

Small-Scale Water Resource Development*

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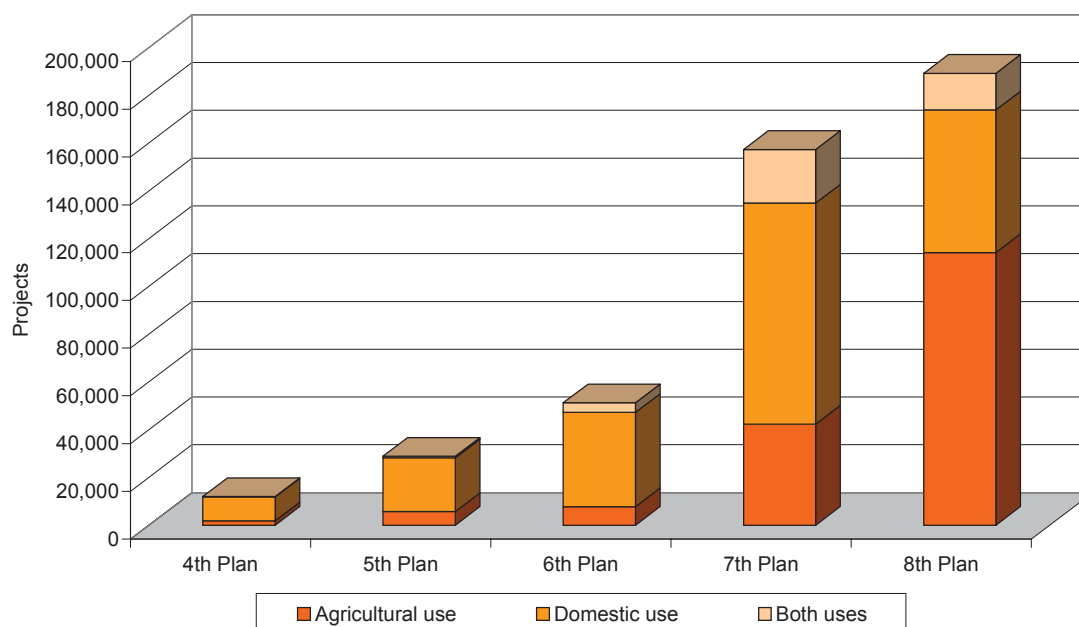
“Water – Two Billion People Are Dying for It!” is the theme of World Environmental Day 2003, or “รักษาน้ำเพื่อสรรพชีวิต ก่อนวิกฤตจะมาถึง”¹ for Thailand.

Water resource development has played an important role in the economic and social development of Thailand. Prior to the 4th Plan (1977-1981), water scarcity in the rural areas was acute. The government responded to the problem by announcing a water resource development policy in 1977. The policy aimed to raise the standard of living of the rural Thai population via small-scale water resource development. Since the implementation of 6th - 8th Plans, in the last 15 years, a total of around 200,000 million Baht has been allocated to small-scale water resource development projects. The public investment in small-scale water resource projects peaked during the 6th – 7th Plans, as the emphasis then was to increase water sources for domestic utilization (Figure 1). Later during the 8th Plan, the focus

shifted to small-scale water resource development for agriculture.

Of the 439,411 small-scale water resource development projects² constructed during 1977-2001 as much as half are located in the northeastern region of Thailand, followed by the northern region, the southern region, the eastern region, the western region and the central region (Figure 2A). The distribution of water was assigned as per the following breakup: domestic (52%), agricultural (38%) and combined usage (10%) (Figure 2B). It is seen that despite the sizable investment in infrastructure, the plan has achieved limited success. For the domestic purpose, there are about 20 percent of the rural villages inaccessible to safe water (กระทรวงมหาดไทย 2545), while improper management led to inefficiency in water utilization has been discovered in the small-scale water resource projects for agriculture.

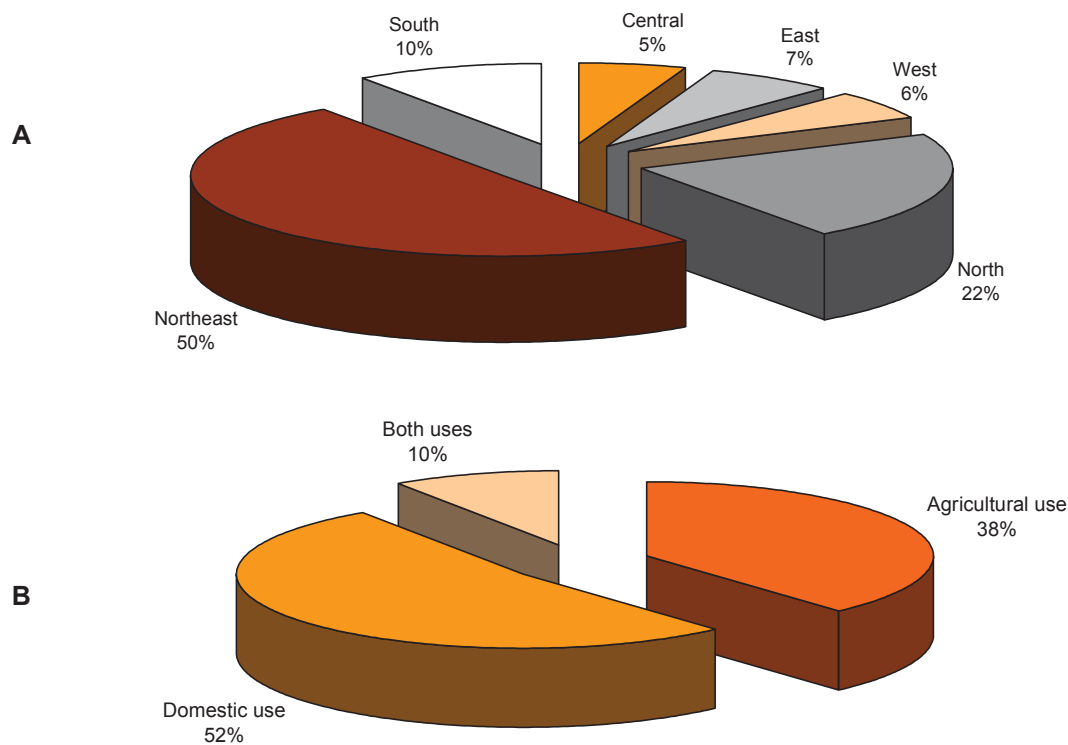
Figure 1 Small-Scale Water Resource Development Projects during 4th Plan to 8th Plan



Source: TDRI (2545).

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Figure 2 Small-Scale Water Resource Development Projects Classified by Regions and Uses, 2001

Source: TDRI (2545).

This article has four parts. Part one describes the government agencies responsible for the small-scale water resource development before and after reorganization of the Thai government (in October 2002), including the decentralization. Part two analyzes impacts of the small-scale water resource development on improving the standard of living of the rural Thais. Part three presents investment challenges for the small-scale water resource development. The last section is recommendation.

GOVERNMENT AGENCIES

Administratively, small-scale water resource development was scattered among seven ministries (Table 1) before the reorganization of the Thai government. Some of these government agencies were responsible for different types of small-scale water resource projects while these different types of projects have different objectives. However it was found that even for the same type of projects, many government agencies were involved. This administrative apparatus introduced complexity in project management and hence lack of unity. Overlapping responsibilities among government agencies and lack of coordination among them are factors that have contributed to limited success in small-scale water resource development. These problems then question the effectiveness of small-scale water resource development in Thailand and their impact on improving the standard of living of the rural Thais.

Under the new structure, the scattered government agencies responsible for small-scale water development projects now no longer exist. They have been relocated with the Department of Water Resources and the Department of Groundwater Resources, the Ministry of Natural Resources and Environment. More importantly, these new government agencies from March 2003 will: (a) handle technical and management advisories, (b) revise legislation such as the Announcement of the Prime Minister Office on National Water Resource Management, and (c) support and encourage local government through the Watershed Committee.

In June 2003, the Ministry of Natural Resources and Environment has set its target for solving all rural villages inaccessible to safe water by providing water pipe system for every rural village in Thailand within three to five years. The integrated plan to alleviate the water shortage problem in the rural villages was approved by the cabinet in June 2003. The Department of Groundwater Resources, the Ministry of Natural Resources and Environment was assigned as a responsible agency in cooperation with other relevant agencies. Sixty-two percent of 29,920 villages are identified as the target villages after the rapidly survey done during May 2003. These villages are classified into three groups regarding their potential for water resource development namely (a) villages with potential for groundwater development (9,952 villages); (b) villages with potential for surface water development (1,728 villages); and (c) villages with insufficient water source (6,831 villages).

Table 1 Government Agencies Responsible for Small-Scale Water Resource Development before Reorganization of the Thai Government

| Government agencies | Starting year | Responsibility | | |
|--|---------------|----------------|---------------------|----------------|
| | | Provision | Water use promotion | Setting policy |
| Ministry of Agriculture and Cooperatives | | | | |
| - Royal Irrigation Department | 1977 | X | X | X |
| - Department of Fisheries | 1982 | X | X | |
| - Royal Forest Department | 1975 | X | | X |
| - Land Development Department | 1982 | X | X | X |
| - The Cooperative Promotion Department | 1967 | X | X | |
| - Agricultural Land Reform Office | 1978 | X | X | X |
| Ministry of Defense | | | | |
| - Supreme Command Headquarters | 1974 | X | X | X |
| Ministry of Interior | | | | |
| - Department of Local Administration | 1977 | X | X | X |
| - Department of Accelerated Rural Development | 1977 | X | X | X |
| - Public Works Department | 1977 | X | X | X |
| Ministry of Labour and Social Welfare | | | | |
| - Department of Public Welfare | 1994 | X | X | |
| Ministry of Science, Technology and Environment | | | | |
| - Department of Energy Development and Promotion | 1965 | X | X | X |
| Ministry of Public Health | | | | |
| - Department of Health | 1964 | X | X | X |
| Ministry of Industry | | | | |
| - Department of Mineral Resources | 1959 | X | X | X |

Source: Adapted from TDRI (2545).

The decentralization and reorganization of the government agencies, as per the 1997 Constitution, that are being carried out may help improve the small-scale water resource development, utilization and management. Small-scale water resource management projects come under the jurisdiction of the local government. Therefore, there are many challenges that relate to decentralization. These include:

- Under the new decentralization plan local government staff will have 31 responsibilities. This will put additional burden on the staff as local governments have limited personnel;
- Technical skills of local government staff relating to small-scale water resource management are limited;
- Because many small-scale water resource projects are inoperative, many local governments are reluctant to undertake these central government projects; and
- There is lack of awareness among local governments regarding environmental and social impact, as government bodies do not network. For instance, the problems relating to pervasive groundwater extraction on the environment was not highlighted, which resulted in saltwater intrusion and contamination of drinking water.

IMPACTS OF SMALL-SCALE WATER RESOURCE DEVELOPMENT

Ultimate aim of the small-scale water resource development program is to improve the standard of liv-

ing of the rural Thais. Therefore, there is a substantial need to analyze the impacts of the small-scale water resource development according to its objectives, on quality of life, and on meeting household needs.

Impact on Objectives

Three main objectives of the small-scale water resource development projects are domestic use, agricultural use and combined usage. That 76 percent of the rural villages in 2001 have gained access to pipe water system³ (กระทรวงมหาดไทย 2545) reveals the impact of small-scale water resource development for domestic projects. Twenty percent of the rural villages do have difficulty in accessing safe water. This is because as much as half of these villages are located in the north-eastern region. These specific rural villages are classified into two groups regarding the level of problem namely (a) villages with severity water shortage (7,938 villages), and (b) villages with moderate water shortage (24,334 villages).

The impact on health due to small-scale water resource development projects during 1988-1996⁴ shows that the illnesses and deaths resulted from water-borne disease have decreased but incidences of diarrhea, dysentery for children and gallstone bladder for adults are still high.

The objective of small-scale water resource development for agriculture is not explicitly specified but is generally described as efficiency in water utilization. Most of the problems found in small-scale water resource development for agriculture are overlapping of projects, project mismanagement, lack of people participation during project formulation stages, and lack of adequate water for dry season cultivation.

Impact on Quality of Life

The evaluation of the impact of small-scale water resource development on quality of life is carried out via examination of the causal relationship between various development inputs and the final outcome that is measured by Human Development Index (HDI). HDI comprises of three factors: education attainment, health status and income level. Based on the NRDC Village Census Data 1996, the adjusted HDI at district level is calculated, with some adjustment according to the data available. The number of the healthy population is used for calculating the health index for this analysis due to unavailability of the longevity from the NRDC Rural Village Census Data.

In the experiment, the development inputs are irrigation water, electricity, population density and water resources. It is found that irrigation water, electricity and population density have positive impact on quality of life as measured by the adjusted HDI. As for water resources, it is found that villages that have safe drinking water all year round tend to have a better quality of life. It is also found that public investments in small-scale water resource development projects eventually lead to safe drinking water all year round and hence improved quality of life. These projects are pipe water system, surface water development, private deep wells and private shallow wells. Public deep well and public ponds do not have an impact on increasing the availability of safe drinking water all year round.

Impact on Meeting Household Needs

One of the aims of the small-scale water resource development is that households in the rural areas gain access to safe water for domestic uses and also adequate water for subsistence agriculture. Government agencies responsible for small-scale water resource development must then operate in such a manner so as to meet the basic needs of water for domestic use and subsistence agriculture for rural households. Domestic water scarcity index is calculated based on the NRDC Village Census Data 1996. A "1" score is given to the villages which have less water scarcity problem. A "3" score is given to the villages which have moderate water scarcity problem and "5" score for the villages have severe water scarcity problem. The index range between one (less problem) to five (severe problem). The data on investments on small-scale water resource development project is calculated in terms of the number of the projects per 100,000 population for the year 1996, 1998, 1999 and 2001.

Based on the NRDC Village Census Data 1996 and the data on investments on small-scale water resource development project in 1996, 1998, 1999 and 2001 at the district level, there exists no relationship between water scarcity index and investments in small-scale water resource projects (Figure 3). The correlation

coefficient (R value) ranges from -0.027 to $+0.130$. This shows that investment in small-scale water development projects for domestic uses was scattered through all the villages in Thailand and was not specifically targeted to meet urgent needs of the villages. On the other hand certain villages, although had no urgent need, were allocated many small-scale water development projects. This pattern of investment has led to unfair and inequitable distribution of public funds. It is necessary to note here that the physical constraint for water resource development was not incorporated in the analysis.

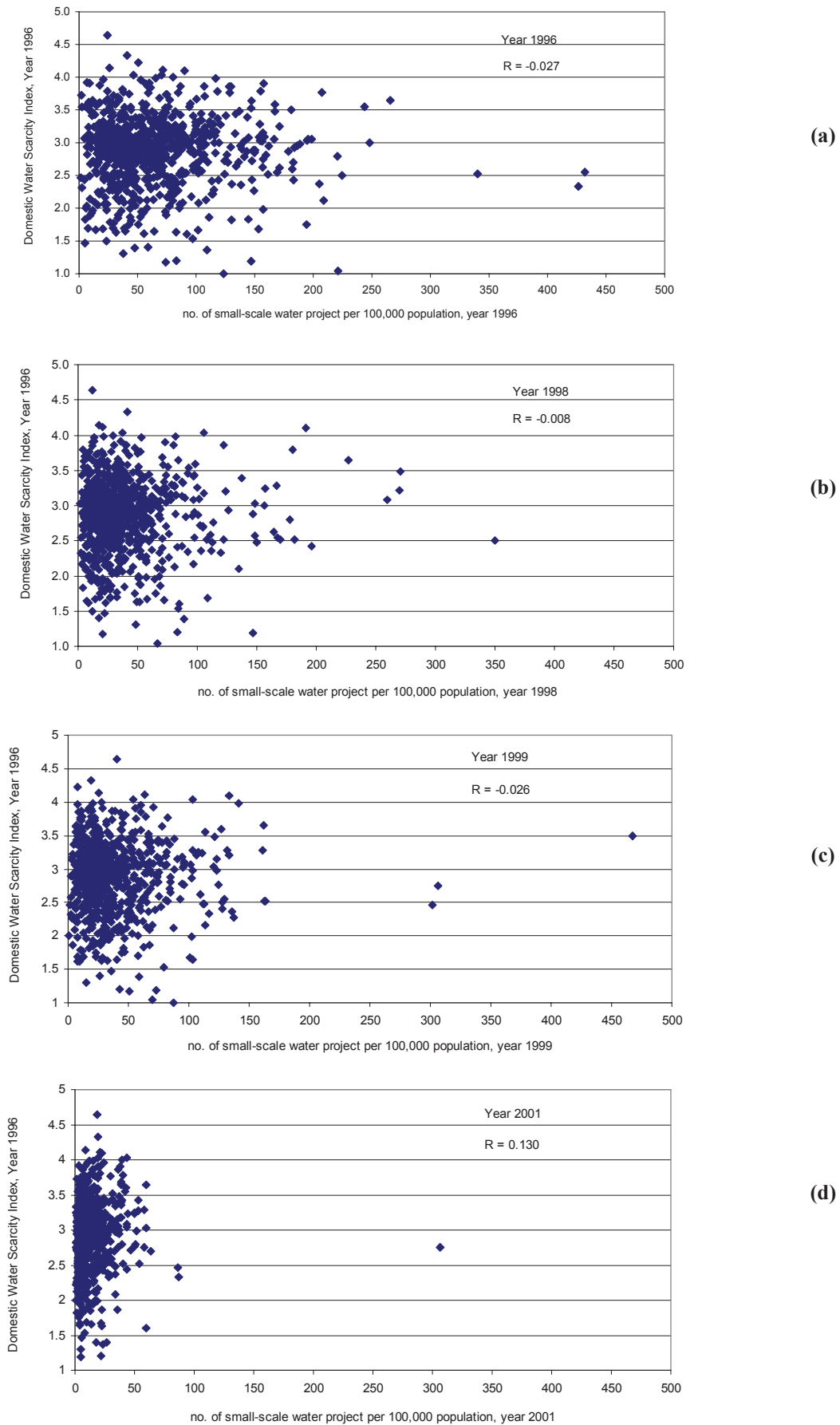
INVESTMENT CHALLENGES FOR SMALL-SCALE WATER RESOURCE DEVELOPMENT

The overall performance of small-scale water resource development in Thailand reflects many problems; these are: overlapping of projects, conflicting criteria used for project approval, or political interference in project approval procedures. These problems arise because government agencies responsible for small-scale water resource development place more emphasis on completion of projects rather than the impact that these projects will have on rural life. It is thus seen that investments are not fairly disbursed, additionally; unclear investment guidelines make the small-scale water resource development projects ineffective, enabling political factors to enter project approval procedures. Thus, public funds are eventually utilized to enhance local politicians' popularity.

Given the problems described above, new investment guidelines for small-scale water resource development projects are needed. Such guidelines can be formulated in many ways. One suggestion is that the net economic returns to the projects be emphasized. The beneficiaries must help pay the investment costs or the government be involved so that these costs may be absorbed. In deciding the type of investment guideline, it will depend largely on the preference or the choice of the general public on this issue.

The current national water policy is adopted as the guiding principle in drawing the investment guidelines for small-scale water resource development project. The current national water policy states, "...the Government shall provide adequate water to meet the basic needs of the people in terms of agriculture and domestic uses. Water allocation for this purpose must be fairly distributed. Water used for commercial purposes must emphasize efficiency, cost recovery and the beneficiaries must pay for the services they receive..." For this reason, the investment guidelines for small-scale water resource development must focus on principle of *fair and equitable distribution*. In addition, environmental impact should also be considered in the investment guidelines.

Figure 3 Scattered Diagram of Domestic Water Scarcity Index 1996 and Small-Scale Water Resource Development Projects per 100,000 Population in 1996 (a), 1998 (b), 1999 (c) and 2001 (d)



Source: TDR*I* (2545).

In complying the upcoming decentralization procedures, the local administration will be more responsible for many investment decisions in their locality. In this regard, the investment decisions of small-scale water resource development will also be transferred from central government agencies to each respective local administration as well. The only responsibility that should remain with the central government agency is the environmental aspects of small-scale water resource development, as a technical advisor. For instance, the investment guideline that the central agency may impose on small-scale water resource development is to assess environmental impact of each development project.

RECOMMENDATION

Despite the sizable investment in small-scale water resource development projects for two decades, 20 percent of the rural villages have difficulty in accessing safe water. The analysis reveals that the impact and success of the small-scale water utilization management is limited, therefore; when re-organizing the decentralization activities of the government, the study proposes the following directions:

- Clean water for domestic consumption should be equally provided to all rural communities.
- Environmental management should be integrated into water resource development and management. This will help mitigate negative impact such as saltwater intrusion and contamination of drinking water.
- Monitoring plans for decentralization procedures have to be established to facilitate transfer of responsibility of small-scale water resource development to the local government.

The recommendation of small-scale water resource utilization and management from the study proposed by the NESDB was approved by the cabinet in March 2003. Consequently, the National Water Resource Management Council is revising the legislation of the small-scale water resource utilization and management 1982. The Department of Water Resources and the Department of Groundwater Resources, the Ministry of Natural Resources and Environment, have been given specific role in water resource development, utilization and management with aim to provide water pipe system to all rural communities within three to five years.

ENDNOTES

- ¹ “Save Water for Life before Crisis!”
- ² This number does not represent the status of the projects whether they are in good condition or not.
- ³ It was calculated from the NRDC (the National Rural Development Committee) Village Census Data that are being collected every two years, by the Department of Community Development, the Ministry of Interior.
- ⁴ Unfortunately, the water-borne disease data have no longer been collected from the NRDC Village Census after 1996.

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