

HYDRAULIC WORKS IN VIETNAM

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Rural areas - Agriculture - Irrigation

The rural population in Vietnam makes up more than 73% of the total national population. Their main income is from irrigated agricultural products like rice, vegetables, fruit, coffee and fisheries... Therefore, rural areas are always associated with agriculture and irrigation.

Vietnamese farmers have derived a conclusion that *“firstly water, secondly fertilizer, thirdly diligence, and fourthly variety”*. Today the agriculture is developed vigorously with increasing yield thanks to various factors. However, in fact, water still plays a decisive role in the quality, yield and production of the agriculture and sustainable rural development (water for agricultural production - water for domestic use, environment, ecology, health, culture and civilization).

Rural areas are “bases” for development of services and business (commercial production and consumption). That is why our ancestors said *“hundreds of industries will fail if agriculture becomes weakened”*.

Agriculture will be able to develop in a sustainable way once the hydraulic infrastructure is improved (to ensure the irrigation and drainage as required at stable and low prices resulting from minimum management cost and maximum water saving because water is the most “precious” material that nothing can substitute for).

It is a common remark that rural areas develop in a sustainable way where irrigation and drainage serve production effectively.

Briefly speaking, agriculture - rural area - irrigation has a close interaction through the adjustment for the benefits of the whole community in the light of “rich people strong country”. However, there remain a lot of problems to be solved in rural area. Particularly, irrigation is not considered *“the first measure”*. *Water shortage, drought, salinization, and flooding... frequently occur and affect the life of farmers in general and rural areas in particular.*

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Hydraulic Works - Investment and Effectiveness

According to the Ordinance on Exploitation and Protection of Irrigation Works (No.32/2001PL-UBTVQH10):

“Irrigation works” mean infrastructure works built to tap the usefulness of water, to prevent and combat harms caused by water, protect the environment and balance the ecology, which include: reservoirs, dams, sluices, pumping stations, wells, penstocks, canals, works on canals and embankments of all types.

“Irrigation work system” includes irrigation works which are directly interrelated in terms of exploitation and protection in a certain geographical area.

Effectiveness of the works can be seen in following points:

- Minimum investment capital
- Minimum management and production costs
- Meeting demands for water (both quality and quantity) for multi-purposes
- The works are the least damaged and the most sustainable
- Stable eco-environment
- Optimum benefits for water users through the most effective service organizations.

Existing hydraulic works:

To 31st December 2006 (*Water Resource Department*) Vietnam had nearly 100 large and medium scale hydraulic systems with 21,177 works (including 1,957 reservoirs with capacity of more than 300,000 m³).

To manage and operate the works and systems **110 enterprises** (Table 1) have been set up to manage the exploitation of head works, main canals and big branches of large, medium and small scale works (including 19,391 works, accounting for 91% of the total number of existing works). The enterprises consist of:

- 96 state owned companies;
- 9 one-member state limited companies
- 3 joint stock companies
- 2 construction companies

Vietnam has 11 inter-provincial systems. MARD manages 3 inter-provincial companies.

Table 1. Companies and their number of workers

No	Region	Number of companies	Number of workers
1	Northern Mountainous Region (15 provinces)	17	2,333
2	Red River Delta (11 provinces)	48	11,764
3	Northern Central Region (6 provinces)	20	4,253
4	Coastal Central Region (6 provinces)	7	1,432
5	Central Highland (5 provinces)	4	472
6	East Southern Region (8 provinces)	8	1,547
7	Mekong River Delta (13 provinces)	6	768
	Total	110	22,569

Source: Water Resource Department - MARD - 6/2007

Nearly 10,000 water user organizations (WUOs) are managing tertiary canals and on-farm works in the hydraulic systems managed by state owned companies (IMCs).

In addition, 1,500 WUOs - WUOs (including cooperatives, teams, associations...) are managing 1,786 independent small scale works (accounting for 9% of the total number of the works nationwide) to irrigate for 20% of the total irrigated area of the whole nation.

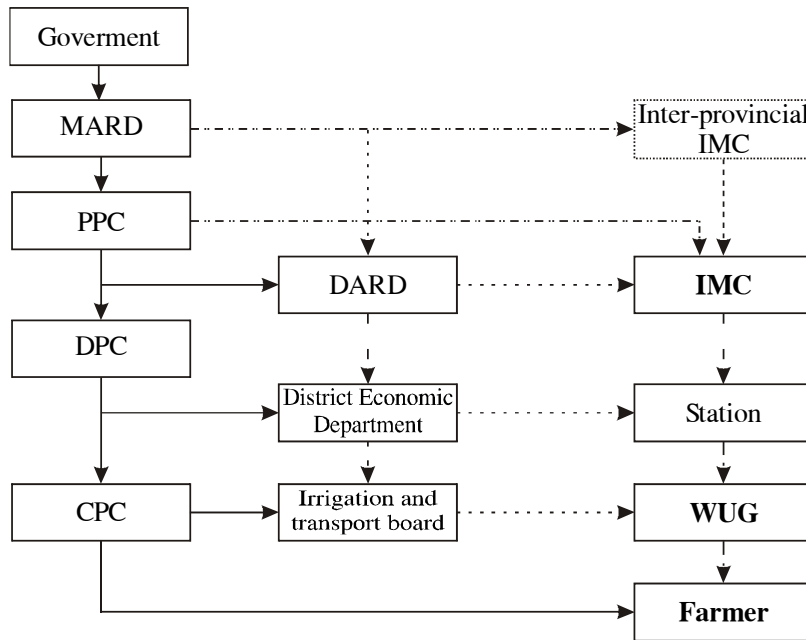
As estimated the hydraulic infrastructure is valued at more than 100,000-125,000 billion VND (more than 6 billion USD). However, this figure is far lower than the actual value. This is because, according to a recent report prepared by MARD², *the Government invested 25,511 billion VND (1.6 billion VND) between 2001 and 2006, of which MARD managed 9,874 billion VND” (5,100 billion VND a year on average)*. In addition, capital from dyke management sector and people’s contributions (in money, materials and labor...) were also invested in construction of works, especially on-farm works, to ensure the synchronousness.

“... To 2005 total irrigation capacity was 8 million hectares and total drainage capacity was 1.7 million hectares. Various programs had been implemented: 1) rehabilitation of existing works, mainly in the Red River Delta, Northern hilly and mountainous areas; 2) reservoir safety, especially in Central region and Central Highland, reservoirs of 50 mil.m³ and more and those with high dams were upgraded to ensure the safety during

² MARD report “Evaluation of effectiveness of investments in hydraulic works” - Water Resource Magazine, Issue No.3, 2006

typhoon season and water supply; canal lining: more than 15,000 km of canals had been lined to increase irrigation and drainage capacity by 350,000 ha and 400,000ha respectively following the motto “Central level and local level, Government and people share”.

Organization system for management of hydraulic works in Vietnam



Note:

- State management —————>
- Expertise and professional management->
- Economic contract -.-.-.-.->
- Formation decision - - - - ->

Also according to that report “the hydraulic systems have total irrigation capacity directly for 3.45 million ha and create water sources for 1.13 million ha... 7.34 million ha of rice in 2005 (5.68 million ha in 1986) were cultivated... Rice area increased from 2.58 million ha to 3.97 million ha in the Mekong Delta. Rice yield increased from 42.4 quintal/ha in 2000 to 49 quintal/ha in 2005. Annual rice production increased steadily from 16 million tonnes (1986) to 32.5 million tonnes (2000) and then to 36.09 million tonnes (2005)... Agricultural production value increased from 13.5 million VND/ha (1995) to 17.5 million VND/ha (2000), or even 100 million VND/ha nowadays in some areas...”.

... As reported by MARD at the meeting on management and exploitation of hydraulic works on 30th - 31st March 2006, the existing hydraulic works could work **55 – 65%** of their design capacity (50-60% in the past).

According to annual local reports and investigation documents the irrigation capacity of the small-scale hydraulic systems is nearly 30% of the design capacity (Luc Yen - Yen Bai: 27%; Yen My reservoir, Song Muc reservoir - Thanh Hoa: 51-53%; Song Rac hydraulic system: 45-50%). For some medium and large scale systems like Bac Hung Hai, Song Chu (Thanh Hoa) the irrigated area makes up 80-100% of the design area. However, supporting measures must be applied (electric pumping, oil pumping, bailing...) to deliver water to.



Using bulk irrigation to take water from quarry canal of Northern Nghe An irrigation system



Water shortage at secondary canal - Ke Go irrigation system - Ha Tinh province

In the Mekong Delta the Government only ensures water supply for source creation through main canals and secondary canals. The farmers are responsible for tertiary and lower level canals through cooperatives, collective and private organizations.

Despite *a lot of contradictions* the above data analysis shows obviously that the effectiveness of the hydraulic works is lower than it should be. (As the investment is so big)

Especially, Joint Donor Report to the Vietnam Consultative Group Meeting at Hanoi, December 2-3, 2003 (Vietnam Development Report 2004), has an interesting indicator: the rate of output and spending by VND was only **0.67** in irrigation sector (0.55 in the Red River Delta), **4.82** in road sector, and **2.66** in education. These figures are important information to help leaders, especially key leaders and researchers in irrigation and agriculture, be fully aware of the current status of the hydraulic works.

Effectiveness does not come up to investors' expectation - Causes?

A report by MARD indicates six “causes of failure in management of hydraulic works”. For example: “... investments in upgrading of hydraulic works are not synchronous and self-contained from the head works to the field, management equipment has not been invested appropriately (the actual investment rate is 0.7-1.6% while it should be 3-7% as regulated...). Arrangement for exploitation management is bulky and ineffective... In some localities WUOs have not been supported by the local leaders for development... The human resource has not met the actual demands... (more than 20% management workers have not been trained)...”³

This report also asserts that “various causes can be attributed to the above said situation but one of the basic causes is that governmental authorities and sectors have not paid proper attention to the management of hydraulic work exploitation...”. An appropriate mechanism has not been introduced to motivate the management hydraulic works. This can be seen as follows:

+ *State and production-service management functions have direct impacts on the arrangement of management:*

It is common in Vietnam today that the agencies involved in state management as well as production-service management (in irrigation sector) does not have synchronous organizational structures (or no management agencies are available, even for head works and on-farm works). The structures are bulky and ineffective. They are under the state management of both professional agencies and governmental authorities that are still working in a bureaucratic way (especially in appraisal work). The research and analysis (SWOT) show that the professional agencies have potential strengths but they have not been promoted (human resource is large and trained on theories but it is not dynamic, experienced, enthusiastic and subjective or even voluntarist). Consequently, state management of hydraulic work exploitation has not been brought into play (7 items of the Article 27 of the Ordinance on Exploitation and Protection of Irrigation Works).

An advantage of governmental authorities is that they are the most powerful agencies in their territorial areas and believed by the local people. However, the awareness of these agencies remains weak. They have not paid proper attention to the management and exploitation of

³ Report on Action Plan for Improvement of Hydraulic Work Management and Exploitation – 27th March 2006

hydraulic works, especially at commune and village levels. Consequently, some pressure problems have been solved by voluntarist imposition. This made the management arrangement inappropriate and ineffective and not to have legal status. *The people have not been introduced the Governmental advocates, mechanisms and policies on management and exploitation of hydraulic works. They have neither participated nor been fully empowered in management and protection... Their benefits and responsibilities for management, protection and financial contribution have not been closely linked. Therefore, a lot of problems arise: conflicts, degradation of works, wasteful use of water, ineffective service, loss of revenue and appropriation of irrigation fee.*

Irrigation fee?

On 28th November 2003 the Government issued Decree 143/2003/ND-CP (to replace Decree 112/HĐBT dated 25/8/1984) on collection of irrigation fee. The regulated fee is subsidized more than 60% by the Government. IMCs and WUOs can be provided additional finance in 5 cases: *electricity cost for anti-flooding pumping, drought control cost exceeding the annual normal levels, rehabilitation of works, failure in irrigation fee collection due to harvest loss caused by natural disasters, and recovery of works destroyed by natural disasters.* Especially, the Government shall exempt irrigation fees for difficult and especially difficult areas and reduce irrigation fees in the events of natural disasters and harvest loss.

As reported by Water Resources Department, in accordance with Decree 143/2003/ND-CP, to 13th April 2007, IMCs have collected accumulatively 885.920 bil. VND, making up 50-60% of the requirement, in which 658.794 bil. from farmers, 227 bil. from the additional financing from the Government, as much as 50% of the total amount proposed to solve immediate problems of the IMCs. The additional finance from the Government is estimated to satisfy 10-20% of the demand for additional financing for the 5 cases as regulated in the Decree. In addition, to 10th April 2007, WUOs had collected 299.088 bil. VND of on-farm irrigation fee...

To 31st December 2005 the total debt of irrigation fee nationwide reached 377 bil. VND due to various reasons.

Some provinces (especially rich ones) have large debts of irrigation fee. For example: Ha Tay (22.73 bil. VND), Bac Ninh (11.78 bil. VND), Thanh Hoa (20.98 bil. VND), and Binh Dinh (10.28 bil. VND)...

Despite low revenue from irrigation fee it helps to relieve the Government burden to some extent and increase the funding for the IMCs to spend on O&M.

How have farmers in different regions paid irrigation fees?

- **In Mekong River Delta:** the Government has invested in dredging main canals... As explained for the issuance of Decree 143/2003/NĐ-CP, irrigation fees should be 1.2 - 2.4 mil. VND/ha/year for electric pumping irrigation, and 630,000 - 1.25 mil. VND/ha/year for gravity irrigation. However, in fact, the farmers only pay the IMC the source creation fee at a very low rate (only one province establishes IMC). For example: in accordance with Decree 143/2003/NĐ-CP Tien Giang IMC collects 140,000VND/ha/year/3 crop seasons, equivalent to 0.3% of rice yield. Some provinces are collecting at lower rates. The farmers invest in construction and dredging and management of main, secondary and lower level canals through such organizations as *cooperatives, individuals, regional pumping groups*... and pay agreed high irrigation fees (*on average, more than 500kg/ha/year, more than 1 mil. VND/ha/year, higher than the rate paid by the farmers in the Red River Delta*).

- **In the Red River Delta:** the Government invests in and manage tertiary, even quarterly level, canals up to head works through IMCs. As explained for the issuance of Decree 143/2003/NĐ-CP irrigation fees should be 2.270 – 3.450 mil. VND/ha/year for electric pumping irrigation, and 1.8 mil. VND/ha/year for gravity irrigation. However, in fact, the farmers only pay the IMCs 300-500 kg/ha/year on average. Thai Binh province is collecting *300 kg/ha/year, equivalent to 700,000 VND/ha/year* in accordance with Decree 112/HĐBT (Thai Binh Water Resource Sub-Department). Whereas, the farmers only manage on-farm canals (quarterly and lower levels) and pay “on-farm irrigation fee” at low rates (135- 160 kg/ ha /year on average, lower than the Mekong River Delta).

- **In other regions** (especially mountainous region and Central Highland): there exist small scale and independent works invested or supported by the Government (or other organizations) and then transferred to farmers for management; or the works farmers invested by themselves and managed by WUOs or individuals (no state organizations - IMCs). Two cases can be seen here. *Firstly, in some places, farmers have to pay the highest irrigation fees to cover the expenses* (as no supports from the Government are available). Farmers in Tuyen Quang province, for example, have to pay 749kg/ha/year. Anh Lan pumping station - a private

station in Thanh Hoa - negotiates with farmers to collect 800kg/ha/year but it also cannot cover sufficiently the costs for electricity...

Secondly, in other places, farmers cannot pay the fees high enough to cover the costs for maintenance and upgrading of the works... Transferred works usually can collect 200-300kg/ha/year and this rate cannot cover O&M costs. As a result, the works are heavily damaged, especially pumps (Government supports are needed in this case).

Although the Decree No.154/2007/NĐ-CP on abolishing irrigation fees for farmers was approved by the government on October 15th, 2007, the results from implementing policy on irrigation fees over the past decades have shown that irrigation fees became routine and well-understanding for Vietnamese farmers and they considerably made contribution to the development of Vietnam's irrigation system ensuring sustainable agriculture and rural areas.

+ *Production and service functions*

The production and service functions have not clearly distinguished as no relevant mechanisms and policies are available to regulate these. Consequently, inappropriate problems arise in irrigation service.

Comparisons of production and service process in irrigation sector and other services:

Irrigation service	Other services
Natural and irrigated water	Other materials, raw materials
Dams, sluices, pumping stations, reservoirs, canals	Production factories
State owned enterprises, WUOs, leaders, workers, <i>people (beneficiaries)</i>	Workers Customers
Each work/system serves a designated area	Serve as demanded everywhere and by all means
The product is a public good, delivered exclusively to specific addresses, and surplus cannot be stored. The provision is not authoritarian	The products are private goods, competitive, can be stored. Authoritarian behaviors can be seen when demand is larger than supply
Everyone has to receive the product through a work system. They cannot transport by themselves from the head works to their fields	Customers can get directly from production sites or through various providers
Affected by a lot of natural disaster risks and "clients", not depending on market	Hardly affected by risks, depending on market due to competitiveness

Comparison of operation processes of water services and other services for farmer households

Supply water for farmer households	Supply materials for farmer households
Autonomous, voluntary	Autonomous, voluntary
Serve beneficiaries in the command area of the work	Serve anyone as required
Not based on administrative boundaries	Not based on administrative boundaries
Exclusive, beneficiaries' participation, no real price	Competitive; depending on market, customers, prices and quality
Mainly driven by mechanisms and policies	Mainly driven by market, supported by mechanisms and policies
Assets of the Government and collectives	Assets mainly contributed by cooperative members
Always exist	Not exist when prices are high, quality is low and customers do not demand

Questions?

The above assessment shows that “the management and exploitation of hydraulic works... have not been paid proper attention...”. The question is “what is paid attention to?”.

A lot of people think that “investments are paid much attention” and a “project” is the plan of a certain sector and it has budget for implementation (research, investment) and the “*budget*” is usually paid much attention. This is a fact and has become “*the unconscious*”. Therefore, in many cases, activities are done only during the project time (budget is available) and turn back to their starting point (especially management) when the project finishes.

In a discussion on establishment of WUOs in some communes of Da Ban, Phu Ninh, Ke Go hydraulic systems, few people participated in the discussion and the local leaders did not expect any changes as they had to work more while they received no direct benefits. And, traditionally, no success can be obtained without supports from the local authorities.

However, after hearing that the establishment of WUOs was done under a “WB project the people think, as a common sense, that the project also means “budget”. Therefore, a leader told us “we will do anything provided that we can have the “**project**”...

It is noting that during the design phase of irrigation investment projects the management seems not to be mentioned (or mentioned insufficiently, if any), especially the arrangement to manage invested work systems effectively (particularly commune and inter-commune works). The justification of the project effectiveness even at appraisal and completion phases includes only calculated figures: how much is spent on the project implementation, how many hectares are irrigated after the project completes? The questions “*Is water delivered to the field?*” and “*what are management costs?*”... cannot be answered. Is it because this depends on management arrangement and beneficiaries’ role? Without management arrangement and good management, if management arrangement is available, the works will be degraded quickly even though they are well constructed. With inappropriate management water cannot be delivered to the fields or, if delivered, the farmers have to pay much higher prices than the prices expected by the project, due to increased spending on other supporting tools (electric or oil pumping, bailing) or labor cost and time for water delivery.

According to a recent survey (WB3 project), as no WUOs were available in Ke Go system, Ha Tinh, each village of Cam Xuyen district had to mobilize 60-80 people to watch along the canals to deliver water to their fields whenever they are informed a water supply plan by the IMC through the CPCs. The local people had an ironic saying that “all the people do water work”. The farmers said that they had to spend 500-600,000 VND/ha/2 crop seasons (labor cost) plus irrigation fees paid to the IMC and WUO.

The low awareness and the present status result in degradation and *ineffectiveness for hydraulic works while the investment is so big.*

Irrigation and drainage are paid attention to only in the event of flooding and drought

In 1970s during a trip (for a survey before construction of Ke Go reservoir, Ngan Truoi hydro-power plant...) to Ha Tinh province, Mr. Tran Dang Khoa⁴ asked us “What are irrigation and drainage?”. The answer was “They are flooding, flooding, drought, and drought”. Today it is a fact that

⁴ First irrigation engineer, ex-Minister of Transport and Public Works (1946) and ex-Minister of Water Resource - Architecture (separated from Ministry of Transport and Public Works), ex-Minister of Water Resource (1958) and ex-Vice Chairman of Standing Committee of the Parliament, Session II, ex-Director of Water Resource Institute, ex-Director of Water Resource Research Institute.

the importance of irrigation and drainage is emphasized only when flooding and drought occur. However, they are just considered a band-aid measure. After flooding and drought are solved things are the same as before. Especially, a lot of problems related to management are not effectively solved... And, the farmers directly benefiting from the hydraulic works will forget the difficulties and damages (low yield, lack of domestic water, muddy and exhausted land, salinized or alkalized soil...) they beared before the existence of the hydraulic works.

It is a fact hydraulic works will be the most effective if they are comprehensively invested, managed by an appropriate organization, and participated in by farmers.

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