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SUSTAINABLE DEVELOPMENT OF WATER RESOURCES, WATER SUPPLY AND ENVIRONMENTAL SANITATION

**Productive uses of domestic water:
a household-level study from Vietnam***S. Noel and J. Soussan, UK, and N. P. Thao, Vietnam*

The use of domestic water in South-East Asia and its scale, values and importance to livelihoods and poverty reduction has been identified as a key policy issue in the region. In particular, the potential for including productive uses of domestic water in the design and economic assessment of water supply programmes has the potential to increase sustainability and transform the economic rationale of these investments. The research described below explored this issue, conducting fieldwork on the ways in which rural and peri-urban households in Vietnam are using domestic water. The study found that domestic water is being used for a broad range of productive activities, including widespread use in household gardens, animal husbandry and many type of micro enterprises. It also found that it was most often poor households engaging in these activities. The paper concludes by considering the implications of these findings for policy makers

Introduction

The research project described in this paper analysed the patterns of domestic water use in rural and peri-urban areas in Vietnam, with a particular focus on micro enterprises undertaken in and around the household using domestic water supplies. The fieldwork was conducted in July and August 2005, and involved 7 provinces and 19 villages. Sites included in-land delta, mountainous and coastal areas, ranging from the Red River Delta and South Central Coast to the Mekong River Delta region. The overall approach was based on conventional rapid participatory appraisal techniques, and included the use of interviews with key informants and households, focus group discussions, field observations and documentary analysis. Over 100 households across the 7 provinces were visited.

Study approach

Recognising that the income strategies of the poor are complex, the research utilised a livelihoods approach in studying the household uses of water. This approach involves looking at the assets available to people, including water and other natural resource assets; material assets, such as infrastructure, tools, machinery and other inputs into productive activities; access to financial capital and credit; human capabilities (knowledge and skills); and social, institutional and political structures, such as contact networks and the openness of government institutions. These factors define the types of activities that make up the livelihoods of the poor and determine the scope of water's role in livelihood activities. The livelihoods approach also looks at the vulnerability of livelihood activities to disruption from external 'shocks and trends', both environmental, such as floods and ecosystems

degradation, and human, such as sudden market price changes and long-term terms of trade. The extent of such disruptive factors is important in generating household livelihoods strategies that seek to diversify income sources, so that disruption to one, such as farming, has less of an impact than if it was the only livelihood source. The implication of this is that the livelihoods impact of 'secondary' activities can be far greater than at first appears, as they provide an important source of security for rural livelihoods.

These non-farm livelihood activities can also be of great significance in acting as a ladder out of poverty. There is a limit to how much can be grown on a given area of farmland, however efficient the production, and the widespread land poverty of rural Vietnam means that the prospects for a family moving out of poverty are almost entirely contingent upon their success in diversifying their livelihoods through adopting additional, usually home-based, activities in addition to farming.

Findings

The study found that water was a key input into rural livelihoods in Vietnam, with a broad range of water-dependent productive activities taking place at the household level. Major categories, in order from most common to least, were as follows.

Gardens

Most families had a patch of land surrounding the house that was intensively cultivated. The most common items cultivated were vegetables and rice, either for household consumption, for sale in local markets, or a combination of both. The percentage being cultivated for each category

varied, with some crops being produced solely for sale and others grown entirely for household consumption, though in general most households appeared to be selling approximately a third to a half of their produce on the local market. Products for sale tended to be high-value crops, such as table grapes, apples and other types of fruit.

Animal/marine husbandry

A significant portion of households was raising pigs and many raised chicken and ducks as well; a much smaller number of households had cows and water buffaloes. Sheep and goats were also being raised on household land in the South Central Coast, and fish and crab farming was taking place in delta and coastal areas.

Food products

The most common food and drink items produced in and around the household were rice-based: wine, noodles, and rice paper. Other businesses included producing tofu cake and juice, cassava wine, and ice cream. Micro enterprises selling ice and water were also found in several locations.

Services

A number of household businesses consisted of different kinds of eateries: restaurants, snack shops, bars, tea/coffee shops and drink stands. Another very common type of service-based business was motorbike washing shops. Numerous hairdressing salons were also found, particularly in peri-urban areas.

The Importance of Water in Income Generating Activities (IGAs)

Water had a significant role in productive activity in and around the home, both in production for household consumption and for income generation. The majority of households surveyed had a vegetable garden and/or were raising some type of livestock, usually pigs. Some of this food production was clearly for household consumption, thus increasing households' food security, but some household crops were being cultivated exclusively for sale in the village market. Most families with more than two pigs were also selling pork.

Water was also crucial to other home-based IGAs, particularly for those undertaken by female members of the household. The most common household IGA observed was the production of food products, and these enterprises were generally run primarily – and often entirely – by the women of the extended household. In many cases, the male head of household and older sons worked outside the household area, either farming or as wage labourers; working on their own, the women were able to produce food items for sale while having sufficient time to raise children and take care of the household domestic needs. This pattern held true in both rural and peri-urban areas and means that these activities are of great significance in gender as well as livelihoods terms. Service-based businesses also offered specific benefits to

female household members. A motorbike washing business in a peri-urban area of Thai Binh illustrated the advantages of this type of micro enterprise, both in terms of how it meshed with child-rearing and other household demands and with respect to the low level of investment and skills required. The female owner of the business washed five motorbikes in a typical day, noting it was something she did in her spare time; for start-up, all she had needed was a pump, soap and an air pressure hose (for drying the bikes).

While many of these IGAs were not seen as sources of prosperity for rural households (in contrast, for example, to farming shrimp and fish or having equipment and machinery to run larger businesses), people did believe the additional income was essential to household security. There were also instances in which IGAs had been used to generate sufficient investment capital for households to move into more lucrative businesses. One family in Thai Binh, for example, had used profits from raising pork and producing rice wine to save enough money to join with two other families in buying a car for a taxi service. This family's experience also illustrates a very common link between small-scale food production IGAs, raising pork, and family prosperity (see box below).

Water Scarce vs. Water Secure: a Comparison of Villages

The study of a village in Quang Nam province with limited water supply infrastructure illustrated the wider impacts of an inadequate water source, especially on quality of life

Box 1. Raising pork in rural Vietnam

Raising pigs was widely considered the most profitable home-based enterprise in rural Vietnam; households with six or more pigs were typically relatively prosperous, often having a number of expensive consumer goods, such as televisions, DVD players and motorbikes. Those families not raising pigs generally cited two reasons they were unable to do so: lack of sufficient land in their household and no source of water to bathe the pigs. In many households, a small number of pigs (usually 1-3) were being raised; the pigs were fed the family's leftover food and occasionally garden products cultivated specifically for them. The pigs were also important to rural households as sources of fertiliser: the pig pens were generally co-located with the family latrine and the combined excreta was used in household gardens and the family's rice fields.

Further, in terms of evaluating the profitability of food production IGAs, it emerged that often the major benefit of these activities was that they generated large amounts of by-products that could be used to raise pork. One family involved in producing rice wine reported it was able to produce 300-400 kilograms of pork a year from the business' waste; the women running another microenterprise in tofu products estimated they were earning more income from pork raised on the tofu by-products than on the tofu business itself. Other households engaged in food production IGAs also drew similar conclusions, stating that the production of items such as rice noodles or rice paper was undertaken more as a food and water source for their pigs than for the income produced from selling the item itself.

and on livelihood options. In contrast, a group of villages in Ninh Thuan, which also faced water shortages but had seen substantial household-level investment in water supply technology, demonstrated the productive benefits of sufficient quantities of water and the range of livelihoods possible under such conditions.

Quang Nam Province

A village located in the Tam Hai district suffered particularly severe water problems, proving a great disadvantage both in terms of quality of life and for local livelihood development. Due to sandy soil and salt intrusion, well water was of poor quality, forcing community members to purchase water for drinking and cooking purposes. As this village could be accessed only by boat, the price of water was quite expensive (VND11,000/US\$0.69 for 20 litres), and residents described using the purchased water very conservatively. In addition to the issue of poor water quality, the village also had major problems with water shortages: during the winter, only ten wells in the village could offer water, and during the dry season, all 65 households in the community relied on one hand dug well. As a result, the women of the village spend a great deal of time waiting at the water point, sometimes spending up to eight hours on water collection.

The most obvious impact on households was loss of labour spent collecting water, with residents pointing out that female household members could otherwise be working as wage labourers in nearby fish and shrimp farms. However, during a focus group discussion, women also mentioned a range of home-based income-generating opportunities not open to them due to lack of water, such as making rice wine, tofu, noodle, and ice cream. This desperate water situation not surprisingly resulted in serious health care and child development issues in the community, which further limited the livelihood options of the villagers. The village chairman believed the lack of water was one of the most important constraints to his community's economic development, and also emphasised the link between health problems and limited livelihood opportunities.

Ninh Thuan Province

A contrast to the plight of the village in Quang Nam was the experience of communities in the Ninh Hai district of Ninh Thuan province. This district is also located on the coast and had soil and climate conditions similar to the Quang Nam village, but in these villages water had been made widely available through local initiatives in technology development (primarily the use of very large hand dug wells, usually 6m in diameter, utilising plastic piping for water distribution). As a result, a broad range of productive activities was being undertaken, and residents benefited from highly diversified livelihoods integrating aquatic and agricultural production and related service industries. Remarkably, the district was in the dry zone of Ninh Thuan and had not had any rain for about two years.

In three communes in this district (Nhon Hai, Vinh Hai and

Cong Hai), observations and interviews with local people indicated that income in these communities came from two main sources: a fishing and seafood processing industry and from household-level crop and husbandry activity. Despite the lack of water, local crop cultivation was quite diverse, including chilli pepper, tomato, table grape, red onion, apple, elephant grass and a variety of fruit trees. Animal husbandry at the household level was also highly developed, with sheep, goat and cattle in herds of 15-20 being raised by individual households. Other water-based businesses observed in these communities included brick making, a number of eateries and drink stands, and some small service-based businesses, including motorbike washing and hairdressing.

The economic value of water in these areas was evident from the level of investment in household water supply facilities. Almost every household either had its own large well (6m in diameter and 6m deep) with electric pump and piping, for which they had paid VND8 million (US\$502), or shared one of the wells with 2-3 other households. In most cases, these wells were used primarily for IGAs; water for drinking and other domestic purposes was drawn from shared wells known to be of good quality or purchased. Though not all wells had water year-round, trading in water was well developed: women with buckets, children on cattle-drawn carts with plastic water storage tanks, and men in large tanker trucks were all observed buying water from wells with consistent supplies.

Other constraints to micro enterprises

Group activities at the field sites showed that most rural and peri-urban residents believed that water was 'essential' but not the only factor that led them to undertake different productive activities. It must be noted of the comparison made above, for example, that in addition to water problems, the Quang Nam village also had a distinct disadvantage in terms of access: it was a geographically isolated village that could be reached only by boat. This underscores the need to examine other factors limiting IGA possibilities and to understand how they affect the interaction between water and livelihood patterns.

Community members identified the following constraints:

- Access to capital and credit for investment: the poor reported difficulty securing loans for microenterprise start-up costs;
- Skills, technical knowledge, and education: this was most frequently mentioned as a barrier to food production IGAs and aquaculture;
- Availability of labour: primarily an issue for female-headed households and elderly couples with no children at home;
- Local infrastructure, including electricity and roads: lack of electricity severely limited IGA options, making most of the food production IGAs infeasible;
- Market access and demand for products; and
- Weather conditions: weather variability led to increased vulnerability, with persistent drought a problem along

the coastal areas and flooding an issue in the Mekong Delta.

While having an adequate domestic water supply was not always seen as a directly proportional factor in generating income for many rural households, having no water supply clearly represented to them a loss of time (and in many cases, a loss of education for their children) on collecting water, limited funds spent on buying water and medicine for water-borne illnesses, and a lack of opportunity to generate income through different activities. When asked, most women could list a number of IGAs they would undertake if more water were available; activities named usually included extending their cultivation area and producing many different kinds of popular food/drink products for sale.

Sustainability and policy implications

The findings of this research demonstrate the need for policy makers to take into consideration the full range of uses of household water in implementing new water supply schemes. Domestic water provision premised on norms for household consumption only (drinking, cooking, and bathing) may not be able to meet the demands of home-based productive activities as detailed above. Residential water supply systems in rural and peri-urban areas must be designed to ensure sufficient quantities of water are available and that supplies are reliable so that productive activities can work with a level of certainty. Failure to plan for these productive uses can adversely impact sustainability of systems, as has been documented (Butterworth and Smout, 2005). Allocation and cost recovery mechanisms also need to reflect the varying needs of different families.

Although much attention has been given to the importance of domestic water improvements in helping to meet health goals, domestic water through its use in home-based micro enterprises also has a critical and less widely recognised role to play in meeting income, food security and other poverty reduction targets. In economic terms, such activities can constitute a significant part of the rural economy, and one that is too often ignored in data collection and rural income assessments. The full poverty reduction significance of these activities is even greater, as they provide the livelihood diversification opportunities that can be the basis for families moving out of poverty and they also bring a high level of livelihoods security for families who are otherwise threatened by the impacts of factors beyond their control (such as floods, droughts or market price collapses) on their dominant livelihoods. In food security terms, the cultivation of vegetables, tree crops and livestock is the means through which a healthier, more balanced diet is achieved as well as the basis for ensuring minimum quantities of food are available even in pre-harvest 'hungry' seasons or when field crops fail.

In poverty reduction terms, an additional advantage to supporting these home-based activities is that they are self-selecting to the poor, as they are the ones who are most reliant on these activities and consequently most affected

when water shortages influences their viability. Thus, national planners need to recognise and make use of the pro-poor nature of domestic water supply improvements in their development strategies.

Recent studies have attempted to quantify the value of investing in water supply improvements. A WHO study (Hutton and Haller, 2004) undertook a global cost-benefit analysis on the benefits of time savings and health improvements for water and sanitation interventions and found returns on investments ranging from 3 to 60 in the major regions of the developing world. On the opposite end of the scale, a WaterAid study (Redhouse, Roberts and Tukai, 2004) performed a household-level cost-benefit analysis of three projects in India, examining the benefits of time savings and calorie energy savings, and found returns ranging from 3 to 52. When the benefits of productive uses of domestic water are included in analyses such as these, a more complete picture of the value of water can be developed, which in turn will enable investments in domestic water supplies to be more accurately evaluated alongside investment in other sectors.

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