

Irrigation Development for Hunger Eradication and Poverty Reduction in Rural Areas of Vietnam

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INTRODUCTION

Starvation leads to poverty, but poverty does not necessarily mean starvation. However, poverty and starvation are closely related to the socioeconomic and educational development. In recent times, Vietnam has seen dramatic progress regarding economic growth and poverty alleviation. Since 1988, the GDP of the economy increased by 8–10 percent annually, specifically the range of annual increases was 12–14 percent for industry and 4–5 percent for agriculture. The number of households experiencing conditions of starvation and poverty has declined sharply, even though Vietnam's population is growing by 2 percent annually.

Vietnam is one of the world's poorest countries with an average annual per capita income of approximately US\$300. Half of Vietnam's population is classified as poor. According to the 1997–1998 Vietnam Living Standard Survey carried out by the General Statistics Office and the World Bank the average income per capita in Vietnam is 3,465,000 Vietnamese Dong (VND) (9,057,000 VND in urban areas, and 2,544,000 VND in rural areas). Considering that 80 percent of the population lives in rural areas, and more than two-thirds of this figure depend on forestry for their livelihoods (48.03–51.57 percent of their income), the income gap between urban and rural areas is quite large. Moreover, there is also a significant difference in income according to age, sex, race, and property.

Poverty and starvation persist as serious problems in the rural areas. The severity tends to increase because of the geographical distance, diseases, natural disasters, and ethnic minority. Hunger eradication and poverty elimination can only be achieved through agricultural development.

Agriculture in Vietnam is primarily concerned with rice production. In the short term, the aim is to stabilize the production of rice through the benefits of a market system economy. Because of the increase in the price of rice, the purchasing power of the rural areas goes up which causes the price of industrial products to increase. From 1995 to 1997, the price of rice increased by 0.6 percent, but the price of industrial goods increased by 8.5 percent and service costs increased by 17.7 percent.

Therefore, it can be seen that agriculture has a positive influence on the development of other sectors, or as a well-known Vietnamese saying goes, "if agriculture fails, so does the rest." It is this positive impact of job creation and increased consumption that helps to ease the problem of poverty and starvation in the rural areas.

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Stabilizing the issue of food is a basic condition for eliminating starvation and reducing poverty. The systematic basis for easing poverty in the countryside is that rural areas move from self-sufficiency in production to production for the market.

IMPACTS OF NATURAL DISASTERS ON AGRICULTURE

Disasters such as floods, storms, pests, and droughts, increase the vulnerability of rural agriculture to potential negative impacts that can cause starvation and poverty.

Storms and floods

In the period of 1971–1990, floods and storms did damage worth 4,289.8 billion VND in many of the areas. The damage to animals and plants accounted for 70.8 percent, while 4.5–6.5 million tons of rice harvests were lost.

Each year from 1988 to 1990, Vietnam experienced large floods and storms. In 1988, flooding left 118,000 people dead and 56,100 ha of cultivated land submerged. Other losses included 169,500 tons of rice, 7,748 million m² of houses, schools, and hospitals, with a total of US\$35.06 million worth of damage. Total rice losses for the three years measured 1,078 million tons of rice, which was 359,000 tons each year on average.

From 1991 to 1994, annual floods on average left 300 people dead, 157 injured, 379,000 ha of rice and upland crops destroyed, 17,000 livestock and 172,000 poultry destroyed, and 379,000 houses ruined. In 1994 alone, seven provinces in the Cuu Long (Mekong) River Delta suffered property losses totaling 2,284 billion VND (1,295 billion VND for agriculture). The heavy floods persisted for a long time causing many difficulties for farmers. The ultimate outcome was that 81,227 poor households were left in need of food assistance.

According to statistics from the Disaster Prevention, Fighting, and Mitigation Center in the Central Flood Prevention and Irrigation Committee, in 22 years from 1977 to 1999, natural disasters caused 13,000 deaths, an average of 590 deaths each year. The level of socioeconomic losses caused by natural disasters is highly correlated with economic development.

According to official statistics damage from natural disasters included:

In 1997: 788 people dead, 1,142 injured, 2,541 missing.

7,200 billion VND worth of property damage.

In 1998: Total damage: 1,800 billion VND.

In 1999: Total damage: 4,000 billion VND.

The total damage to property caused by storms and floods in recent years was estimated at 2–3 percent of the GDP, putting the stability of rural areas at stake.

Pests

Pests ruin plants with diseases like yellow plant and stem borer. Pest proliferation depends on farming practices used, such as watering and irrigation techniques. From 1988 to 1993, 2,100–3,800 ha of cropped areas are affected each year with estimated losses equaling 163,000 tons of rice. In 1991, the heaviest losses were experienced with 46,330 ha affected and 487,000 tons of rice lost.

Droughts

Droughts are a frequent occurrence in different areas because of exhausted sources of water. This is a result of many factors, however, one reason is that hydraulic structures fell short of the irrigation design capacity.

As reflected in the official statistics, 16 mountainous and northern mid-land provinces now have a total natural area of 10.3 million ha and a population of 10 million people. Because of *El Niño* influenced conditions, rainfall in Vietnam was reduced by 20–40 percent. The vegetation was highly damaged resulting in greater than normal flows in the flood season and smaller flow volumes in the dry season. This resulted in a serious decrease in the capacity to use hydraulic structures to their full design capacity.

There were 11 winter-spring crops struck by droughts from 1980 to 1990. A typical example is the 1997–1998 cropping season when 56,000 ha were affected by drought and production on 1,500 ha was lost completely. The total affected area accounted for about 20 percent of the total area under cultivation and 53,000 people were affected by this water shortage. The cost for drought mitigation measures increased by 38 billion VND (not counting other damages such as crop productivity and complete crop loss).

Effects of droughts in other areas include:

- Hong river delta: 114,000 ha experienced drought out of 513,100 ha. In this case, the cost for electricity used for water pumping rose up to 2.9 billion VND in 1997–1998 for the winter-spring crop.
- Six North Central provinces: in 1998, 62 ha (or 46% of the area under cultivation) of the summer-autumn crop was ruined, 33,000 ha industrial plants' and fruit bearing trees' productivity was reduced. 2.1 million people were in shortage of water for domestic use.
- Four provinces in Western Plateau (Tay Nguyen) with a population of 2.9 million and agriculture as the main source of income (especially, using forest products for long-term industrial trees development) suffered from drought. In the 1997–1998 winter-spring crop, almost 11,000 ha of rice (29%) was hit by drought,

74,000 ha of coffee was affected in which 14,000 ha were completely unusable. Additionally, 777,000 people (26.5%) lacked water for domestic use. Early in 1988, drought was directly responsible for 300 ha of forest fires in Dak Lak.

In summary, the risks involved in droughts have a definite negative impact on agriculture, directly leading to increased starvation and poverty. Those frequently bearing such risks are the farmers, and drought is the major threat to the rural starvation and poverty.

WATER RESOURCES IN THE DEVELOPMENT OF RURAL AREAS

The role of water in irrigated agriculture

As has been affirmed by Vietnamese farmers, “first is water, second manure, third industriousness, fourth variety.” Many research papers suggest that together with many other factors (especially high-yield varieties) water contributes 16–35 percent to rice productivity. According to research on maize in Vietnam, good irrigation and care contribute 18 percent to a variety’s productivity. A survey showed the irrigated and nonirrigated productivity of some land-based plants with great economic value.

Table 1.

Trees varieties	Nonirrigated (ton/ha)	Irrigated (ton/ha)	
		Normal	Good
Coffee	0.3	30	50-70
Tea	0.8	15	26
Sugar cane	30-50	80	120
Cashew	2	3	120
Litchi	1-1.5	2	3

The role of water resource projects in hunger eradication and poverty elimination

The Government, in collaboration with the local people, has invested in a wide variety of water resources projects. According to a survey, there are now 8,265 projects of different kinds, including: 743 reservoirs of medium and large size, 1,017 dams, 4,712 irrigation and drainage sluices, almost 2,000 pumping stations of medium and large scales. The total value of the investments, measured by the current prices, was estimated at over 100,000 billion VND (exclusive of 5,700 km of river dikes, 2,000 km of sea dikes, together with sewage system and thousands of kilometres of embankments for fighting floods in Cuu Long

(Mekong) River Delta. There are many reasons behind the decision to invest in these projects. These reasons are briefly discussed below.

Providing water for domestic use

Approximately 36 percent of local inhabitants were supplied with fresh and clean water in 1999, excluding 10 million people in the countryside using water from hydraulic structures for everyday living.

Table 2. Providing water for industries.

Year	Industrial water use	Percentage of total
1980	1.5 billion m ³	4%
1990	5.33 billion m ³	9.8%
2000	16 billion m ³	20.2%

Table 3. Providing water for irrigation.

Year	Irrigation water use	Percentage of total water consumed	Hectares irrigated
1980	40.65 billion m ³	89.8%	4 million ha
1990	51 billion m ³	91%	5 million ha
2000	60 billion m ³		6 million ha

There are numerous hydraulic structures serving irrigation and drainage functions, which is helping to increase crop diversification, as well as improve the quality and yield of crops. Statistics from many areas indicate that after irrigation infrastructure was introduced, rice productivity increased by 16–35 percent (particularly in Bac Duong where productivity increased by 33% and output by 44%). Many areas in the Cuu Long River Delta have recorded an increase in yields from 4.5 tons/ha in 1975 to 9.5 tons/ha in 1990 and then to 10–12 tons/ha in 1999. Because of the irrigation and drainage projects, cropping intensity increased from 1.3 to 2 to 2.2. In some areas the figure is 2.4, the 2.7 fold increase which helped boost rice production to 16 million tons in 1986 and 34 million tons in 1999 from 9.5 tons/ha in 1930.

The increase in rice yields and cropping intensity has raised the average per capita food level from 328 kg/person (1930) to 371.8 kg/person (1995), 400 kg/person (1997), and 400–500 kg/person (2000). This occurred even though the population has increased from 20 to 77 million people from 1930 to 2000, which has in turn caused the land area per capita to decrease from 2,548 m² in 1930 to 730m² in 1997. However, chronic starvation does not occur as before because of the stabilization of rice output.

Benefits for irrigation and water resource projects include mitigating the negative effects of water, reducing the risks from natural calamities, improving the eco-environmental quality, and the sustainable development of rural areas in the lowlands. These are briefly discussed below.

- Easing the negative effects of floods on rural areas through a system of small, medium, and large reservoirs.
- Building a drainage system to prevent inundation of cropping areas because of rains and storms. Creating a clean environment free from chronic diseases.
- Irrigating and draining water for good and timely harvesting. Increasing the planting area, productivity, the number of crops per year, and output, while at the same time fighting diseases caused by pests.
- Forming transportation systems, liberating people from too much labor, and meeting the requirements of agricultural production in rural areas.

Benefits also include the creation of jobs for farmers and helping to increase farmer incomes through an increase in the number of crops possible per year. Additional benefits are derived from a diversification of plants and animals with higher economic values (such as aquaculture or industrial plants). Because of greater water availability, many regions have now yielded four crops, worth of 60–80 million VND, whereas, normally two crops of rice can only yield 10 million VND.

Raising farm workers' income through agricultural production is an extremely effective solution to the issue of starvation and poverty. The increase in the purchasing power of farmers of rural areas then aids the development of other sectors. Typically, in places where the water resources are developed, the standard of life of the local people is also upgraded, social security is assured, and starvation and poverty are reduced.

THE EXISTING STATUS OF IRRIGATION AND DRAINAGE SYSTEMS

The efficiency of hydraulic structures is currently not in line with the amount of the investment. On average, hydraulic works are used at only 50–60 percent of designed potential. Many small works utilize only 25–30 percent of the designed potential. In some places, the hydraulic works have been destroyed. There are many causes for these conditions, which are discussed below.

Investment

The investment in the hydraulic works is not comprehensive, continuous, and coordinated. Now investments are primarily concentrated on head works and the main channels (the State's

responsibility) but lacking in branches at different levels (local people's responsibility). Therefore, the full potential of irrigation and drainage is not yet secured.

Management

Management organizations have been established, but not properly, especially those at the local level (at town, and inter-town level). For example, the channel network at the local level has not had a genuine manager and, in fact, some places along the channels not ever been completed. The problems of illegal digging of channels, disputes over water, and excessive use of water are still prevailing. Other sectors and levels have paid little attention to investing in construction, management, and proper policies, particularly financial policies. In many places, fees for using such hydraulic works cannot be collected, or minimally collected, so funds are unavailable to maintain and repair projects from degradation.

Now, fewer investments are made in building more hydraulic works, but instead more attention is being paid to the management of existing works (e.g., upgrading, overhaul, and repairing). However, the methods of approach have thus far not been appropriate, therefore, effectiveness has not been high. There is still a widely held idea of dependence on others, so that the responsibilities for exploiting and using hydraulic works have not yet been fully realized.

MANAGING WATER RESOURCES TO ALLEVIATE POVERTY IN RURAL AREAS

In order to manage and make use of the source of water to meet the requirements of effective water use while ensuring a sustainable development, several approaches should be adopted. The management and use of water should be made from an integrated, basin-wide approach. Similarly, management of irrigation schemes should be made according to the irrigation system network and not be divided according to political administrative boundaries.

Water use has to be planned in connection with the protection of the water source, in terms of both quality and quantity. This will protect against exhaustion of the water source to recycle the source for domestic use and for the economy.

In the interest of hunger reduction and poverty alleviation, policies must be formulated that comprehensively address the multi-faceted issues of rural development for each specific location. Only when the issues of starvation and poverty are partially solved can agriculture and water resources exploitation be assured. This will help bridge the income gap between rural and urban areas. Some of the multi-faceted issues are discussed below.

Lowering the population growth rate

Population growth is posing a threat to the nation's security both economically and socially. The agricultural areas are where most of the 1.5 million people born yearly live. If the population continues to grow at over 2 percent a year, then poor rural areas will become

even poorer, and the land area will be reduced on a per capita basis. Too much intensive farming will be practised and the environment will get continually degraded eventually causing incomes from agriculture to decline.

Land use rights

The guaranteed right to land use is a valuable asset of each household. This right can be used as collateral for mortgages and capital mobilization for making investments in water resource projects serving agriculture. Therefore, land use rights are for the sustainable development of water resources.

Infrastructure

Investing in the infrastructure in rural areas is not inclusive of developing such areas. Included in that system are traffic lines and electricity that are related to modern approaches to water resources development.

Cropping patterns

The diversification of crops will lead to a change in the requirement for water supplies. In order to boost production efficiency towards the plants of high economic values based on export potential.

Seafood

In consideration of the benefits of agriculture, aquaculture alters the purpose of water resources and can raise the effectiveness of the production process and raise income.

Developing forestry

Forests are a great resource that can be called “a natural reservoir” that serves as a tool to regulate flows that can result in floods or droughts in lowlands. Forests are necessary to develop the full efficiency of water resources projects (e.g., irrigation and water for domestic use). Reducing poverty is one effective solution to protect forests. It has been suggested that for each ha of irrigated rice in rural areas, 5–15 ha of forests are prevented from being destroyed). Policies to develop forestry (Programme 327) also have an influence on the sustainable development of water resources.

Financial policies

To ensure the equality of contributions, those who benefit from agriculture should take the financial responsibility for the construction, management, operation and maintenance of such

projects. The State should adopt a policy that balances different sectors to provide financial aid for constructing, exploiting, operating, and managing water resources projects. This is a complicated problem at the macro level and is a large obstacle to agricultural development.

Rights and responsibilities of the government, organizations, and every citizen

Rights and responsibilities need to be defined and assigned for the exploitation and protection of hydraulic structures in order to develop water resources, agriculture, and rural areas in a sustainable manner. However, the government and organizations are currently just exercising their rights, not their responsibilities. The local people, especially those directly benefiting from such hydraulic structures, are now lacking in rights (of participation) and responsibilities.

EFFECTIVE MANAGEMENT OF HYDRAULIC STRUCTURES

Politburo Resolution 6 (11/10/1998), “*Some of the problems in the agricultural and rural development*,” affirmed that, “first and foremost is the investment in upgrading management jobs in order to raise the efficiency of the existing hydraulic structures.” It further called for, “developing policies to encourage local people to participate in the investment, management, and exploitation of hydraulic structures.”

Some possible policies to achieve these goals include diversifying a sector’s objectives in order to boost exports—socializing the sector of water resources by promoting internal resources and strengthening integration of the whole society in the development of water resources. It is necessary to mobilize contributions of labor and money from those who gain benefits and organizations related to this sector.

Another approach is the strengthening and consolidation of hydraulics groups with the participation of the farmers. Besides the State-owned companies that manage and exploit hydraulic structures, it is essential to divide into levels the cooperative organizations and the community to develop these structures.

The level of investment between the central government and the local administration should be divided between the State and the inhabitants in order to make comprehensive and coordinated investments in projects and find a balance between construction and management.

Encouraging democracy and social equity must be considered along with the benefits from the hydraulic structures. The investment of the government in developing water resources has to go hand in hand with contributions from the beneficiaries.

SOLUTIONS

There are several options available to address the previously discussed problems and issues. Many of these options have been or being considered. Some of these options are briefly listed below by category.

Policies

- Law on water resources
- State laws on the exploitation and protection of hydraulic works
- Specifying management organisations (the State, and the people)
 - State law on administrative punishment
 - Financial responsibilities (fees)

Trainings for upgrading working capacity

- Raising people's awareness, agreement on actions to be taken
- Methods and skills
- On-the-job training and propaganda

Cadres

People play an important role in a country's development. In other words, cadres have to be trained to be able to perform jobs properly. Cadres are those people responsible for guiding local people to carry out policies. The local people will be unable to fully understand the law, unless the cadre understands it.

Finance

Financial policies are necessary to build the infrastructure required for the development of water resources. These policies have been in the direction of decentralizing management (IMT) and encouraging farmer participation (PIM).

Models

- Drawing on experience for practical application
- Promoting persuasiveness on the basis of new models
- Developing the organisation under models

Proper mobilization method

From the bottom up (local people's volunteering)

From the top down (guidelines of the government)

Farmers will be able to manage and exploit the full potential of a project in an effective way once they are enabled with the right to manage them. They must also be trained to use any techniques required for the management. Many organizational models in Vietnam assert that the State cannot control hydraulic structures properly without the participation of the local people.