree, the river basin framework plan shall include "*directions and objectives for water protection, exploitation, use and development, prevention and minimisation of damages caused by water and water dependent environments in a river basin*" and the component "*water allocation, exploitation, use and development plan will include the following:*

1. *Assessment of water exploitation and use status of each water resource in a river basin; water quantity, quality and variable forecasting of each water resource in a water basin;*
2. *Identification of water demand and supply for living, water for agriculture, aquaculture, industry, transportation, tourism and other socio-economic development and environment protection in the river basin;*
3. *Identification of allocation principles and objectives, and control of water resource exploitation and use;*
4. *Identification of environmental water and inter basin water transfers;*
5. *Recommendations on water resource development works; and*
6. *Specific solutions for plan implementation."*

This planning process along with other relevant legislation provides a significant opportunity to implement a robust and participatory water allocation system. Whether the 'agency approach' can be improved under MONRE to improve security to the multitude of resource users through improved understanding and a more transparent and accountable rule based system remains to be seen, as does MONRE's capacity to strike a more even balance between all of the water uses that is cognisant of the opportunity cost of water, and the long term environmental sustainability of the resource. Section 4 identifies possible elements of a process to address this challenge.

4. Possible elements of a reform process

4.1 Overview of key elements and their sequencing

As stated in Bruns and Meinzen-Dick (2005), "*the best route to better water management depends on where you are starting and there are many pathways available*". This section attempts to develop and discuss elements or strategies in a phased water allocation and water rights reform process that is cognisant of the political, economic, resource and organisational constraints and directions outlined above. The focus is on discussing practical and feasible options that will contribute to equitable, sustainable and productive outcomes.

One of the fundamental aspects of the process revolves around balancing progress towards effective reform with political imperatives to maintain control and reduce risk. A successful

process will require manoeuvring within the constraints of the existing organisations and the political system.

An outline of the proposed water allocation reform framework is provided in Figure 2 below and is similar to the general approach developed Bruns, Ringler and Meinzen-Dick (2005) based on "*redesigning governance, resolving tenure and regulating transfers*".

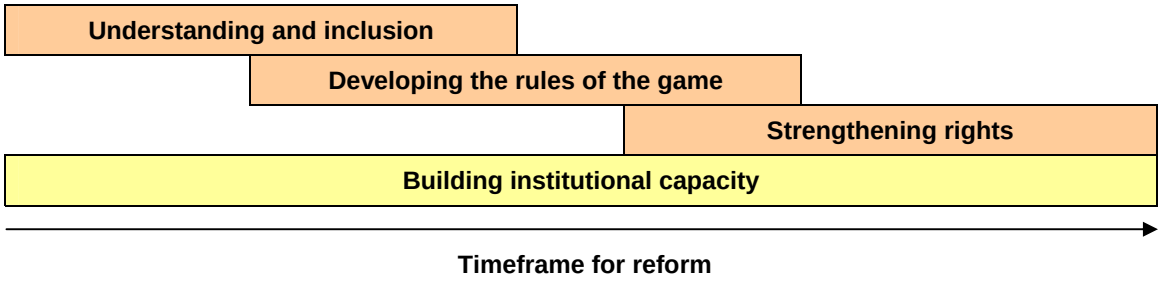

Figure 2: Key elements of potential water allocation reform process in Vietnam

Bruns and Meinzen-Dick (2005) and numerous others stress the importance of sequencing in the reform process. Therefore, the first reforms to improve inter-sectoral water allocation at the river basin scale should revolve around improving understanding, both from the hydrological and environmental perspective and with respect to the role of water in meeting the needs of communities and the economy. It is suggested that participatory activities are used to improve understanding as well as to facilitate the strengthening of institutional networks for further engagement into the future.

Efforts in the first phase are likely to assist in phase two which involves a participatory planning process using hydro-economic modelling tools to assess and balance trade-offs and determine a set of system wide allocation rules at the bulk or macro scale. Phase three then examines a range of state, user and market options that could be used to strengthen these rights. Throughout each of these phases significant emphasis will need to focus on building institutional capacity.

While this description and Figure 2 convey a rather linear sequencing, it is certainly expected there will be significant overlap with feedback and iteration occurring between and within each phase. While a timeframe is not included on the diagram, recent experience suggests that successful reform should be measured not in months, but in decades (Garduno, 2005).

4.2 Understanding and inclusion

When information is poor, there is little incentive or commitment to establish rules, which may then prove to be inefficient, ineffective, inequitable, or simply unpopular. This situation represents a major hurdle to the development of a robust rule based system for water allocation. Therefore, significant effort needs to focus on better understanding the multiple needs of water users at the river basin scale. Olszak, Le and Phi recommend this should include:

- improving local and river basin understanding of the demands for water including timing, quality and reliability aspects both now and in the future;
- modelling the system supply and current usage patterns; and,
- assessing the ability of the system to meet these multiple demands and identify trade-offs.

These efforts should be used to focus for improving co-ordination across uses and from the national to the provincial and local scale especially in basins where scarcity is considered to be the most important issue. Consulting with, and inclusion of, a wider spectrum of users will improve mutual understanding of the competing needs in the basin.

Essentially, the objective of this phase is to increase knowledge to a point where there is sufficient confidence to begin to develop and trial robust and systematic approaches to water allocation.

Demands for water

There are a number of complex elements required to build an understanding of water demand at a river basin scale involving multiple uses. The process of estimating demand for water can be either top-down or bottom-up and can be aided by the development and application of a water accounting framework. For example, irrigation demand can be determined based on crop types and water requirements across a set area (top-down). However, water use efficiency improvements in irrigation systems can affect overall system reliability and should also be considered. Furthermore, irrigation canals often have multiple uses, including water for living. In such cases, consultation with users and representative authority's can be aggregated to inform estimates of demand for various uses (bottom-up). In an environment where data quality and information is poor, triangulating a number of estimates is likely to be the most effective approach.

It is important to recognise that demand is different from current and historical use. Demand is the amount each entity would use based on supply at a particular price. In Vietnam, where water prices are not linked to the costs of the service and not related to water use in a volumetric manner, it may be more useful to consider 'unrestricted demand': the demand if unlimited resources were available. For water allocation, it is important to determine if there is a gap between current use and unrestricted demand. This is referred to as unmet demand or deficit. It is important to assess use and unmet demand both now and in the future. Where unmet demand exists, it is likely that there is competition for water resources.

As well as demand and usage information, it is necessary to account for water discharges and drainage outfalls from consumptive uses as these often form an important source of supply to downstream uses. For example, in the dry season, wastewater discharges from Hanoi are thought to account for up to 95 per cent of the total flow in the Nhue River.

Aside from the technical issues associated with use and demand, it is important to understand the value of water across multiple uses and how access to water contributes to poverty alleviation and socio-economic development. Improved general understanding of these linkages could be pursued through targeted research and river basin scale investigation will assist in identifying drivers for reallocation. Key areas include the provision of water to meet basic needs, customary uses, the importance of reliability for irrigation, and the social, economic and environmental benefits of increased river flows.

For example, the LWR provides priority to water for living, but provides little guidance on how this can be achieved in practice. Understanding the value of water to the rural poor and how these values can be affected during times of shortage is not well known. Olszak, Le, and Phi (2005) found that water for living requirements are difficult to estimate in simple 'litres per person per day' terms as they have been done in other countries including South Africa. This is because rather than being a quantity issue, water for living is predominantly a water quality issue in combination with water quantity and effective access (ie. for pumps and

pipes). In such cases, water for living rules may need to consider quality, flow and/or river height.

Modelling the current supply system and usage patterns

This step involves the development of a hydrologic model of the supply and current use in the system. The model needs to be credible and needs to cover all supply inputs, uses and outputs as it provides the technical basis for decision making in phase two. Involvement of key stakeholders in the important decisions regarding the level of detail required in the model is likely to assist in ensuring sufficient credibility is achieved. A theoretically perfect model is neither possible nor necessary. Credibility is the most important factor to consider in its development and ongoing use. In the development of the model, the two guiding principles of Rapid Appraisal should be considered (Chambers, 1992). These principles are:

- Optimal ignorance – knowing that some facts are not worth knowing as they will not improve the overall result so the amount of data collected can be limited to what is needed.
- Appropriate imprecision – data are only collected to the degree of detail and precise required for subsequent analysis.

Water resource modelling is especially difficult in the densely networked delta systems in the north and south of the country. Delta systems are extremely difficult to model and are data intensive in respect to water extractions and hydrological / hydraulic processes. There are equally challenging issues in the remote and mountainous sloping country with hillside rice terraces.

Inadequate monitoring data both with respect to the quality of the data and the duration of the record adds to the difficulty. Vietnam's long struggle for independence meant that records were significantly interrupted. Even if they were maintained, major changes in hydrology due dam development, climate change, and changing land use in the upper catchments means that historical data is not necessarily representative of future hydrological conditions.

Many of these challenges are well known by Vietnam's hydrologists working in government and in institutes concerned with water resources management. Effort and funding is currently focused on establishing a more comprehensive monitoring network. While establishing an adequate data collection network is a challenge and will take time, the problem and the solution are generally agreed. The challenge for water resource management is to make good decisions in the short to medium term which balance the need for action now without cutting off future avenues and opportunities or worse still, over-allocating water rights or setting rules that can not be met.

Matching demand with supply and identifying trade-offs

This step involves inputting the current and future demands from all uses into the model (how much water they would like to have now and in the next 10-15 years including the reliability and timing aspects and any targets for improvements in water use efficiency).

This can be completed in a stepwise manner or by inputting all demands simultaneously. If all demands can be met entirely, including those for non-consumptive uses, the environment, flood control and hydropower, then defining the allocation based on these demands is simple and unlikely to result in significant debate. However, it is most likely that appropriation problems will arise, that is, the system will not fully meet all demands (in the present as well as the future) so there will be shortfalls or competing demands at certain times. For example,

meeting all requirements for irrigation may lead to less than desired flow levels for transportation and other downstream uses and vice versa.

Developing inclusive processes

During the national level consultation, the Ministry of Construction representative said that the biggest challenge in developing the process for sustainable water allocation is the *"development of cooperation and coordination between local, provincial and national scales and across sectors. To ensure sustainability and equity, water resources should be managed within a river basin context and decisions should be made based on discussions and negotiation using a participatory approach"* Olszak and Nguyen (2005).

Coordination and inclusiveness are both a means for improving understanding of the uses of water in the system as well as a strategy for facilitating an on-going voice for these users in the planning and management processes for water allocation, and river basin planning more generally. Under the previous MARD dominated management system, even major stakeholders like the Ministry of Construction (MOC, who are responsible for urban water supply), have been marginalised from planning and management activities. However, new and emerging sectors also need to be identified and included in the process. For example, navigation, fisheries (both in-stream and aquaculture), recreational fishing and other forms of recreation, and tourism are important water users. For example, in a recent project in the Nhue-Day system, economic benefits associated with cost savings for the transportation sector associated with improved flow regulation were estimated by DHV Consultants BV et al (2002) as an annual benefit of 14,580 million VND ($0.9 million USD) for 3,000 tonnes per day, rising to 48,600 million VND ($3.0 million USD) for 9,000 tonnes per day.

Another important aspect to the task of improving coordination and inclusiveness relates to the development of systems and processes for the dissemination of information and knowledge. The national consultation revealed several areas where this was currently inadequate. For example, the tourism sector stated that further information on water resources was important to aid tourism development planning. Particular requirements included regional water resource status and assessment reports, information on the availability and sustainability of groundwater resources, and any information on plans for the development of water resources. Meanwhile the transportation sector stated that they require improved information on a daily and seasonal basis regarding flow releases and river operations to improve the efficiency and safety of their operations.

The MOC and other national stakeholders *"supported MONRE in their role as national coordination of water resources management"* and suggested that "*river basin organisations are required at the next scale down and should be provided with sufficient authorities and official roles and responsibilities*". However, improving the coordination amongst existing and well known sectors and including new and emerging sectors is an extremely difficult task. It requires alteration of existing power structures and institutional norms which have evolved, developed and been actively reinforced over time.

While the cross sectoral issues at the national level are critically important and complex, the task is even more difficult when one considers the linkages from the national to provincial and district scale within both the state management and sector based functions of government.

Public participation

"*A participatory approach advocates actively involving 'the public' in decision-making processes, whereby the relevant 'public' depends upon the topic being addressed*" (Slocum, 2003). For water allocation planning in Vietnam this could include stakeholder representatives of the various uses of water, environmental groups, technical experts and government representatives. Participation can involve transmitting or disseminating information, consultation (which involves both information transmission and 'public' input to the process at specific stages) and active participation where the 'public' is actively engaged in the decision making process (ibid, 2003).

Consultation, especially outside of the administrative and political system, is a relatively new concept in water resource management in Vietnam. It is critical in water allocation planning to help address complexity and uncertainty and more generally to improve the quality and credibility of the resulting decisions through involvement in developing and testing the feasibility of rules. Other benefits of effective participation in the planning process include:

- effective and efficient plan development and delivery;
- more equal representation of society's interests in the plan;
- contributing to building public confidence and trust in decisions;
- generating a greater understanding of public issues, concerns, priorities and solutions;
- building broader support for river basin management and water allocation planning;
- increasing mutual learning through the sharing of information, data and experiences;
- ensuring that decisions and policies incorporate knowledge and expertise that otherwise might be overlooked;
- reflecting a wider range of public concerns and values in decision-making; and
- rapidly identifying possible controversial aspects of an issue and help bring together different points of view to achieve consensus in a collaborative manner (ibid, 2003).

Of course, public participation costs both money and time so the process needs to be designed at the appropriate level based on an assessment of the hierarchy of stakeholders and their needs while rapid appraisal techniques can be employed to increase the efficiency and effectiveness of this process.

4.3 Developing the rules of the game

Once water users, their demands, and the current issues in meeting demands are mutually understood and coordination mechanisms have been established, a process could commence to establish rules for water allocation that attempt to address the conflicting demands fairly, efficiently and sustainably. Rules for water allocation should be explicit, robust and transparent and should be designed to provide investment confidence and security. Rules should guide the allocation of water over the full range of possible supply situations both temporally and spatially. Rules are said to be robust when they are abided by even when there is pressure to break them, thus limiting political interference and ad hoc decision-making. They establish a set of common ground to limit the extent of the dispute, provide a sound basis to test the overall efficiency and effectiveness of the allocation, can and should

be effectively enforced, and allow for adaptive management through monitoring and evaluation.

Olszak, Le and Phi (2005) suggest that key steps in this process could revolve around an economic approach to allocation planning, including:

- identifying and modelling alternative allocation options (sets of rules);
- assessing the benefits and costs of the options and comparing them to the base case;
- selecting a preferred set of allocation rules; and,
- developing mechanisms to implement, monitor, evaluate, review and revise the rules.

In regard to sequencing, Figure 2 demonstrates that some activities in phase one (building understanding and inclusion) are required before proceeding to this phase, however, in reality, managers will need to balance the need for improved information and processes with the desire to progress to rule development. In some cases, phase one and two may be a contiguous process.

Identifying and modelling alternative options

Once there is mutual appreciation of the competing demands for water it should be evident from phase one that some form of compromise option is necessary. This should be one which balances the needs of different uses and the overall objectives for the river basin. To identify a suitable compromise option, a range of options should be explicitly defined and modelled. The hydrologic properties of water sources and supply systems largely determine the type of options available to deliver the intended allocations. The most important hydrologic factor is whether water supply comes from current water inflows, water held in storage or some combination of the two. The greater the water storage volume, the more ability there is to use stored water to supplement water supply during times of low inflow. In systems where storage volume is high relative to inflows, it is possible to make greater proportions of total water use highly reliable (pers. comm. Vanessa O'Keefe, 2005). Thus, supply systems can be broken up into three broad categories, depending on the ratio of inflow to storage. There are:

- unregulated rivers - where there is no water supply dams whose stored water is available to augment river flows - all that can be shared out at any time is current inflows;
- regulated rivers - where storage exists and it is being used to augment flows and maintain some supply during dry periods - sharing can include both inflows to the river system and water in storage; and,
- groundwater aquifers - where storage is generally very large relative to inflows and sharing does not need to take into account small time step recharge rates.

Depending on whether the system is regulated, unregulated, or an aquifer the types of management tools used to achieve these rules include:

- Specific flows or river heights at various points in the river, at which time specific "uses" must cease or reduce extraction (this is the main tool used in unregulated rivers).

- Dam operation rules over releases, including the management of reserves for high priority uses, environmental release rules, flood mitigation operation rules, and customer ordering.
- Pumping restrictions in groundwater systems to manage local impacts, particularly during dry times, near connected rivers.
- Licensing limits and licence management rules. (pers. comm. Vanessa O'Keefe, 2005)

As an example, for surface water, at one extreme, an option could be defined to meet the full downstream flow requirements and provide very high security for water for living in rural areas. This would generally be at the expense of major water uses such as irrigated agriculture, which would receive a lower level of secure supply. At the other end of the spectrum would be an option that provides as much water as possible to irrigated agriculture in the upper catchment. In between the two extremes, compromise options can be defined which reduce allocations (flow, volume, or reliability) to one or more uses.

Compromise options for investigation in Vietnam could:

- adjust security for future industry and urban use, agriculture, and/or fisheries;
- adjust the level of flood control or hydropower generation;
- alter provision of a minimum flow of water for the environment and other uses such as transportation at all or specific times; and/or,
- alter flows for non-consumptive use and the environment by providing pulses and periodic flows of varying frequencies and durations and at critical times for example to alleviate water quality problems or to protect high value environmental assets.

As the number of competing demands increases, the number of combinations of options required is also likely to increase. Pre-existing agreements, say, for private sector investment in hydropower, or for foreign investment in industrial development may be considered pre-requisites for all options and a safe minimum standards approach may be adopted for water for living and other very important uses. These requirements, for which general agreement is more likely, provide a tool to limit the variation in the options.

The output for each option should be a fully defined set of robust operational rules for the system covering a range of supply options. This means that for any supply situation throughout the year it is clear to all users and the general public how the system will be operated and how much water they will get.

Assessing the benefits and costs of options

This step requires an objective assessment of the positive and negative impacts of each of the options compared to a base case allocation. It is suggested that the assessment consider the multiple economic, social and environmental impacts of the options. The challenge was summarised by an EVN representative during the national consultations:

> *Many hydropower dams have multiple purposes and it is likely that most new developments will also be multi-purpose. While this is considered an efficient and desirable trend, it also creates difficulties in defining management and operational rules and in defining cost sharing agreements, especially as EVN has been corporatised and is responsible for major debt repayments to local and international banks and donors.* (Olszak and Nguyen, 2005)

There is growing interest in hydro-economic modelling in Vietnam to assist in understanding the magnitude of trade-offs relating to water allocation across multiple uses. This includes work by Ringler (2001) for the Mekong, Ringler and Nguyen (2004) in the Dong Nai basin and Cheesman and Bennett (2005) for groundwater in the coffee growing region of Dak Lak in the Central Highlands.

Olszak, Le, and Phi (2005) focused on demonstrating how Cost Benefit Analysis (CBA) and the valuation techniques developed by natural resource and environmental economists could be adopted to assist in water allocation decision making in Vietnam. This work drew on URS (2003) and the IUCN in Emerton and Bos (2004) which provide extensive detail on the economic assessment of non-market environmental and social impacts for natural resource management while Young (2005) provides a detailed explanation and assessment of the concepts and methods used to determine the economic value of water using production function, cost-based, and willingness to pay approaches. Non-market techniques and shadow prices are particularly important in relation to water resources in Vietnam due to the lack of effective markets for water and the public good aspects of water.

There are a number of limitations to the economic approach to natural resources, particularly in the treatment of equity issues, long-term environmental trade-offs, and the impacts of historical management activities (see Marshall, 2005). One of the major concerns in Vietnam is that these models provide coarse 'snapshots' of economic values at a particular time and should not be used to guide management within a specific sector. Therefore, a concern in the promotion of hydro-economic modelling is whether the goal of improved understanding of water resources systems is used to develop robust rules which provide investment certainty and confidence or whether model inputs will be monitored on an on-going basis and used by government at the national, river basin or provincial level to continue to intervene at the management level on an ad hoc basis. The later approach would actually undermine efforts to develop rules and rights that provide investment confidence and contradicts policy directions towards decentralisation and regulatory approaches to the role of government.

Despite these limitations, the approach delivers an integrating trade-off framework which is essential in establishing a robust and transparent basis for negotiation. To improve the quality of outputs from in the CBA process a multidisciplinary approach is recommended which should be tailored to required level of detail for each basin (see URS, 2005). For example, Flows Assessment Tools and other assessment techniques contribute to understanding the ecological impacts of alternative options. Many of these methods are based on the same principles of defining alternative options and assessing the relative positive and negative impacts although many lack the integrated trade-off framework provided by CBA if used in isolation. For example, in the first trial environmental flows assessment in Vietnam for the Huong (Perfume) River, one of the key limitations identified was the absence of socio-economic data upon which to make trade-offs (IUCN, Huong River Basin Project Management Board, IWMI, 2005). This view was supported at the MONRE hosted, USAEP funded workshop in Tam Dao entitled '*Environmental Flows Management*' (April 15-16, 2005) where it was reinforced that human needs, demands and values will drive water allocation in Vietnam into the immediate future (see Fitzgerald, 2005).

Selecting the preferred set of allocation rules

Once the appraisal is complete, the next suggested step is to select the preferred option using the economic and other information about the options. Stakeholders and government can begin a process of informed negotiation, and begin to develop agreement in a step-wise manner. In this stage, stakeholders can also use local and technical knowledge to identify

modifications to the options or to the assessment of existing options that improve the accuracy of the analysis. It is considered reasonable that the technical analysts could re-assess such new options and provide results back to the stakeholders in a managed iterative process.

Trade-off analysis can be completed by changing the operation of the modelled system to meet the demands of one use and to determine the impacts on other uses (see Ringler, 2001). These results can then be shown to the stakeholders to build mutual understanding of the impact of their demand on the ability of others to meet their own needs.

The critical issue in this process is the extent of stakeholder involvement. Due to the limited capacity government representatives are less likely to identify modifications or possible improvements in the options and increased participation will improve credibility and reduce enforcement and compliance costs. A better approach may be for government to set some regulations or constraints on what aspects of the allocation are and are not negotiable and reserve the right for final approval as there are likely to be some areas where broad agreement can not be reached and government will have to decide how the resources should be allocated.

In defining the preferred option, it is likely that a number of critical assumptions will be identified and uncertainty around these assumptions may be the source of debate and disagreement. Sensitivity analysis and threshold analysis can be used to understand the magnitude of the uncertainty. Another adaptive management strategy to deal with this issue is to specifically identify and define the assumptions and plan to research and evaluate their validity. Ostrom (1999) also identifies this issue and suggests multiple parallel processes may be used to identify key areas of divergence.

One of the biggest national water issues in Australia and other countries in defining inter-sectoral water allocations relates to the identification and assignment of risks of both uncertainty in biophysical assumptions and other external factors, especially climate change. The effect of these risks will be evident if the actual volumetric allocations systematically differ from those predicted by the model are not achieved. It will be important to identify these risks in the planning process and it is preferable to actually define how the risks will be allocated between the various uses if changes are required.

Finally, in developing the initial inter-sectoral allocation it will be important to balance the extent of reallocation with the political desire to manage and minimise change. By simply embedding current practices into more robust rules, the extent of change and need for adjustment will be reduced. However, this may legitimise inefficient, inequitable, and unsustainable current practices making it more difficult to reallocate at a later date. Developing a water allocation plan which contains a staged introduction of rules may be a useful approach to manage this issue.

Developing mechanisms to monitor, enforce, evaluate, review and revise the plan

Mechanisms for monitoring and enforcement should be developed to measure progress and assess compliance. Monitoring results can also be used to demonstrate changes in the overall condition of water resources in the basin. Where users are not complying with the water allocation plan, graduated sanctions are recommended (Ostrom, 1990) to provide disincentive for further non-compliance. It is critical that the transactions costs and the viability of the monitoring and enforcement system guide how the institutional and management structures for regulating the system are developed and applied.

After the plan has been in operation for a set period of time, the allocation rules and the system of implementation should be evaluated. Such evaluation should identify 'lessons learned' and possible opportunities for improvement of the actual allocation and the system used for implementation. The evaluation should also test the assumptions upon which the allocation was based to ensure they are still relevant.

It is likely that the water allocation plan will have to be revised after a period of time to reflect:

- improvements in data and modelling capability;
- trends in socio-economic development at the national, provincial and river basin scale; and,
- other results of the evaluation.

The plan can be revised by fully or partially repeating the planning process. In Vietnam, where integrated water allocation planning is a very new concept, it may be preferable to trial the initial allocation plan as a draft for a period of one or two years, then to develop a more finalised plan for the next three to five years. In the long term, water allocation plans could be revised in accordance with five yearly national planning periods or perhaps longer. Longer timeframes provide greater investment confidence but less flexibility to adapt to changing societal values and physical water resource conditions.

4.4 Strengthening rights

The critical contribution of the work of the IASCP and it members revolves around demonstrating that state-based and private market-based property rights are not the only approaches to overcome the 'tragedy of the commons'. The work of Ostrom (1990) demonstrated that natural resources can be, and have been, managed remarkably efficiently and sustainably over centuries by self-organised communities of local users across multiple continents and cultures. More recent work has demonstrated how nested or polycentric institutions involving the state, communities, and markets interact to overcome appropriation problems (Ostrom, 1999) and that this paradigm is especially relevant where appropriation issues are related to the processes of modernisation and globalisation and actions have effects at a larger-than-local scale.

It is argued that this polycentric or nested view of institutional arrangements is relevant in relation to water rights in Vietnam. As developed in phase one and two, this will contain a critical role for government or state-based rights in inter-sectoral allocation at a river basin scale. Molle (2003) supports this view more generally stating that "*contrary to the widespread idea that economic incentives are necessary to ensure the reallocation of water to economically more productive uses, inter-sectoral reallocation is often well administered by the state*". In essence, this means that these rules developed by government are water rights (Bruns, Ringler and Meinzen-Dick 2005). Even in western countries where commitment to markets and to community involvement in decision-making processes is more evolved, government generally still play an overarching role in allocating water, for instance, between the environment, urban users and the irrigation sector.

This section discusses some of many options which could be used to strengthen rights by:

- continually strengthening the state-based inter-sectoral system; and,

- understanding and strengthening institutional linkages between the state, users and markets.

Many of the themes identified correspond with general options identified by Bruns and Meinzen-Dick (2005).

Strengthening state-based processes for inter-sectoral allocation planning

From a purely state management perspective, there are a number of areas that will need continual improvement in order to strengthen the system of rights at the inter-sectoral scale. These include improving monitoring, enforcement, and the credibility of administrative sanctions and formalising institutional roles and responsibilities. More detailed and specific policy development will be required in these areas and implementation should be closely aligned with efforts to build organisational capacity at the river basin and provincial scale.

While significant improvements are possible in this area, the more challenging area of reform relates to how users and local systems for allocation are nested within the over-arching state-based framework.

Strengthening institutional linkages to strengthen rights

In the first phase of the proposed reform process, significant focus is placed around building inclusive networks in the water allocation planning process. This process should continue to develop over time with a focus on improving understanding and adding to the credibility of the process. Increased credibility will increase the likelihood that agreements will lead to improved mutually beneficial outcomes as well as the likelihood of compliance. However, government processes for inter-sectoral allocation face a significant challenge in understanding localised and sector based mechanisms for management and allocation and to scope their role and function in the overall institutional environment. A major contributing factor to this complexity is that management of use across most sectors comes under the direction of the state, or is strongly influenced by the state. So the distinction between user and state is still quite blurred. Some local institutions, such as water user associations do exist outside of the realms of the state but they have complex and often conflicting relationships with the state at the commune, district and provincial level (see Cheesman and Bennett, 2005).

Efforts may need to focus on building capacity within the state based system with a view to progressive decentralisation of some activities. However, care should be taken to ensure that effective user based institutions outside the state are not further marginalised in this process. The case study in the Nhue-Day basin demonstrated that significant effort will be required strengthen the capacity of provincial government departments to engage in inter-sectoral allocation. Capacity building of the provincial and district government authorities to undertake participatory resource management may be more appropriate than efforts to develop separate water user associations, although mechanisms for their inclusion could be developed where these local organisations exist and operate effectively.

Licensing

A government decree (No. 149/2004/NĐ-CP) under the LWR outlines licensing mechanisms for water resources. Until now, implementation of the decree has been focused around industrial wastewater discharges in the basins in and around Hanoi and HCMC where pollution is a high priority. Use and access licenses are required but there is limited ability to control the quantity of water use particularly due to the inadequacy and cost of monitoring and enforcement. Vietnam is following the recommendation of Bruns and Meinzen-Dick

(2005) in progressing "*gradual and selective licensing*" for water allocation as a way to formalise the rights of users and at the same time prioritise administrative effort to where it is most needed. The first target in Vietnam is the hydropower sector. All major existing and planned hydropower developments will be licensed by MONRE in the coming years. Into the future, licensing may be extending to other sectors and priority basins, particularly at the bulk scale.

Forums

Another of the options proposed by Bruns and Meinzen-Dick (2005) is the idea of forming forums to bring together representatives of water users as they "*may be a faster and more effective approach to solving water allocation problems than immediately attempting to strengthen administrative procedures for formalising water rights*". At a national level, this is being pursued through the ADB supported National Water Resources Council (NWRC) involving government representatives across a number of users under the leadership of MONRE. However, the NWRC only meets every six months and its representation consists mainly of high level politicians (eg. vice ministers). This model has proven ineffective in driving change and several recommendations have been made to develop working groups of less senior bureaucrats based around particular issues. Forums may also be particularly useful for dealing with inter-provincial basins.

Building community awareness

At the most basic level, government officials in Vietnam also recognise the need for, and challenges associated with, building community awareness and understanding of river basin management concepts of sustainability and efficiency, the competing demands for water, the hydrology and supply limits of the system, and the role of the government in water resource management.

Market based approaches

The aim of this paper has been to demonstrate that significant strengthening of state and user based rights regimes is a necessary prerequisite of any effort to develop market based approaches to property rights. However, assuming these reforms occur, markets do present an important opportunity to facilitate efficient resource use and to facilitate structural adjustment by allowing rights to be transferable. A number of issues would need to be dealt with in the development of these markets which are discussed in Bruns, Ringler and Meinzen-Dick (2005).

5. Conclusion

The partial institutional analysis outlined in this paper demonstrates how the incomplete transition to a '*market oriented socialist economy*' has created a complex policy-making environment that is resistant to change. In turn, this has affected efforts to reform the institutional structure of the water sector through the adoption of a state water resources manager that is unaligned with service delivery. Meanwhile, rapid economic development associated resulting from the same political and economic reforms has resulted in a significant increase in the number water users in the economy as well as dramatic increases in the total water use which are expected to continue to increase over time. As well as issues of water scarcity, this has resulted in significant pollution in and around major urban centres, environmental and social impacts of dam construction for hydropower generation, increased flood risk, and increased susceptibility to global climate change.

National level consultation and a sub-basin scale case study conducted in 2005 revealed that efforts to develop a process for sustainable water allocation are constrained by lack of coordination between government departments at the national, provincial and local levels and limited capacity to effectively undertake the responsibilities for state management of water resources as outlined in the Law on Water Resources. Further analysis revealed that the development of a robust, transparent, and sustainable approach to water allocation across multiple uses at the river basin scale is constrained by the absence of rule based approaches to water allocation and water rights. Ad-hoc decision-making reduces investment security and favours those with political power and control and reduces the potential to use adaptive management to gradually improve the efficiency and sustainability of resource allocations.

A phased approach has been proposed in an attempt to outline the types of reforms, and their general timing, that may be applicable in Vietnam and other economies in transition in order to address water rights. The proposed process initially focuses on building mutual understanding of supply and demand for water across sectors and developing coordination and engagement processes that are inclusive of water-users and their needs at multiple levels. The second phase revolves around the development and implementation of a planning process for water allocation based on the development of transparent rules which drive inter-sectoral allocation. The final phase is based around identifying options to strength the rules and rights. This can take the form of improving the agency based mechanisms to develop and implement rules as well as investigating how user-based and market-based rights can operate at a local or sector specific scale. Significant capacity within the administrative system exists and significant progress is already being achieved in relation to these objectives. However, further institutional capacity is required to develop and protect water rights.

In summary, the issue of water allocation poses a significant risk for Vietnam in achieving its objectives for socio-economic development and poverty alleviation so the need for reform is great. However, experience from other countries reveals that successful reform can take decades and requires a great deal of effort. The complexity of the issue means that reforms must be delicate and cognisant of the institutional environment. Idealistic approaches to the issue of water rights are doomed to failure, particularly those that advocate the adoption of market based property rights before significant work is completed to build understanding and strengthen capacity both within government and amongst water users.

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