

# Pro-poor Interventions in Irrigated Agriculture

## Issues, Options and Proposed Actions

### Vietnam



Decentralization and market reforms are creating favorable conditions for rapid poverty alleviation in Vietnam. But, agricultural productivity needs to be improved. Diversifying farmers' sources of income will help achieve this. But, irrigation management institutions also need to be developed, strengthened and integrated at the national, provincial and local levels.

# Pro-poor Interventions in Irrigated Agriculture in Vietnam: Issues, Options and Proposed Actions

## Introduction

Reducing poverty is a major development goal. But to achieve this, we need to answer some basic questions. What contribution does irrigated agriculture make to reducing poverty? How does the performance of irrigation systems impact upon poor men and women? Have recent irrigation reforms improved access to water and lifted the poor out of poverty? And, what practical actions will give the best return on investment in terms of alleviating poverty?

This briefing answers those questions in the context of Vietnam. It is one of a series produced by the project 'Pro-poor Intervention Strategies in Irrigated Agriculture in Asia', which took a holistic approach to understanding poverty, in order to identify practical, pro-poor interventions. In-depth, multidisciplinary studies were carried out in each of six Asian countries, and primary data was collected from 5,408 households in 26 irrigation systems using a standard set of methods, to provide new insights that are valuable contributions to the fight against poverty.

## Overview: Context and Country-specific Issues

Vietnam's government has made sweeping socio-economic changes since 1981. This has opened the country's economy, boosting agricultural productivity and rural economic growth tremendously, and causing the percentage of people living in poverty to drop sharply. Vietnam's economic growth rate has climbed to 8.4% per year, while rice yields per hectare have risen by almost 50% in 15 years. Consequently, the country no longer has to import rice—it is now the world's second-largest exporter. Plus, food poverty (or the percentage of people who don't have enough food to meet their daily needs) has dropped dramatically—from 25% in 1992 to 15% in 1998.

But, poverty is still a major problem in rural Vietnam, where 80–90% of the country's poor live. And, because Vietnam's rural poor depend on agriculture, they have been directly affected by two key factors associated with the country's dramatic economic revival: (1) policy reform and (2) investment in the irrigation sector.

### Policy reform

There were two important policy reforms: market reforms and land reforms. In 1981, the government

issued directive No.100 that created favorable conditions for peasant households to hold agricultural production contracts. In 1988, Resolution No.10 on the contract of final products to every household or group of households was carried out. These resolutions ensure that farmers have the right to use the land for production for a period of 15 years along with stabilized clauses of contracts for a period of 5 years.

### *Land reform*

To boost agricultural production, Vietnam's government divided up land formerly managed by agricultural cooperatives and re-distributed it to individual households. Designed to be extremely fair, these reforms gave each family an equal share of productive and less productive land, ensuring that each received some land near to the family house and near a source of water, and some further away. Unfortunately, this meant that each family received only a little land—often divided into 5-7 tiny plots scattered across a wide area. The result was inefficient farming operations that required a lot of labor.

### Irrigation investments

Vietnam has invested a total of 100,000 billion<sup>1</sup> Vietnamese Dong (VND), or US\$6.54 billion<sup>2</sup> over the

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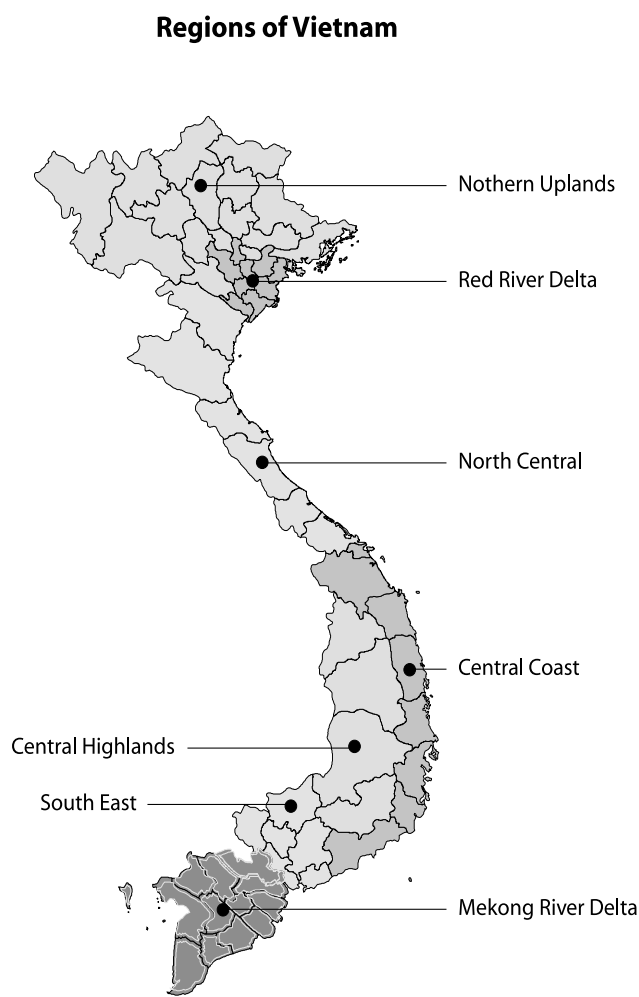
<sup>1</sup>1 billion=1000 million

<sup>2</sup>1 US\$=15,291 VND

past years, in 8,265 water works. Now 75 medium- and large-scale systems cover 2.2 million hectares. Most of this area (88%) is devoted to rice, which is grown (on average) 2.6 times per year.

But, 60–80% of investment went to the more developed regions (the Red River Delta, the Mekong River Delta, and the North Central and South East regions). So, only 40% of the poorest communes have access to irrigation systems. Previous studies suggest that irrigating 5% more land in Vietnam could cause poverty to fall by around 1.28% annually—with the impacts being much larger in poorer areas.

Common problems in the country's irrigation systems include a lack of funds, incomplete construction, damage to irrigation structures, and poor operation and maintenance (O&M). So, these systems irrigate less than 70% of the area they were designed to, and many need to be rehabilitated after



**Figure 1.** Regions of Vietnam: the Nam Duong irrigation system is located in the Red River Delta region and the Nam Thach Han system in the Central Coast region.

## Main features of the two irrigation systems studied

**Nam Duong irrigation system.** Located in the flat Red River Delta region, this system has a command area of 16,500 hectares. Average annual rainfall is 1,700 mm. The rainy season occurs from May to October, and the driest period is March to April. Extensive river dykes have been built to minimize damage caused by monsoon rains and typhoons.

The total population in the irrigated area is around 340,000, 88.5% of whom are employed in agriculture. The average household landholding is 0.25 hectares, and rice monocultures predominate, with an average yield of around 4.0 tonnes/hectare.

**Nam Thach Han irrigation system.** This gravity-fed irrigation system is located in the Central Coast region. Although the designated area is approximately 13,310 hectares, only 7,600 are irrigated because of water shortages. Average annual rainfall is 2,609 mm, occurring mainly in the rainy season (September–December). In the dry season (March–July), drought can be a major problem. The climate is monsoonal, and extreme seasonal fluctuations and frequent typhoons occur.

Farming is the principal occupation of more than 80% of the area's population of 217,000. The average household landholding is 0.53 hectares, and rice monocultures predominate.

only a few years of use. Yields, cropping intensities and crop diversification are often limited by poor irrigation and drainage on the peripheries of systems, and floods and drought both occur.

Formal water rights still do not exist in Vietnam. The process of implementing participatory irrigation management (PIM) and irrigation management transfer (IMT) approaches, which give farmers control over the irrigation systems they use, is still in the early stages and lacks concrete legal framework. Moreover, the fees charged do not cover the cost of supplying irrigation water despite the fact that fee level and collection rates are fairly high.

Clearly, irrigation performance, and the well-being of poor men and women in rural areas, could be greatly improved. To this end, IWMI and the Hanoi-based Center for Irrigation & Water Supply Research (CI&WSR) critically reviewed the management of two irrigation systems in 2001–2002 (see Box and Figure 1).

This, coupled with interviews of 900 households, has allowed researchers to pinpoint policy actions that could make the country's irrigation systems more efficient and more pro-poor.

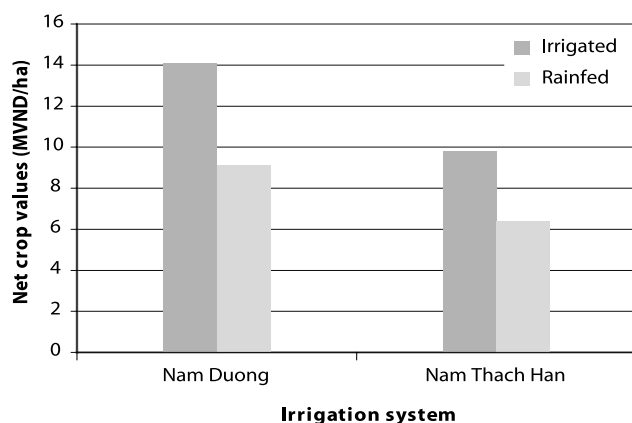
## Key Study Findings and Outcomes

### Agriculture, Poverty and Irrigation

The study found that irrigated farming produces farm incomes significantly higher than rainfed farming. In irrigated areas, the gross value of crops produced per hectare was double that in rainfed areas. The net values of crops produced using irrigated and rainfed agriculture also differed considerably (Figure 2). The difference amounted to VND 332,600 (US\$22) of extra income per person for a family of five with an average-sized farm. This may not sound like much, but it actually represents 28% of the annual income of people living on Vietnam's official poverty line for rural areas.

Agricultural productivity was similar in all parts (from 'head' to 'tail') of each system studied. Indeed, the gross value of the crops produced in the different reaches ranged very little (from MVND<sup>3</sup> 10.5 to MVND 11.9 per hectare). This means—importantly—that water is being delivered equitably to all farmers with access to irrigation.

As both land and water are generally equitably distributed, increased investments in irrigation would not have a significant distortionary impact within an irrigation system. The infrastructure of existing systems should therefore be maintained and irrigation coverage expanded.



**Figure 2.** Net value of crops produced in irrigated and rainfed plots (million VND/hectare). The higher values in irrigated plots show the benefits of irrigation.

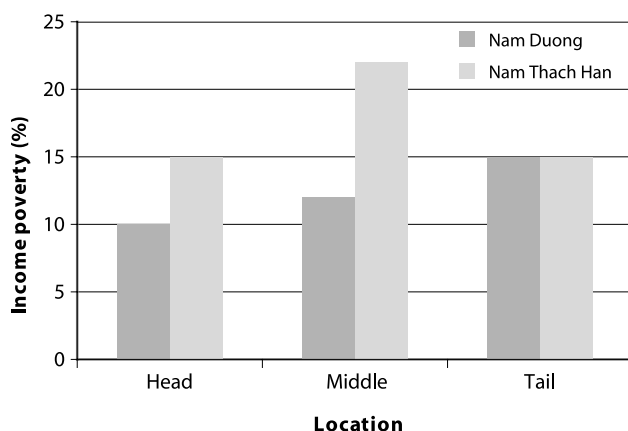
<sup>3</sup>MVND=Million Vietnamese Dong



Because agriculture is their primary source of income, improved irrigation would directly benefit poor men and women in Vietnam—those with incomes below the Vietnamese poverty line of VND 100,000/month (equivalent to US\$1.12/day in purchasing power parity terms). In Nam Duong, the poor obtained 62% of their income from agriculture (crops and livestock, and rice in particular). In Nam Thach Han, the figure was greater (78%). The non-poor relied less on farming, obtaining their income from a greater number of sources than the poor. So, greater investment in irrigation would actually benefit poor men and women more than the non-poor.

The incidence of poverty—the percentage of people falling below the poverty line—was relatively low. But, it was higher in Nam Thach Han (15-22%) than in Nam Duong (10-15%). This is probably because more people in Nam Thach Han (particularly the poor) depend on the income from agriculture. They also suffer more frequently from dry-season drought, use fewer inputs, and grow fewer high-value crops. Greater poverty was associated with low levels of education and economic diversification, as well as with a low number of workers per family. Especially poor were families with a very small amount of land per worker.

Analyses also showed that dry-season crops are important to farmers' incomes and to poverty levels. Producing dry-season crops had a far greater impact on preventing negative fluctuations in income than either rainy-season crops, the raising of livestock, or the earnings derived from off-farm activities (although all were valuable income sources). This is because



**Figure 3.** Income poverty in the different reaches of the two irrigation systems studied (percentage of people earning less than the national poverty line of VND 100,000/month).

many farm households are vulnerable to temporary poverty in the dry season. So, ensuring a successful dry-season crop, through improved irrigation, can reduce seasonal poverty significantly.

Overall, no clear trends in poverty rates were found when moving from the head to the tail of each of the systems studied (Figure 3). Instead, pockets of poverty occurred (1) where there was no, or only poorly developed, infrastructure, and (2) where irrigation was not being conducted efficiently. Indeed, farmers' perceptions of 'bad' irrigation performance (namely how often their crops suffered either from inundation or drought) were directly correlated with income poverty. Likewise, farmers' perceptions of 'good' performance (i.e., the adequacy of the amount of water delivered and the timeliness of deliveries) were negatively correlated with income poverty.

The general performance of the Nam Duong system needs to be improved, as inundation and floods and droughts are reducing crop yields. But, the problem is worse in Nam Thach Han, where floods occur in winter/spring, and water shortages occur much more frequently—seriously affecting crop yields and causing some areas to be left unplanted. More water is needed during the summer season and for unplanted land. Better water-storage practices could help, by increasing water storage upstream of the dam and inside the command area. Some of the infrastructure for this is already in place, as water could be stored in drainage canals such as the Vinh Dinh River in Nam Thach Han.

## Institutions and their Interactions

Four major types of institution are involved in irrigation in Vietnam:

- **Irrigation and drainage management companies (IDMCs)**—managing the entire irrigation system (especially main canal, headworks and main hydraulic structures in main and secondary canals). They have their own bank accounts and have the right to use their incomes to carry-out mandated duties.
- **Irrigation enterprises**—are sub-units of IDMCs, normally formed at district level. Enterprise along with irrigation stations manage main canal, secondary canals, and hydraulic structures within the district boundary. They do not have their own account and need permission from IDMCs for spending money.
- **Irrigation stations**—are sub-units of IDMCs/enterprises. They manage hydraulic structures in certain areas. They make irrigation contracts with cooperatives, deliver water to the cooperatives and collect water fees.
- **Agricultural service cooperatives**—commune- or village-based institutions, providing services such as irrigation to local farmers.

The study's analysis highlighted two main problems. First, accountability is split between a number of institutions (both operational and administrative) functioning at various levels. These don't always cooperate. Second, the set-up of the highest level institutions (the IDMCs) hampers their effectiveness. Both IDMCs and cooperatives play a key role in irrigation management.





## *Irrigation and Drainage Management Companies*

Vietnam's IDMCs are public companies, set up as quasi state-owned enterprises. So, they have to comply with policies and regulations which ensure that they provide a public good, regardless of financial return. This limits their effectiveness in two ways:

- They lack the power of true government agencies, which can implement strong policy and enforcement measures. So, they aren't really able to stop water theft, for example.
- They cannot employ market-based solutions—unlike private companies. For example, they can't set the water fees they desire, as these are dictated by the provincial government. So, despite fee-collection rates of 85–99%, the fees received by IDMCs do not cover O&M costs.

But, IDMCs do implement pro-poor measures. They will waive irrigation fees during severe droughts, and their water-delivery schedules often favor disadvantaged areas, such as high-elevation or tail-end regions. Their delivery schedules can also be adjusted to suit different cropping patterns. So, if farmers diversify into new crops, the IDMC can accommodate their needs.

However, delivery schedules are not responsive to short-term changes in demand—often because water-storage infrastructure is lacking. More seriously, normal delivery schedules are often not met. IDMCs view these schedules as general plans, which are not binding or strictly enforced—especially in terms of timeliness.

What's more, while IDMCs are responsible for the O&M of every part of the system down to the cooperative, due to budgetary short-falls large parts of the secondary canal system can be left with no one in charge. Division and clarification of responsibilities is urgently needed.

### *Cooperatives*

Cooperatives are directly responsible for supplying farmers with irrigation water. Cooperatives do not always fully cooperate with the IDMCs. Consequently, IDMCs often don't receive information about system-management needs, or feedback about good or bad irrigation performance.



Effective cooperatives ensure that irrigation water does not become an open-access resource. However, they aren't always effective—especially if they exist at the commune level rather than at the village level (which is a strong, traditional, rural-community unit). What's more, irrigation fees may be absorbed into cooperatives' general funds, rather than being put back into irrigation services.

However, cooperatives do have a tradition of providing services to farmers at the local level. Plus, their irrigation teams can communicate directly with farmers. In times of drought, they can also take rapid action to protect farmers—even before they receive official approval from provincial authorities.

### **Irrigation Charges and Costs**

Irrigation-water charges are based on crop type, cropping season (spring/summer), and crop output, as well as on whether partial or full irrigation is supplied. In both systems studied, farmers pay in rice. In Nam Duong, for example, the charge for full irrigation of a spring rice crop is 209 kg of rice/hectare (this charge is based on average crop yields over the previous 5 years). In monetary terms, therefore, revenues depend on crop prices.

Overall, annual per-hectare irrigation costs are around 1 MVND (US\$63), with around 60% arising at the system level and 40% at the farm level. Cooperatives collect water charges, at an administrative cost of 5–6%.

In both systems, water fees make up most of the IDMC's income. The Nam Duong IDMC's annual income is around VND 7 billion, but its annual expenditures are VND 11 billion (60% of which are accounted for by staff salaries and repairs, and 40% by electricity). The state government provides a subsidy of

around VND 2 billion; but, the IDMC still falls short by VND 2 billion every year—mainly in the form of debts to the electricity company.

## Recommendations and Interventions

### ***Improve Coordination and Communication***

- As many institutions are involved in irrigation management, effective coordination and good communication are vital—particularly between IDMCs and cooperatives. Communication and coordination should also be improved within the IDMCs—between the Board of Directors, technical/water management and financial/administration departments, and the field stations.

### ***Improve the Administrative and Incentive Environment***

- Clearly written water delivery schedules and requests from the IDMC head office, field stations, and cooperatives are needed. *Up-to-date information* on water availability and deliveries should also be received by the head office. Strict *monitoring and enforcement* of field stations and cooperatives on water delivery in secondary and tertiary canals is essential. The administrative environment should ensure *rapid and timely action* during droughts. And, irrigation managers should be given *better incentives* to improve water management.



### ***Reform Cooperatives***

- There is an ongoing process of the reforming of cooperatives—to make them village-based rather than commune-based. Although commune-level cooperatives still exist in some areas, their role is very formal. The actual body responsible for agricultural activities—especially water management—is the village. *The traditional village community is the most effective terminal unit in the multilayer organizational structure of irrigation management.* The constraint is a lack of detailed research on terminal units and pilot models to test the findings.

### ***Develop Water-control Structures***

- In the Central Coast region, major causes of poverty are droughts and floods. But, the damage they cause has been drastically reduced in Nam Thach Han, through the development of a major water-control infrastructure. This helped to prevent 13% of farmers falling below the poverty line during the 2002 drought. Such structures could improve conditions in similar areas, improving farmers' welfare and preventing the non-poor from re-entering poverty.

### ***Improve Drainage Management***

- Improving the management of drainage courses, and increasing their capacity, allows better draining of flood water and storage of irrigation water. In Nam Thach Han, for example, a large proportion of the system's water is wastefully released into the Vinh Dinh river and the sea. Using this drainage course more productively would allow more of the command area to be irrigated.

### ***Increase Investment in Irrigation***

- Providing irrigation to rainfed areas, and improving irrigation and drainage in irrigated areas, could greatly reduce poverty. Farmer incomes and land-use intensity could be increased. Rice producers could also diversify and grow high-value vegetables. This would, however, require significant investment.



that few funds are available to pay managers or to construct, maintain or repair irrigation infrastructure. A sound financial cycle should be developed, which takes into account potential impacts on the poor, local needs and conditions, and constraints faced by central government.

### ***Ensure Research is Action- and Policy-oriented***

- Research should target topics relevant to policymakers' concerns and yield practical answers to their questions. Better cooperation between researchers and policymakers would help them to coordinate their efforts, bring together disparate agencies and institutions, and refine the national research agenda.

### ***Strengthen the Legal and Policy Environment***

- Clear and consistent laws and regulations are needed to deal with water fees and punish individuals stealing water. To implement and enforce these regulations, responsible parties at different levels should be identified and granted the necessary authority. Means should also be found to fund and support such efforts, and users and managers should be educated about the regulations. Strong, flexible and dynamic policies are needed—to suit the conditions prevailing at different times and in different areas.

### ***Involve Farmers More in Irrigation Management***

- There is an urgent need to integrate male and female farmers strongly into the management process (especially the setting of water-delivery schedules). This would make management more transparent, and more responsive and accountable to water users. Pilot studies would be valuable in identifying the most effective way of achieving this.

### ***Develop Financially Self-sufficient Irrigation Institutions***

- Water fees are key to establishing self-financing institutions. Currently, fees are low. But, this means

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Full references for the information presented in this briefing are contained in the above reports.

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