



Community-based Water Resource Management in Vietnam

A literature review of experiences and best practices

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Preface

This report reviews current literature by local and international researchers on community-based water management in Vietnam available in both Vietnamese and English. Due to limited access to all sources of information in a short period of time, we have not covered all aspects of this issue. The key findings in this report sum up the major research work that our team has carried out.

It is necessary to mention the historic lack of thematic and comprehensive research and studies on community-based water management in Vietnam. Although local communities throughout Vietnam have practised self-management mechanisms for use and distribution of water since time began, little has been documented about the diverse culture and customs of this interesting issue.

Within the scope of UNESCO's funding contract, PanNature will also carry out field research missions to examine how local communities in selected areas throughout Vietnam are currently using and managing their water resources. Together with this report, we hope that results from field research will shed more light on this issue. The final product of this project, which is a combination of literature review and practical research work, will provide a more comprehensive picture of community-based water management in Vietnam.

Summary

Vietnam has a long history of community participation in the management of water resources, which is found in many places, both uplands and lowlands, under different models and manners, including drinking water supply and irrigation water. Traditional models of CWRM (Community-based Water Resource Management) can also be found in many upland areas throughout the country. Water resource has been regarded as common property of the community; however, as Vietnam's market economy grows, water is becoming a trade good.

Advanced CWRM models in Vietnam have moved forward with the growing changes of market-oriented socio-economics of the country. Several forms of advanced CWRM are described by real cases of participatory irrigation management and water supply such as joint management between a farmer organisation and a state agency, between a farmer organisation and a quasi-state organisation, sole management by a farmer organisation, water supply cooperative, or community-managed water station.

This literature review tries to document factors that make CWRM models workable in Vietnam, varying from different forms of community participation, demand-based approach to institutional support, stakeholder capacity, technological transfer, resource mobilisation and financial autonomy. It emphasizes the issues of rights and authority as well as the role of local communities in making decisions toward managing and utilising water resources. The research team also recommends four sites in Hoa Binh, Bac Kan, Nghe An and Thua Thien Hue provinces as CWRM best practices for further field studies. At this initial stage, we try to make preliminary recommendations for promoting CWRM in Vietnam. These include process of decentralization in water resource management, legislation for community participation, community-based decision making, awareness raising and capacity building, organisation and implementation, gender aspects, indigenous knowledge, and water valuation.

List of Acronyms

| | |
|--------|--|
| ADB | Asian Development Bank |
| CRES | Centre for Resource, Environment Studies in Vietnam |
| CWRM | Community-based Water Resource Management |
| CBNRM | Community-based Natural Resource Management |
| DANIDA | Danish International Development Agency |
| FAO | Food and Agriculture Organization of the United Nations |
| IRC | International Water and Sanitation Center |
| IWMI | International Water Management Institute |
| MARD | Ministry of Agriculture and Rural Development |
| MONRE | Ministry of Natural Resources and Environment |
| MOSTE | Ministry of Science, Technology, and Environment |
| NGO | Non-governmental Organization |
| PIM | Participatory Irrigation Management |
| UNDP | United Nations Development Programme |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| UNICEF | The United Nations Children's Fund |
| VEPA | Vietnam Environment Protection Agency |
| VND | Vietnamese dong |
| WUA | Water Users Association |

1. Introduction

1.1 Water resources and water management in Vietnam

Water is a vital and integral part of all organisms, including human beings. People use water in most of their daily activities, from domestic consumption, sanitation and health care to agricultural, forestry, aquacultural and industrial production. Water is an essential component of the environment in which human beings are living and thriving. This crucial resource provides human societies with various social, cultural and spiritual implications for their societies everywhere.

Water resources in Vietnam are of great diversity in both surface and underground water presented in different natural and man-made bodies such as rivers, streams, lakes, reservoirs, wells, ponds, pools, lagoons and aquifers. According to the National Water Resources Strategy toward the Year 2020 (MONRE 2005), in Vietnam there are 2,372 rivers over 10km in length, including 109 major rivers. Among these, nine rivers (Red River, Thai Binh River, Bang Giang – Ky Cung River, Ma River, Ca River, Vu Gia – Thu Bon River, Ba River, Dong Nai River and Cuu Long River) and four tributaries (Da River, Lo River, Se San River and Sre Pok River) make up a basin area covering over 10,000km². They account for about 93% of the total area of the river network in Vietnam. In addition, the country has a diverse range of natural lakes, ponds, pools and lagoons, whose volumes change according to the season. Some large lakes are well known, such as Lak (10 km² in Dak Lak province) and Bien Ho (2.2km² in Gia Lai province) in the Central Highlands, Ba Be (5km² in Bac Kan province) and West Lake (4.5 km² in Hanoi) in the North. Large lagoons and pools such as Tam Giang, Cau Hai, Thi Nai and Xuan Dai are found in estuaries of the Central coastline.

In addition, there are thousands of man-made reservoirs with a total capacity of up to 26 billion m³ of water. The six largest, with a capacity of over one billion m³ each, are currently being utilized for hydropower production. These are Hoa Binh, Thac Ba, Tri An, Dau Tieng, Thac Mo, and Ya Ly. Many smaller reservoirs and dams are used for irrigation purposes, such as Cam Son (Bac Giang province), Ben En and Cua Dat (Thanh Hoa province), Do Luong (Nghe An province), Ke Go (Ha Tinh province) and Phu Ninh (Quang Nam province). In total, Vietnam currently has more than 3,500 small reservoirs and around 650 large and medium sized reservoirs, which are being utilized for different purposes including hydropower, flood control, transportation, irrigation and aquaculture (FAO 1999).

Underground water could potentially be a high capacity source of water, particularly in the Northern and Southern Deltas. Water in the coastal and inland wetlands is of high conservation importance and is needed for maintaining the ecological functions and biodiversity of the wetlands, e.g. in Ba Be (Bac Kan province) Xuan Thuy (Nam Dinh province), Tien Hai (Thai Binh province), Bau Sau (Dong Nai province), Can Gio (Ho Chi Minh City), and Tram Chim (Dong Thap province).

Though water resources in Vietnam are abundant in terms of capacity, it is actually limited in terms of “ready for use”, as it is unevenly distributed. Pollution, flooding, erosion, drought and other factors will cause a shortage of fresh water in some areas and affect the quality of water resulting in damage to the environment and putting the population at risk. Water loss through wastage has been estimated at 37%, and in some areas up to 50% (Jordan 2003). This is partly caused by most of the irrigation schemes developed in the 1960s and 1970s that are now in severe state of degradation (Molle 2005), while existing irrigation systems are able to provide water to only 50-60% of the design command area (Tiep 2002).

In recent decades, water resource management in Vietnam has improved remarkably in terms of legislation, institutional structure and mechanisms that contribute to the socio-economic development of the country. A Law on Water Resources has been promulgated since 1998 (VEPA 2006) and the follow-up legislative guidelines have provided regulations on management, administration, collection, exploitation and use of water resources nationwide. Institutional changes in water resource management have encouraged decentralization and wider participation of non-state stakeholders into exploitation, use and protection of water resources, especially domestic water supply and irrigation.

According to this law, water resources in Vietnam are commonly owned and uniformly managed by the State in order to ensure that all people are beneficiaries of the water, both intrageneration and intergeneration. Currently, the Ministry of Natural Resources and Environment is assigned the responsibility of state management of water resources, but other ministries such as the Ministry of Agriculture and Rural Development, the Ministry of Fisheries and the Ministry of Industry are also sectorally responsible for managing water resources used for irrigation, aquaculture and hydropower respectively.

Integrated and basin-based water resource management has been promoted in Vietnam. In principle, water has not only been seen as “a common good” but as “an economic or trade good”. Therefore, several mechanisms have been initiated to strengthen effectiveness and efficiency of water management in different dimensions of policy, practice, capacity and infrastructure.

Experience in natural resource management in Vietnam has strongly acknowledged and appreciated the role of local communities, which have been recognized not only as direct users but also as direct and significant managers and protectors of water resources. Community management and/or community based management has been introduced and adopted in many areas in different ways particularly in regards to drinking and irrigation water. Despite inadequacies from legislation, institutions and capacity, local communities have proved that water resources would be better managed if there were community participation in the decision-making process. To date, however, there has only been little comprehensive research and/or assessment on community-based management of water resources (CWRM) in Vietnam. Unfortunately this has limited the efforts to develop and disseminate understanding and insight into Vietnam’s CMWR as well as effectively promote its application in practice.

1.2 Research objectives

- To review and assess current models and their associated issues and/or features of CWRM in Vietnam.
- To identify four communities of CWRM best practices that are available in the Central and the North for further study.
- To propose a research outline to conduct field assessment in four identified CWRM sites.

1.3 Research approach and scope

This CWRM review is developed based on secondary information collected from printed materials such as research and project reports, newsletters and bulletins, newspapers and internet-based materials. Another source of information comes from the observations and interviews of people who have worked with communities in natural resource management.

To facilitate the literature review, this research began by defining the concept of CWRM which is viewed as appropriate for the Vietnam context. This, showed that CWRM models exist primarily in rural rather than urban areas.

This research focuses on CWRM models at communal and/or village levels which seems relevant in light of the current situation of community organization and administration in Vietnam. It also focuses on drinking (domestic consumption) and irrigation water issues, excluding aquacultural and/or environmental water. This limitation is due to the lack of suitable information and data during the study.

2. Community-based Water Resources Management

2.1 Definitions on CWRM

Community-based natural resource management (CBNRM) is a broad and polysemantic concept for its application in practice, referring to the involvement of beneficiary communities in the management of land and water resources, forest and wildlife, and aquacultural resources. According to the International Water and Sanitation Center (2003), the notion of community involvement in water use was first officially introduced by the international community at the World Water Conference in 1977 (Argentina) for the International Drinking Water Supply and Sanitation Decade in the 1980s. Lately, community management and decentralization in water supply (and sanitation) became strengthened and there was increased growth in the 1990s, particularly in developing countries after the Global Consultation on Safe Water in New Delhi (1990), the Dublin Statement on Water and Sustainable Development (1992) and the Earth Summit in Rio de Janeiro (1992) were held. Recently, one of the six “Bonn Keys” from the International Conference on Freshwater in Germany (2001) recognized the importance of community management by stating that *“Decentralization is the key. The local level is where national policy meets community needs.”*

In any form of community based management of water resources, the core principle of this paradigm is the participation of communities in the planning, implementation/operation and maintenance of water supply systems of which they are the beneficiaries. According to Molle (2005), participation can be conceived as a tool (for better management) or as a process (with view to empowerment).

According to Madeleen (1998), CWRM has three key aspects namely responsibility, authority and control.

Responsibility: the community takes on the ownership and attendant obligations of the water supply system to ensure that operation and maintenance are successful.

Authority: the community, acting as water users and managers, has the legitimate right to make decisions relating to the control, operation and maintenance of its water resources and associated water supply system.

Control: the community is able to carry out and determine the outcome of its decisions relating to the system. This basically refers to the capacity of the community, in terms of technical, labor and financial contributions, and the institutional support that they are able to have in the planning, implementation/operation, and sustainability of the water supply system.

CWRM is a process of participation in which the community is at the heart of effective water management. Community participation varies depending on local context and size of the community, national legislation, local institution and capacity, and technology used. It may

range from consumer association and community action groups in urban areas to water user groups and irrigation cooperatives in rural areas (Bandaragoda 2005).

CWRM does not imply that communities have to be responsible for every aspect of the water supply system they use. They may be involved in one, some or all of the managerial, operational, technical and financial aspects of a water supply system. According to Bruns (1997), the degree of community participation is varied, ranging from merely information sharing for water plans, to discussions which allow community members to suggest ideas; or from participation as a form of “cheap labor” or as “cost sharing”; or from participation with decision making, based on mutual agreement, to full transfer of responsibility and authority to local control.

2.2 CWRM in Vietnam: a glance at policies and institutions

Vietnam has a long history of community participation in management of water resources, especially in the northern and southern deltas, where annual flooding of the Red and Mekong rivers would cause injuries and damage to the population, property, crops and land. With the involvement of communities, thousands of dikes, irrigation reservoirs, dams and channels, and village wells have been built nationwide. The nature of community participation in water management, however, has been shaped by socio-economic development and the social and political institutions.

Ever since Vietnam started its economic transition (also known as *doi moi* or reform) in 1986, the Government has continuously emphasized the participation and contribution of communities and sectors to many development sectors in the country, including water exploitation, use, treatment, supply and protection. This concept known as “socialization” is executed under the slogan of “the State and people working together”. However, handing over the full responsibility of water management over to the community completely was not yet considered.

The Law on Water Resources of Vietnam was first issued in 1998, and in regard to ownership, it stipulates that water resources are the property of all people and universally managed by the State (ref. article 1). This means that water resources are common property. The law also states that any organization or individual has the right to exploit and use water resources for living and production, while at the same time having the responsibility of protecting the resource. However, there is no reference in the law to “community participation” and/or “community management” of water resources. Article 4 of the law states that “the Government shall carry out unified State management over water resources and all activities of protecting, exploiting and utilizing water resources; preventing, controlling and mitigating adverse effects caused by the water throughout the country”. This is understandable because the “community” paradigm has not yet been legislated in national regulations (except the 2005 amended Law on Forest Protection and Development regulating community as a stakeholder unit for forest resource management).

Progressively, the issue of CWRM has been officially suggested in the National Water Resources Strategy towards the Year 2020 which was approved in accordance with Decision 81/2006/QĐ-TTg by the Prime Minister on 14th April 2006 (VEPA 2006). This strategy sees community involvement as a key measure for sustainable water resource use and management. It emphasizes: 1) mobilizing the involvement of people in the protection of water resources, particularly in big cities, populated areas and the areas of seriously polluted water resources; 2) developing suitable mechanisms to facilitate the ability of the public to be essential supporters in monitoring water protection and preventing negative behaviors for water degradation and pollution; and 3) strengthening the participation of organizations and individuals in the process of planning, inspecting and monitoring the implementation of river basin plans and water resource projects.

The Vietnam Water Environment Report (World Bank, MONRE and DANIDA 2003) has reviewed that within existing institutional structures, water users have a low profile in water management systems. Recently the government piloted some strategic changes to transfer the authority of irrigation management to grassroot irrigation companies and water users organizations, but progress was limited. Today, several kinds of community institutions for water supply and management have already emerged in Vietnam. With the trend of “civil society” growing in the country, more community organizations will be developed in the future, and certainly this will greatly motivate communities participating in social governance and resource management.

2.3 CWRM best practice – how to define it?

Due to the variation of community participation in form and degree, it is hard to say which CWRM model in Vietnam (or any another country) is the best, since each model is determined by the particular demographic, geographic, institutional and cultural settings of the community. Specific criteria and indicators would be needed to verify how successful a CWRM model in Vietnam is. In this review, however, it is impossible to determine one CWRM as the best practice, due to the lack of baseline data and actual measurements. But this review should remain focused on the advice that states “it is possible to find out successful experience from small-size communities” (Ryan 2003).

Theoretically, performance, sustainability and benefit-gain may be components of the key criteria, while each of them may contain individual indicators. For instance, dimension of performance will have operational indicators, financial indicators, social indicators and institutional indicators. Van den Berg (2002) concludes that the more important aspect of management is not so much the organizational model, but what “rules of the game” are being applied. For example, autonomy in managing the water supply service and proper tariff levels are better indicators for success, than the management models per se. In addition, some researchers also raise the issue that the use of a more customer-orientated approach (or demand-responsive approach) results in better overall performance. This supports evidence elsewhere in the world that the demand-responsive approach has a positive impact on a systems’ sustainability.

3. CWRM in Vietnam: Approaches and Models

3.1 Indigenous or traditional models – water as a common property

Traditional models in CWRM may be found in many upland areas in the country where indigenous people are living and also in lowland areas. They are mainly involved in domestic water resources but their management scope is also extended to other resources, e.g. land, forests and biodiversity. Customary laws also play a significant role in directing community behaviors towards managing their water resources.

Village wells are a type of water supply that is commonly found in the lowland communities of Thach Ha district of Ha Tinh province (e.g. Thach Kenh, Thach Viet, Thach Long, Thach Son communes¹). It is usually circular or square medium sized (around 2 - 3m deep), enclosed by a soil or concrete edge that is higher than its surroundings, and built on a clay or sand base. Rainwater and underground water are main supplies for the well and the location is normally in the middle of a village field, away from village residences. Effective construction and careful location help to prevent unclean water flowing directly from the surrounding fields into the well, and also to prevent water filtration in the drought season.

Each village usually has at least one well, which is common property of the village. All villagers have the right to collect water for domestic use and it is their responsibility to protect the well. People from other villages in the community are also allowed to collect water from the village well, particularly in drought time, in the spirit of community sharing. There is no management committee in charge of the well, but all villagers are universally responsible for well management and protection. Grazing and littering around the well are strictly prohibited. Annually, the village will organize labor-days and each household or family will send one member to join in cleaning up and maintaining the well. Villagers do not have to pay fees for water use from the village well, but they have to contribute labor and/or money if they want to build concrete well edges. Wells deeper than 5m are not good for drinking due to the presence of alum, but these village wells are still in use, although requirements for drinking water from that resource may have not been met because pesticides from the fields may have accumulated in underground water around the wells.

Indigenous minority communities in Vietnam typically used to protect their water resources and watersheds by deifying their natural resources. They believed that rivers, streams, water-posts and watersheds all have “souls” and or belonging to certain deities or gods. Therefore, when people want to access and use water, they must beseech the gods by conducting rituals and/or strict customary procedures. This enforcement became the customary laws of those indigenous communities for water protection.

Traditionally, Thai minority people in the North have a customary law ruling that nobody in the community, including the leader, is allowed to slaughter any livestock or discard waste at the source of water. Any violation will result in a fine of from 5 “franc” (so-called as “*quan tien*”) to 3

¹ Researchers' experiences and observations.

silver bars, excluding meat and wine. They see that streams as common property of the community (each community equivalent to a *muong*), but people in the *muong* are permitted to select a section of the stream for his/her own fish-raising. To demarcate this section, he/she has to take a tree branch to span the stream and to hang a bamboo wattle (called as *Ta leo*) on a tree at the stream edge. These signs are to keep others informed that this section of the stream has an owner and others are banned from fishing. Any wrong-doing will be fined from one franc to one silver bar excluding wine and meat (Scientific Studies 2002).

According to Ngo Duc Thinh (1999), Thai people in Thuan Chau (Lai Chau) strictly regulate water areas such as *Pak Bom* and *Pak Muoi*, because they are near sacred forests. These are forbidden areas which are only to be used for worship and for the offering of black buffaloes to the head soul and elf of the water source in the village or *muong*. The *muong* law clearly defines provisions relating to conflicts over water sources for irrigation, illegal modification of water flows and the acquisition of water using pipes, which is seen as stealing. The law also strictly punishes those who destroy fish-traps, steal fish from another, and illegal fishes in fields and pools.

Community constructed water supply is commonly found in the villages of Muong, Dao and H'mong people in the North with bamboo water-reels and self-flowing systems. Dao people in Ngoc Hoi community (Tuyen Quang province) mainly exploit water from self-flows whereby water flows down from high to lower terrain. Therefore, when clearing forests for swidden cultivation, the larger trees on peaks or source-heads are left standing to hold water. Muong people in Nam Son community (Tan Lac district, Hoa Binh province) install bamboo reels close to streams to collect and direct water by bamboo pipes to their fields. H'mong people in Lao Cai province used to carry water to their fields by rivulets, canals/gullies and troughs/conduits. Close to the river's source, the H'mong used to construct a waterbreak or wall made from bamboo wattles, soil and stones in order to adjust flows from the stream to a canal/gully dug by the community. They carved out big trunks for troughs/conduits to carry water to terraced fields. This can be an effective way to collect water for cultivation but it also usually damages field-edges or causes soil erosion (Son 1999).

The Ede, J'rai and M'nong peoples in Highlands traditionally believe that "land, rivers, streams, and forest trees are the baskets and backs of our grandparents". Therefore, protecting natural resources, including water, is a holy and compulsory obligation for each community member. The customary law of the ethnic Ede's notes that natural resources (land, water, forests) are closely linked to their ancestors, and the right of ownership belongs to land-owners and is transferred through generations, as it said:

*" Uncle passed away, the right moves to grandchild,
Grandmother passed away, the right moves to grandchild
One passed away, another to be taken (the ownership)
No one dares to occupy for his/her use forever..."*

According to Nguyen Huu Tri (1999), water-ports and/or water sources are considered typical symbols of the village. Each water-port of the village is common property, which is overseen by a deity. The deity will get angry and punish villagers with diseases if they make the port dirty. At the beginning of the year Ede and J'rai people hold a worship ceremony (an event known as *Nga yang tring kpin ea ala buon*) for the village's water-port when all villagers participate in cleaning up the water-port and hope the deity will be happy and make all villagers healthy. Customary law of Ede and J'rai says that:

*“Dirtying soil and water source of others
Threatening millets unable to grow
Rice will not be flowering
Worrying that crops will not be reproducing
Land will not provide rice
Forests will not create millets
Family will not be rich
And this will be judged”*

In the customary laws of the M'nong people, the purpose of water protection does not only refer to its provision of domestic water, but also to other resources such as fish, crabs, snails as foods for their village. The community will strictly punish those who fish with poisonous plants. It states that:

*“Forests are common (property)
Land is common
(Fishing) streams belong to village
Fish in streams people can catch
But catching young-frogs has to leave parent-frogs
Catching young-fish has to leave parent-fish
Cutting down bamboos without touch to young ones
Heating bee hives without harm to bee queen
Poisonous fishing make streams poor, ...
Want to eat frogs, shooting them with arrows
Want to eat fish, catching them with baskets
No fishing with poison leaves
That can kill all small crabs and shrimps.
The village will hold a court
Who poisoning fish, will be accountable and guilty”*

Such customary poems have revealed great insights to integrated and sustainable use and protection the water resources of Ede and M'nong communities, without any encouragement of resource exploitation for short-term benefits.

Co Tu minority people in Thua Thien Hue and Quang Nam provinces (e.g. Thuong Lo and Thuong Nhat communities in Nam Dong district, Tabhing community in Nam Giang district)

usually worship at a village house (known as *guol* house) when a gutter is completed for a new village or a village gutter is renewed. By worshipping, villagers hope their god will always give them enough water and remind their children about saving water (Lan 1999).

As traditional wet-rice cultivators, Cham people in Ninh Thuan province hold a system of significant beliefs and rituals related to water, such as rain worship, dam and canal opening and waterhead blocking. The Cham's customary law contains detailed regulations on procedures on land reclamation, watershed protection, reservoir maintenance, including rights and obligations of community members towards water protection and management. For instance, it specifies that every member of the community is responsible for protecting water sources, participating in canal dredging, contributing to worship costs; preventing theft of water and exploitation of watersheds (Hung 2006).

There may be more indigenous models of CWRM in Vietnam that have not been investigated, especially in mountainous areas where local communities have a strong reliance on exploitation of natural resources, including water as a common property, for their long-term livelihoods. These models have been in existence for a long time and are closely linked to socio-cultural settings of the communities. There is no information and/or assessment, however, to confirm which indigenous models are seen as CWRM best practices, but their sustainability is greatly recognized.

3.2 Advanced models – water as a trade good

The development of advanced CWRM models in Vietnam has moved forward with the growing changes in the market-oriented socio-economics of the country, in which water, as a scarce resource, is widely accepted as a trade good, mainly in the fields of irrigation and drinking water supply.

3.2.1 Agricultural Water: Participatory Irrigation Management (PIM)

PIM has been adopted in Vietnam since the early 1990s when the Government officially decided to hand over the right of agricultural land use to individual households through the policy "Contract 10" (known as *Khoan 10*). PIM is seen as an effective way of CWRM, where targeted communities join together as water users, and managers and protectors of small scale irrigation systems. PIM models have been applied in many provinces such as Tuyen Quang, Bac Kan, Ha Tay, Thanh Hoa, Nghe An, Quang Tri, Quang Nam, Quang Ngai and Binh Dinh. A recent assessment has named three institutional models for community related PIM in Vietnam, including 1) farmer organization and state agency joint-management model; 2) farmer organization and quasi-state shared management model; and 3) farmer organization sole management model. This assessment confirmed that the increased involvement of farmers in the decision-making process led to better performance of management models (Trung *et al* 2002).

1) Farmer organization and state agency joint-management model

This model exists in Bac Thanh, Trung Thanh, Xuan Thanh and Long Thanh communities of Yen Thanh district in Nghe An province. In these communes farmer organizations such as

water use cooperatives (WUCs) and/or agricultural cooperatives, were established to work with the North Nghe An Irrigation Company as a state service agency to provide irrigation services to local households (MARD 2004).

Management and distribution of water in the area is being decentralized. The irrigation company has the responsibility for the management of headwork, secondary canals and some tertiary canals, which provide a watering service for large fields of above 500ha, including regular maintenance and protection of the works from violation and destruction. This company is responsible for taking water from the headwork to tertiary canals and handing over to agricultural cooperatives and/or water use cooperatives for their distribution to the field.

Agricultural cooperatives and WUCs were established in accordance with the Cooperative law. The former are suitable for the area where the irrigation works are located within one commune or one hamlet. The latter, for example cooperatives N4B and N6, are suitable for those works consisting of inter-hamlet and/or inter-commune canal alignments. Then, each canal alignment has a single water service group in charge of water distribution to household farms. These cooperatives are responsible for management, maintenance, protection and conveyance of water from the heads of tertiary canals to the on-farm canal system, which are defined by their rules. Through contracts with the company, each household of irrigated farms will pay irrigation fees under the monitoring of their cooperatives.

The major benefits of the WUC models in Nghe An and Thanh Hoa provinces were evaluated by Nguyen Van Phuc (2004) and are as follows:

- improved ownership and responsibility;
- careful and appropriate irrigation planning based on effective and timely collection of irrigation requirements from households by the WUC (participatory planning);
- significant water saving and higher irrigation efficiency, allowing more water for downstream users;
- chronic water conflicts between head and tailed canal users were eliminated;
- better maintenance of canals with reduced cost because of work undertaken by WUC protection teams, improved attitude, concern and “canal watch” by all farmers;
- water resources in canals are always kept clean as rubbish in the canals is collected by cooperative farmers;
- much improved water fee collection system, leading to almost 100% collection;
- stabilized production and improved livelihoods with less concern about water than previously;
- improved opportunities and a better income for the poor;
- improved irrigation management; and
- reduced costs, lower workload and possible staff reduction for the irrigation station.

The benefits from this model, however, are limited to those farmers who become cooperative members. A list of constraints and limitations were found including:

- still weak and inefficient supporting legal structure and policies;
- insufficient support and facilitation from local governments;

- inappropriate institutionalization supporting participatory approach;
- limited operational and managerial capacity among managers;
- weak infrastructure support;
- limited awareness and understanding of farmers;
- small-scale and fragmented production;
- inefficient gender mainstreaming strategy;
- overlapping operation and management functions between the WUCs and local authorities (e.g. communal People's committee)
- the weak status of the WUCs from both managerial and financial perspectives.

Similarly to WUCs in Nghe An, another PIM model in Quang Nam province is the joint-management between the Irrigation Management Company and Agricultural Service Cooperative (MARD 2003). This occurs in Tam Thanh – a commune of two cooperatives, located along the canal N12 of Phu Ninh irrigation system in Tam Ky town. It also applies in Binh Tu commune (Thang Binh, Quang Nam) where an agricultural service cooperative does not exist but a Communal Economic Board acts as a replacement. On behalf of water users (farmers), the head of the cooperative or board, signs a contract with the irrigation company for managing and distributing water from the head of tertiary canals to on-farm canals. To fulfill its job, each cooperative establishes an irrigation team which consists of village or hamlet leaders. Tam Thanh commune has two cooperatives (No.1 and 2) which results in two irrigation teams. At each hamlet, at least two self-managed groups are formed. Each group has 2-3 members elected by villagers. These groups are responsible for the irrigation service at the hamlet by keeping households (as water users) informed about watering schedules, collecting irrigation fees, and taking up administration issues.

A Model of Community-based Water Management in Quang Nam Province

Tam Thanh commune (Tam Ky district) had 2,209 households with 4,486 people and 10 hamlets (in 2003). It had 2 Agricultural Service Cooperatives: Cooperative 1 covered 4 hamlets and Cooperative 2 covered 6 hamlets. Each cooperative had its Administrative Section and Control Board. They had the responsibility for providing agricultural services – watering, agricultural materials and techniques, and advising local people about production plans and technical aspects; managing and distributing electricity to civil household-users; and servicing handicraft production. There was a reform of previous Agricultural Cooperatives, by changing functions and responsibility from planning, managing and organizing production under collective mode (land was under the Cooperative management) to providing services (including consultation service) to farmers (land was under management and long-term use of households).

In this Quang Nam model, the local authorities are not involved with water management and distribution. A communal people's committee only participates in solving conflicts and/or disputes in regard to its functions. This model is only suitable for small irrigation works operated in a hamlet and/or inter-hamlets, and therefore it is easy to adapt to the actual capacity of the farmers in water management and distribution. This model, however, also

reveals a disadvantage in collecting irrigation fees since water users (households) have not directly entered into contracts with the irrigation company.

2) Joint management by quasi-state and farmer organizations model

This model is presented in Son Nam commune of Son Duong district in Tuyen Quang province (MARD 2004). In this commune, irrigation teams and community organizations work with the Agriculture and Forestry Cooperative of the commune to provide irrigation service to households needing water. The cooperative directly owns and manages local irrigation works, including canals and pumping stations in the commune, and provides the irrigation service. It works freely and independently from local irrigation enterprises as a self-financing mechanism. About 80% of water fees collected is used to maintain local canals, and the final 20% is to cover administrative costs of the cooperative.

Though the cooperative is responsible for overall management of all irrigation facilities, water using households are also assigned to manage specific tasks. They are requested to oversee and protect the facilities and convey water in and out in accordance to the local cropping schedule. This is done so that all irrigation facilities are well maintained and repaired, helping to prevent water loss.

The irrigation teams are provided with training on irrigation and drainage, management and utilization of irrigation facilities, thus their capacity and responsibility are strengthened, resulting to the water reservation and management being notably improved. Every year, these teams and water use households also contribute labor for maintenance, rehabilitation and the dredging of the irrigation works.

3) Farmer organization sole management model

The model of Water Users Association (WUA) has been introduced in Bac Kan province since the 1990s, particularly in Bach Thong, Cho Moi and Cho Don districts. It reflects effective participation of local communities in water management for irrigation. The WUA of Nguyen Phuc commune in Bach Thong district is an example (ADB 2006).

Nguyen Phuc is a mountainous commune with agricultural production, mainly rice paddies planted in an area of 90ha. Its irrigation system had around 40 facilities (headwork and canals) but most of them were temporary. Before the WUA was introduced, there was no organization or group responsible for managing those irrigation facilities. Local farmers freely used those facilities to water their own farms. Therefore, several problems were raised in the commune, such as water shortage for cropping, low crop productivity, canal degradation due to the lack of maintenance, water losses, high labor consumption for irrigation, and especially conflicts among farmers due to water competition.

With external consultation and high support given by communal authority, farmers discussed and decided to establish four WUAs in the commune in order to operate and manage the irrigation system. Plenary meetings were organized with participation of villagers, whereupon they voted a management board for each WUA and mutually agreed on the statute, regulations

and rules of their WUA. A number of irrigation operators were also selected by the farmers who are responsible for conveying water to each farm and making small repairs for the irrigation system and protecting irrigation facilities. The management board and operators usually meet monthly to review the irrigation progress and make monthly plans. They were trained in irrigation and financial management.

Farmers participate actively in making decisions relating to WUA operation. At the begin of each cropping season, the WUA management board prepares an irrigation workplan for farmers' comments and approval during a general assembly meeting. This workplan focusing on the water delivery schedule which is based on the water demand of each household and water availability at the headwork.

By setting up WUAs, irrigation in the commune has improved remarkably as irrigation facilities are better maintained and protected; water losses were clearly reduced; irrigated area increased by 15%, and crop productivity rose by 20%. Farmers are now liberated from irrigation labor because the responsibility is now handed over to irrigation operators. This means they have more time to make other income generating activities to improve their living conditions.

3.2.2 Drinking water supplies

Current information provides no proof of CWRM being implemented and existing in big cities like Ha Noi, Ho Chi Minh and their suburbs. In these cities, domestic water supplies are commonly undertaken by state-owned enterprises and services such as a provincial/city/district water supply company, local center for Rural Water Supply and Environmental Sanitation (for suburb districts and communes). Some are run by privately owned water supply companies and cooperatives. The involvement of water users (or households) in water management is low and only presented in the overseeing of water-meters and contributing to the costs of facility installation and maintenance. The authority and responsibility for water management belongs to water supply enterprises/companies. These companies sell water to each household based on a contract, and collect water fees monthly based on the real consumption of each household.

In rural areas, CWRM for domestic water supply is found in two forms: rural water supply cooperatives and community managed water supply stations. The former is a limited joint management between a state agency (e.g. center for rural water supply) and a community-based organization that operates based on the principle "the state and the people working together". It is found in several provinces such as Thai Nguyen, Thua Thien Hue, Dak Lak, Dak Nong, and Tien Giang. The following are two examples in Thai Nguyen and Tien Giang.

In 2003, Don Bay hamlet of Vi Huong mountainous commune in Bach Thong district received a water supply station, which was financed and constructed by Thai Nguyen's Center for Rural Water Supply and Environmental Sanitation. This work includes a filtration tank and six water containers supplying clean water to 43 households and primary and secondary schools (Van 2004). Previously, villagers in Don Bay used to take water from wells, streams and rivers for

their family uses and irrigation. However, these sources were not clean enough and often ran out in the summer months. To solve these problems, the provincial center for rural water supply and environmental sanitation consulted villagers to be permitted to carry out the work. Local villagers benefited from raised awareness and were trained in water supply management, water resource protection, environmental sanitation and health care. They have participated in construction of the work with labor contributions estimated at 10% of investment costs. They also proposed measures for the management and protection of the work and set up a fund for management and maintenance. Every month each household contributes VND1000. At present, villagers in the hamlet have enough clean water for family usage.

The model of the Rural Water Supply Cooperative in Binh Trung hamlet of Thanh Nhut commune, Go Cong Tay district, Tien Giang province, has been considered an effective CWRM. This cooperative was initiated in 1991 by some pioneering households in the hamlet to deal with problems of water shortage problems caused by pollution and salty intrusion. Villagers elected seven people to form a management board in charge of organizing and monitoring the construction of a small water supply station as well as the financial management. At the beginning, there were only 138 households participating and contributing to the construction. In 1999, the cooperative decided to invest and upgrade the work with a water tower with a height of 13m and 11m³ in volume, a water container with 37m³ volume, a filtration tank of 300m³, and a drilling well. By 2003, there were 1345 households in Binh Trung and surrounding hamlets joined the cooperative as water users. Every month, about 7750m³ of clean water are delivered to water users at the price of VND2000 per m³. A team of six water operators, paid monthly, was formed and trained, responsible for management, operation and maintenance of the station. Villagers (water users/cooperative members) are informed about the budget collected from water fees at the cooperative plenary meetings and approve the use of that budget. By 2003, there were about 260 water supply cooperatives such as Binh Trung were operating in Tieng Giang province (Hoan 2003).

The model of a water supply station purely managed by community is found at Tan Binh commune of Binh Minh district, Vinh Long province. Tan Binh water supply station started operating in 2001 with 135 households participating as water users (Dong 2004). With funding from an international organization, the station was constructed and transferred to the community for management. Villagers contributed to fund the water meter and pipe installation. They also nominated a person to operate the station. After some years in use, however, the number of households participating as water users did not increase. Therefore water fees collected were not enough to compensate for operation and maintenance costs. One of the main reasons was that the technology being used (pumping and pushing) was not suitable for the local conditions. Every day the station only delivered water for 6 hours, thus it was necessary for each household to construct a water storage facility, but most of villagers were unable to pay for this. Because of those difficulties, in 2002 the station (and other 34 similar ones) was handed over to Vinh Long's center for rural water supply and environmental sanitation to manage.

The systems of self-water delivery existed in many mountainous villages of Tuyen Quang, Ha Giang, Dien Bien, Hoa Binh, Nghe An and Quang Nam provinces. Most of these systems are recently constructed under the support from Programme 135 – Assisting Poverty Reduction for Poor and Remote Communes carried out by the Government. The model of self-water delivery in Tan Phong commune of Ky Son district, Hoa Binh province is an example (An et al 2004). Tan Phong is a commune of Muong ethnic people. People here used to collect water from streams for drinking and washing. Since 2001, the province has supported the commune in the construction of two systems of self-water delivery with 34 water containers and wells. Villagers have actively participated in these projects by attending water training schemes, discussing and deciding on where to place water containers, and selecting people for their water management board. This board is then responsible for overseeing construction, maintenance and repair of the systems. At present, about 90% of the community has access to a large quantity of clean water (above 50 liters per day). They do not have travel as far as previously to collect water. All villagers in the commune do not have to pay water fees but each household makes a voluntary contribution of VND2000 every month for maintaining the systems.

4. CWRM in Vietnam: What Makes It Work?

4.1 Community participation

At this stage of the research, it is recognized that the level of community participation in CWRM models is moderate and usually characterized by the following forms:

- having been invited to attend in “consultation” meetings when a CWRM is initiated
- making comments for local water plans and their implementation
- nominating and voting community representatives for management board or team which is responsible for local water issues
- making labor and financial contributions to construct, operate, maintain and protect local water facilities
- paying water fees based on their real consumption of water for irrigation or consumption.

The common forms of institutional organization for CWRM are cooperatives or water use associations which are formulated as farmer/community organizations and work closely with state organizations. To them, water is a trade good and normally users have to pay water fees. But, to indigenous communities, there is no existing formal institution for them to manage their water. They perceive water as a common property with spiritual values and is managed in accordance with their customary laws. However, to date, there is no information/assessment about how much these laws influence community participation in water management in practice.

In the CWRM models mentioned, the responsibility of the community is well defined but their ownership is not clearly described although their contribution is counted. The sense of ownership is more reflected in traditional CWRM models than in advanced ones. In advanced models, it is more likely that the local authorities are formally the facility owners, particularly if the works were partially financed by the State.

The role of the communities in making decisions in CWRM is well defined but they usually participate at a low level, such as voting / selecting management board, identifying locations for facility installation and so on. At higher levels, such as selecting technologies or operating/managing facilities, they are not usually capable of making those decisions. According to Dr. Le Van Minh at the Department of Ministry of Agriculture and Rural Development, the contribution of local communities made up 44% of the 6.500 billion VND total investment for water sector in Vietnam. However, local people do not have the authority to select suitable technologies for water use and management (MONRE 2005).

4.2 Institutional support

Though the “community” scheme has not been legislated yet, the CWRM's existence and its recent development have resulted in a wide range of political and institutional reforms in Vietnam, from market orientated economics, the agricultural policy “Contract 10” (known as

Khoan 10) in early 1990s, to movements of socialization and privatization and grassroots democracy. These have helped communities get involved in water resource management.

Water user associations or water service cooperatives are institutionally adaptive to community based management. A part of this process is the involvement of international organizations (e.g. UNICEF, DANIDA) and non-government organizations in providing technical and financial assistance to promote CWRM in Vietnam. In conjunction with this, it has gained the support of local authorities (Communal Communist Party and People Committee) in enabling CWRM to operate on the ground. In some case the People Committee decides on the management and operation model for the water supply system.

4.3 Capacity, technological transfer and resources mobilization

Capacity is one of decisive factors that significantly influences the participation of the community in CWRM, especially the process of decision making. Normally, local communities are able to do the following:

- making comments on CWRM plans during consultation meetings
- proposing those they believe are qualified to join the management board or water team to be responsible for managing and maintaining water related works
- contributing part of their assets (dependent on their income sources and living conditions) to repairing and creation of tertiary canals with simple works such as earth filling and digging, transporting, pouring concrete, building and guarding
- participating in water managing and distribution, through irrigational teams and Agricultural Service Cooperatives with guidance from technical staff on works of simple technical requirements.

By participating in CWRM, the capacity of the community is certainly improved because they join in training and discussions on water management and protection in general. Special training in system design, technical performance and monitoring and financial management is usually given to community representatives who directly operate and manage water works.

The system of traditional/indigenous knowledge plays a significant role in CWRM, particularly experience and practices of the communities in protection of watersheds, water collection and water deification.

Technologies used for rural irrigation and water supplies are generally simple and inexpensive. This is suitable for local capacity and resources as CWRM models usually take place in rural, poor and remote areas. External contributions made by the government (e.g. Programme 135, credit for the poor), international organizations and non-government organizations are significant resources for operating CWRM at grassroot levels.

It has been proven that lack of clarity in ownership rights affects the process of mobilizing communities to make contributions. This may lead to confusion over ownership rights, causing

disputes between different stakeholders. Clarifying property rights at the outset will help avoid later conflicts in management and operation (Van den Berg 2002).

4.4 Demand-based approach

Since water is accepted as a trade good and water users have to pay water fees, the demand-based water consumption is clearly presented in CWRM models. Irrigation operators deliver water to a farm at the level that is suitable for crop growing as villagers expect; and drinking water is counted using water meters. User payment is a significant principle, helping to save water and raise awareness of communities on water preservation. However this approach is not adapted for CWRM models where local communities regarded water as common property or get water from self-water delivery systems.

4.5 Financial autonomy

Funding used to construct the community-based and small-sized water supplies and/or irrigation works usually comes from three sharing-sources : government funding, external funding (e.g. NGO projects), and community contributions. Water fees paid by water users makes up the budget to pay for operation and maintenance costs. The water fee of CWRM systems is usually set by the community (at the plenary assembly meeting) and endorsed by the People's Committee. In rural water supplies, it has been proved that community managed systems charge the lowest rates.

4.6 Sustainability

The sustainability of a CWRM is likely defined by the combination of different key aspects social, financial, institutional, technical and environmental. Identifying a CWRM best practice must come from this and therefore it is extremely challenging. In this context, some aspects below current CWRM models should also be considered as a good performance.

There is worldwide recognition that the application of water user-oriented or demand-responsive approaches have had positive impacts on the sustainability of water management systems.

Community consensus as a result of social performance has proved a success with CWRM models. There is much evidence that women have actively participated in the construction and monitoring of the water systems.

5. Recommendations: Fostering Community Participation in CWRM in Vietnam

CWRM in Vietnam has proven successful in water management at the grassroots level. Its application and development nationally, however is still limited, due to many constraints and difficulties in terms of political, institutional, managerial and technical contexts that exist and are raised during its implementation. Legally, as described above, water resources in Vietnam are currently owned and managed by the state, and obligations to water protection are for all individuals and organizations in the country. The authority or rights of decision-making over water resources at the local or grassroots level to a certain extent belong to the water supply companies, irrigation enterprises, and management boards of watersheds, lakes and reservoirs and their branches.

Promoting CWRM in Vietnam means strengthening the decentralization process in water resource management. To make this realized, the following is recommended :

- “Community” must be legally constituted as a formal entity in the society as household/family or official organizations with functions, obligations and rights for participating in socio-economic development. Vietnam’s law on forest protection and development has recently made this possible.
- “Law on associations” should have been passed, then it will facilitate and promote the establishment of “community organization” at the grassroots level. This seems the most important perspective to legally get local communities participating in natural resources management in general.
- Raising the awareness of policy and decision makers, managers and development planners of the government, on the importance of CWRM, with the aim to influence their decisions on the issues of water management.
- Encouraging local authorities to support CWRM initiatives through training, seminars, consultation meetings or study tours.
- At the grassroots level, CWRM should be carried out in small-sized communities.
- The model that is solely managed by communities should not be of preference in Vietnam at present due to limits in resources and capacity. Partnership models comprising a community organization (e.g. cooperative or water user association) and state agencies or non-state agencies are preferable. In this model, it should clearly state responsibilities, obligations and rights of the communities towards water resources and their management (based on a set of rules/regulations).

- Strengthening capacity for communities in water resource management must be seen as a definite factor for the success of a CWRM model. This should be done through practical activities (or experiential learning) and ensure it meets the real needs of the community. Technical and managerial assistance for the community from experts / specialists should play a significant role.

- Diversifying sources of contributions for CWRM from the community, the state, and non-state is necessary, whereby community contributions are the majority in order to facilitate the definition of ownership rights in the community.

- The community must be involved in the process of decision making for water exploitation, use and management. It should not be as simple as getting comments during surveying and planning or selecting a management board. The community should directly participate in deciding on the technology selected, financial management of the mechanism applied, prices/ costs recommended, and monitoring process to be achieved. Of course, these must be relevant to the capacity of the community.

- The older generation, women and children in the community must be linked with CWRM activities, especially in planning, price setting, construction, maintenance and monitoring of their water facilities. It should develop environmental education and communication programmes on water protection and management for local children and villagers.

- CWRM in each community should consider the use of traditional / indigenous knowledge to address local water problems and improve water management. Useful knowledge, experience and practice may be collected from the seniors in the community.

- In relevant cases, water must be priced as a trade good while ensuring it satisfies the water demand of every household in the community. Pricing water may be the best way to save water and change community behaviors towards water conservation.

6. Proposed Field Research on CWRM “Best Practice”

Based on available information on CWRM in Vietnam, to gain further understanding of this issue, it would be advisable to conduct more field research at the CWRM sites which may be seen as being most successful performance. There are four sites that are recommended for this purpose:

- 1) Thuong Nhat or Thuong Lo communes in Nam Dong district, Thua Thien Hue province which is populated by Ca Tu minority people (for traditional CWRM).
- 2) Vi Huong commune in Bach Thong district, Bac Kan province with CWRM model for drinking water supply.
- 3) Nam Son commune in Tan Lac district, Hoa Binh province with the CWRM based on self-water delivery system.
- 4) Water Use Cooperative N6B of Bac Thanh commune, Yen Thanh district, Nghe. A province with CWRM model for irrigation.

Tentative Plan:

- Field research in Nghe An: last week of November 2006
- Field research in Hoa Binh: second week of December 2006
- Field research in Thai Nguyen: third week of December 2006
- Field research in Thua Thien Hue: first week of January 2007

Research contents:

- 1) Geographical and socio-economic conditions: topography, climate conditions, area and location, population and demography, economics and poverty, education and health care, production and service activities run by locals.
- 2) Characteristics of the water resources/systems being managed by the community: status of water resources; changes of the water resources over time; facilities in use; changes in water management over time.
- 3) CWRM analysis with focus on:
 - **Operational performance** (including technological aspects): functions of the system; operation and maintenance mechanism, who manages and operates it, how the technology and facilities are selected and constructed; types of facilities and structure; what rules for its operation; capacity of the community;
 - **Institutional performance**: the kind of organization that is managing the system; its structure; how was it established; how does it function and cooperate with other institutions; how the community is involved in this institution; ownership and authority of the community over the system;

- **Financial performance:** the community's contribution to the system; the water fees; water consumption and payment; operation and maintenance costs; financial benefits/savings the community gained; external support or investment;
- **Social performance:** community attitude to the participation in their CWRM; management capacity; any surplus social benefits the community gained (time, labor, awareness, crop productivity etc.);
- **Ecological and/or environmental performance** (where relevant): changes in water quality and quantity over CWRM implementation and their impacts on cropping, plantation and wildlife (if locally observed);
- Community recommendations for a better performance overall.

Methodology

- Formal and informal interviews with local authorities, community representatives, and the community in general;
- Field observations and visits.

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