



**Poverty and access to water and water
governance institutions in Con Cuong
district, Nghe An Province, Vietnam
– report on the results from a household
questionnaire survey**

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List of available papers

- Mena, Tania Paz, Gómez, Ligia, Hermann, Roberto Rivas y Ravnborg, Helle Munk, Pobreza y acceso al agua e instituciones para la gobernanza del agua en el municipio de Condega, Nicaragua – informe sobre los resultados de una encuesta a hogares, *DIIS Working Paper* 2011:02.
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- Cossio, V.; Bustamante, R.; Skielboe, T. (2010) Conflict and Cooperation in Local Water Governance - inventory of water related events in Tiraque District, Bolivia, *DIIS Working Paper* 2010:11
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- Rivas Hermann, R.; Paz Mena, T.; Gómez, L.I.; Ravnborg, H. (2010) Cooperación y Conflicto en torno a la Gestión Local del Agua en el municipio de Condega, Nicaragua, *DIIS Working Paper* 2010:13
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ABSTRACT

In view of the increasing competition for water, there is a risk that particularly the rural poor will increasingly face difficulties in meeting their water needs for domestic and productive purposes. Based on a questionnaire survey carried out during 2008 in Con Cuong district, Nghe An province, Vietnam, this DIIS Working Paper provides a household poverty profile for the rural population of the district and analyses access to water enjoyed by the poor, less poor and non-poor households and their contact to water governance institutions.

I. INTRODUCTION

Water plays an integral role in daily life and is a natural resource sustaining for livelihoods of human beings. In developing countries like Vietnam, domestic water plays an important role in small-scale production activities that provide enough products for household consumption and generate income by selling abundant products (Noel, Soussan and Nguyen, 2006). Irrigation water can increase crop productivity, improve income and thus make a great contribution in poverty alleviation for poor rural communities (IWMI, 1998).

In any country all over the world, people have rights to access to domestic water (IWMI, 1998). However, the *2006 United Nations Human Development Report* indicated that around 1.1 billion people living in developing countries have insufficient access to water and 2.6 billion people lack sanitation. They are mainly the poor, because two thirds of this number are living on less than 2 dollars per day and one third is living on less than 1 dollar per day. In addition, the poor lack access to piped-water. While 85% of the wealthiest fifth of the population has good access to piped-water, this is the case for only 25% of the poorest fifth of the population (UNDP, 2006). A similar situation is found in mountainous areas of Vietnam. Domestic water deficiency and water pollution, especially during the dry season, are in an alarming situation due to serious effects to water users living in poverty (Lan Huong, 2007).

Ability to access irrigation water and irrigated land for the poor is less favourable than to access domestic water. The task of water agencies to improve accessibility to irrigation water for the poor in developing countries is far from always met (IWMI, 1998). According to Tran Duc Vien (2001), one of the major constraints of poor farmers in the Northern mountainous

regions of Vietnam in the market integration is lack of irrigation water.

Due to insufficient access to domestic and irrigation water, competition for water has been increasing among households, leading to conflicts and cooperation in water usage. When conflicts occur among water users, the poor are primarily at a disadvantage (UNDP, 2006).

Under the project: “Competing for water: Understanding conflict and cooperation in local water governance” with the collaboration of five countries, namely Bolivia, Mali, Nicaragua, Vietnam and Zambia and coordinated by the Danish Institute of International Studies, a household survey was conducted aiming at understanding the relationship between household poverty and access to water for domestic as well as productive purposes. It also explores the correlation between household poverty and cooperation and challenges in water usage among households and strategies to maintain and control access to water, and problems that local farmers face. Further, the survey aims to provide a comprehensive insight in the role of institutions in solving water issues according to the perception of local households. The survey was conducted in Con Cuong, a mountainous district in Nghe An province, which is one of the five research locations for the Competing for Water programme.

2. METHODOLOGY¹

Inspired by the reservations expressed by Sen (1981, 1985) towards understanding and measuring poverty and well-being solely on the basis of income or expenditure data, and

¹ A more detailed description of the methodology is available in Ravnborg *et al.* (1999) and Ravnborg (2010).

Table 2.1. Main characteristics of three villages selected for well-being rankings

	Village		
	Thanh Dao	Ke Trai	Bu
Agroecological conditions (access condition to town, road quality)	7 kms, very good road, a car can reach the village	24 kms, relatively good and rather rough road, a car can reach the village	35 kms, rough road winding around mountains, a car cannot reach the village since there is a small stream running through.
Ethnic composition	Thai	Thai	Dan Lai
Economic condition	Medium	Medium	Poor
Number of households	117	123	130

in line with the increasing recognition among agencies like IFAD (Jazairy *et al.*, 1992), UNDP and the World Bank (e.g. Narayan *et al.*, 2000) of the multidimensionality of poverty and the importance of including poor people's own perceptions in poverty assessments, the poverty profiles developed as part of the Competing for Water programme are based on people's own perceptions of poverty, identified through well-being rankings.² The rankings were conducted in a sample of three communities from each of the five research locations, drawn through a maximum variation sampling strategy with respect to factors which could potentially lead to the existence of different perceptions of well-being.

Con Cuong is home to four main ethnic groups: Kinh, Thai, Dan Lai and Hoa Kieu, of which the Thai ethnic group is the largest. Kinh and Thai people normally reside near main roads and in areas relatively favourable for transportation, whereas Dan Lai and Hoa Kieu people primarily live in remote areas where transportation is quite difficult. In recent years, under the resettlement programme for the Ban Ve hydropower construction, in

Con Cuong district, a few Dan Lai households have resettled in villages with a relatively good transportation condition. In terms of economic conditions, Kinh people usually have the best economic conditions, followed by Thai and Dan Lai people. People living under different agro-ecological conditions and economic conditions may have different perceptions of well-being and poverty. In order to be representative for the whole study site, two Thai communities and one Dan Lai community, named Thanh Dao, Ke Trai and Bu villages, were selected for well-being rankings based on a combination of typical sampling factors related to agroecological conditions, mentioned here as accessibility to town, ethnic composition, and economic conditions (Table 2.1).

The descriptions of different poverty levels resulting from the rankings were 'translated' into indicators. While differences were encountered with respect to the specific characteristics of these indicators across research locations, e.g. what constitutes a good house in Douentza district in Mali is different from what constitutes a good house in Tiraque district in Bolivia, a common set of indicators were encountered across the five research locations. The indicators, which are listed in Table 2.2, cover aspects related to demography, sources of livelihood and living conditions and were made quantifiable through the formulation of a household questionnaire.

² In consultation with local informants 'well-being' was translated using the Vietnamese terms "đời sống" and "cuộc sống".

The questionnaire was administered to five independent samples, one from each of the five research locations, drawn as a two-stage random sample, based on complete lists of households living in the research locations, elaborated as part of the programme. This means that absentee landowners are not included in the survey and thus that survey data cannot provide a full picture of issues such as land distribution. The samples comprise 400 households for each of the research locations. A scoring system was designed according to which a score (33, 67 or 100) was assigned to each household for each indicator depending on the characteristics of the household with respect to the indicator. Table 2.2 lists the indicators and describes the scoring system. For each household, the scores obtained on each of these ten indicators were then combined into a poverty index – calculated as the arithmetic mean of the scores obtained on each of the indicators – on the basis of which three poverty categories were defined, namely the poorest, the less poor and the non-poor households. Table 2.3 describes the resulting household poverty index and the threshold values defining the three poverty categories. Following this procedure, qualitative poverty descriptions are turned into an absolute, but locally informed poverty measure. For a more detailed description of the methodology, please refer to Ravnborg *et al.* (1999).

Table 2.2. Household poverty indicators³ and scoring system

Indicator	Score	Description
IMARITAL	67	Household head is a married (religious, civil or customary wedding) or co-habiting man or woman
	100	Household head is a single, divorced or widowed man or woman
IHOUSING	33	Good roof and good floor (tiled or iron roof, nicalit) and cemented or tiled floor) and house not in need of major repair – in Douentza, Mali, good roof and house not in need of repair!
	67	Either good roof or good floor (but not both) and house not in need of major repair – in Douentza, Mali, good roof quality but house in need of some repair!
	100	Poor roof (thatched, plastic, wood, etc.) and poor floor or house in need of major repair – in Mali, poor roof and house in need of major repair!
IFACILITIES	33	Have electricity and/or piped water at the house
	67	Do not have electricity nor piped water at the house
IEDUCATION	33	Household has children/youngsters who attend secondary education, university and/or other higher education
	67	All children between 6 and 12 years of age attend school
	100	Some children between 6 and 12 years of age do not attend school
IFOOD	33	Household did not experience a period with insufficient food
	67	Household had short period of insufficient food and/or could cope with food insufficiency by reducing the amount of meat or by buying food (from own money)
	100	Household experience extended periods of insufficient food (e.g. > 2 months) during which they reduce the number of meals, borrowed food or money to buy food, asked for food aid or had to send wife and/or children to day-labour to raise money for food
ILAND	33	Having a lot of land ^a or having some land ^b with irrigation on part of the land during part of the year ^c – in Douentza, Mali, owning land ^d and having irrigation part of the year ^e on part of the land
	67	Having some land without irrigation or having a little land with irrigation on part of the land during part of the year – in Douentza, Mali, owning land but without irrigation
	100	Having no or just a little land, ^f all without irrigation

³ A detailed description of the indicators IHOUSING, ILAND, IPRODCAP and ILIVESTOCK available in Ravnborg (2010; Annex III).

IPRODCAP	33	Own a plough and animal traction (pair of oxen, camels or buffaloes) and in Con Cuong, Vietnam, also a cart, or own a tractor or contract labourers for at least three agricultural tasks (land clearing, preparation; sowing/planting/transplanting; weeding; harvesting, livestock herding; maintenance or watching of irrigation canals) – in Tiraque, Bolivia, for at least four agricultural tasks.
	67	Own only either the plough or the traction animals or, in Con Cuong, Vietnam, a cart, or contract labourers but not for more than two of the mentioned tasks – in Tiraque, Bolivia, not for more than three of the mentioned tasks
	100	Don't own traction animals or ploughs – and in Con Cuong, Vietnam, do own a cart, and do not contract labourers or only contract labourers for one task – in Tiraque, Bolivia only for a maximum of two tasks
ILIVESTOCK	33	Having a lot of cattle – in Tiraque, Bolivia, Condega, Nicaragua, and Con Cuong, Vietnam, more than three heads of cattle; in Douentza, Mali, and Namwala, Zambia, more than 10 heads of cattle
	67	Having cattle or other livestock – in Tiraque, Bolivia, Condega, Nicaragua, and Con Cuong, Vietnam, three heads of cattle or less; in Douentza, Mali, and Namwala, Zambia, 10 heads of cattle or less – or having oxen, buffalos; camels or donkeys
	100	Not having any livestock (cows, donkeys, camels; buffaloes or oxen)
INONAG	33	Having a shop, bar, clinic, etc; buying up and transporting agricultural products and natural resources; or somebody in the household being employed as a professional
	67	Somebody in the household engaged in charcoal burning, brick making, tailoring, carpentry, construction etc. or the household receives remittances
	100	Nobody in the household having any of the above non-agricultural sources of income
IDAYLAB	67	Wife does not day labour on other people's land and husband either does not day labour on other people's land or only does so during one month a year or does so more than one month a year but less than once per week less
	100	Wife day labours on other people's land or husband day-labours on other people's land either during more than one month a year more

a In Tiraque, Bolivia, a lot of land is >2 hectares; in Condega, Nicaragua, it corresponds to >8 manzanas (1 manzana = 0.7 hectare); in Con Cuong, Vietnam, it corresponds to >4 hectares; and in Namwala, Zambia, it corresponds to >8 acres or >4 hectares.

b In Tiraque, Bolivia, some land is between 1-2 hectares; in Condega, Nicaragua, it corresponds to between 1 and 8 manzanas (1 manzana = 0.7 hectare); in Con Cuong, Vietnam, it corresponds to between 2-4 hectares; and in Namwala, Zambia, it corresponds to between 4-8 acres or 2-4 hectares.

c In Tiraque, Bolivia, and Con Cuong, Vietnam, irrigation during the dry season; in Condega, Nicaragua, and Namwala, Zambia, irrigation during the dry and/or the rainy season.

d Very few people in Douentza, Mali, have a reliable estimate of the size of their land holding.

e During the dry and/or the rainy season.

f In Tiraque, Bolivia, a little land is <1 hectare; in Condega, Nicaragua, it corresponds to <1 manzana (1 manzana = 0.7 hectare); in Con Cuong, Vietnam, it corresponds <2 hectares; and in Namwala, Zambia, it corresponds to <4 acres or <2 hectares.

Table 2.3 Description of household poverty index and threshold values defining the categories of ‘non-poor’, ‘less poor’ and ‘poorest’ households

Research location	Minimum	Maximum	Median	Average	Threshold values
Tiraque district, Bolivia	43.2	90.1	66.7	65.5	
Douentza district, Mali	43.2	90.1	70.0	68.9	
Condega district, Nicaragua	43.2	93.4	70.1	69.8	non-poor: ≤61.0 less poor: >61.0 and ≤72.0 poorest: >72.0
Con Cuong district, Vietnam	39.8	90.0	63.5	64.8	
Namwala district, Zambia	39.8	93.4	70.1	68.6	

Apart from the questions necessary to quantify the poverty indicators, the questionnaire contained sets of questions aimed to establish the access enjoyed by the household to water for different purposes such as domestic (drinking, washing and bathing) and productive uses (e.g. irrigation, livestock and fishing).⁴

Distribution of households according to poverty categories

Based on the well-being index, the household poverty category is shown in Figure 2.1. Of the 400 households interviewed as part of the questionnaire survey, 36.3% (145) households were categorised as non-poor households, 42.5% (170) households were categorised as less poor households, and the rest (85 households) accounting for 21.3%, belong to the category of poorest households.

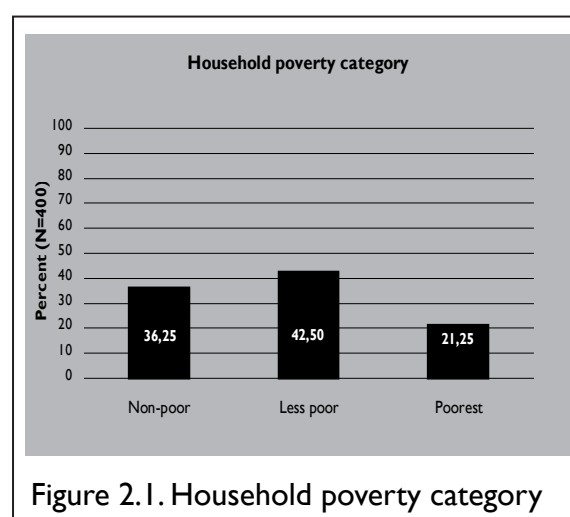


Figure 2.1. Household poverty category

3. DESCRIPTION OF STUDY AREA

3.1. Brief overview of main characteristics of study area

Con Cuong is a mountainous district located in the West of Nghe An province. It shares boundary with four other districts of Nghe An province (Anh Son, Quy Hop, Tan Ky and Tuong Duong) and with one district of Laos (Xieng Khuoang).

According to statistics in 2007, the population of the study area is 68,000 inhabitants with four ethnic groups: Thai, Tho (Dan Lai),

⁴ In Con Cuong, the average duration of the questionnaire-based interviews was 63 minutes.

Kinh and Hoa Kieu, of which the Thai accounts for the highest rate of about 70.0%. Each ethnic group has its living and production methods with different cultures in the district. As mentioned in Section 2, the Kinh and Thai normally reside near main roads and in areas relatively favourable for transportation, whereas the Dan Lai and Hoa Kieu primarily live in remote areas where transportation is quite difficult. In terms of economic conditions, the Kinh usually have the best economic conditions, followed by Thai, Dan Lai, and Hoa Kieu. The Dan Lai in general live in poor economic conditions.

Con Cuong is located in the middle of the Ca river basin and covers 6.5% of the total natural area of the basin. There are 12 communes with 126 villages and one small town. The district is divided into two major areas. On the left bank of Ca River, at the average altitude of 500 m, there are five communes while on the Ca River's right bank, with much steeper slopes and an average altitude of 1,000 m, there are seven communes and a town. The natural district area is 174,400 hectares. Forestland accounts for 69.6% (nearly 121,500 hectares). Fallow land is about 48 thousand hectares, accounting for 27.6%. Agricultural land and residential land occupy only 2.0% and 0.7%, respectively, in complex terrains with steep slopes.

Along the 30 km length of the Ca river, there are many waterfalls, rivers and small streams scattered throughout the area: Khe Moi, Khe Choang, Khe Thoi, Gioang River, Khe Kem waterfall, and Bo waterfall. Water is, therefore, plentiful to develop agriculture and forestry production and support for life activities of communities in Con Cuong district. However, most rivers and streams run lower than the field surface and residential area, so access to

water resources in the community is relatively difficult, especially for poor households.

In recent years, the government of Vietnam and NGOs have implemented many economic development projects in Con Cuong as well as in other mountainous districts all over the country. With the help of such development programmes, the infrastructure and socio-economic conditions of Con Cuong district have improved significantly. However, in 2007, the poverty rate for the district was estimated at 30.0%, which is high compared with that of Nghe An province, around 17.0%. In some communes in the Con Cuong district, such as Binh Chuan commune, the rate of poor households even amounts to over 50.0% (Annual Report of Con Cuong, 2007).

Regarding the development of water infrastructure, the Programmes 135 and 134 with funds from the government of Vietnam have been implemented. The Programme 135 is the Socio-Economic Development Programme aimed at poor communes of minority ethnic populations in mountainous region. After Programme 135, Programme 134 has been carried out. This is the programme supporting the agricultural production, housing and water for poor ethnic minorities with difficult lives. These two programmes especially put much concern into improving the living standards of poor households and *“ensure the provision of enough clean water for community livelihoods”* and *“develop public services at the community level such as clean water systems”* (Decision No. 135, 1998). Especially one of the objectives of the Programme 134 is *“The government is going to support 0.5 tons of cement per household belonging to minorities to build rain water tank or 300,000 VND for digging a well or building a water supply infrastructure for to support the livelihood of households belonging to ethnic minorities who live in the high and rocky mountain regions and have problems of water resources. For hamlets and villages where 50.0% or more of the*

households belong to ethnic minorities, the government will support 100.0% cost for the construction of clean water supply systems. For the villages where 20.0% to less than 50.0% of households belong to ethnic minorities, the government will support 50.0% cost to build clean water supply system” (Decision No. 134, 2004).

Thanks to the Programmes 135 and 134, the irrigation system of the communes has been upgraded. Although the rate of cement-lined irrigation system is low, all 13 communes of the district have tried to build important irrigation systems and main canals to improve production activities, especially paddy rice cultivation. For domestic water use, the Con Cuong Clean Water Company was established in 2000. Each day it provides 1,000 m³ of clean water for 100% of the households in the town. In many other communities, gravity-fed piped water system with tanks and taps have been built through the Programme 134. Until 2008, Con Cuong was regarded as one of the successful districts with respect to the implementation of Programme 134. According to “Planning water supply and environmental sanitation in rural of Nghe An province, the period 2001-2010”, the rate of people using public water system in Con Cuong is expected to be around 60% in 2010. This rate has increased very much compared with 2001, when only 20% of the population used the public water system.

3.2. Main water use of households in the study site

Water used by households in the study site is divided into domestic and productive water use. Domestic water use includes the use of water for drinking, laundry, and bathing. Productive water use includes water for irrigation, water for animal husbandry, and water for alcohol production. Currently, water for crop cultivation, mainly paddy rice, occupies the

largest proportion of the amount of water used within the district. In animal husbandry, pigs, poultry, buffaloes, cows, and goats are raised. A few activities, such as alcohol production operated in households, also consume water, but not much. Fishing is very limited in the district due the absence of flood plains. Only 29.8 m² of water surface are used for fish farming. In the following sections, only irrigation and animal husbandry water use are further analyzed.

The principal forms of water supply infrastructure in the district are deep wells,⁵ shallow wells,⁶ and piped water supply systems with individual household connections⁷ and operated by the Water Company in town or as gravity-fed water supply schemes with public tanks and taps in the rural communities.⁸ Finally open water sources such as rivers, stream, ponds, and lakes are used. In terms of water quality, people regard water supplied by the Water Company and through piped water supply systems as cleanest, followed by water from deep wells and shallow wells.

4. POVERTY AND ACCESS TO DOMESTIC WATER

This section addresses the three domestic water use types drinking/cooking water, water for laundry water and bathing water. Detailed analysis on the relationships between poverty

5 A deep well normally has an average depth of more than five meters with its wall firmly built. Costs for digging a deep well are relatively high.

6 A shallow well normally has an average depth or less than five meters with its wall firmly built.

7 Household water consumption is metered and a monthly fee is paid based on the amount of water consumed.

8 Several households share a water tap and no fee is paid for water usage.

and access to such types of domestic water use will be done.

4.1. Most important source of domestic water

For domestic uses local people primarily use water from open sources (stream, rivers, lakes, etc.) and deep wells. In addition, they also utilize water from other sources including gravity-fed piped-water systems, shallow wells, and rainwater. The most important source depends on using purposes as well as household poverty categories (Figure 4.1).

Regarding drinking/cooking water, non-poor and less-poor households mainly use water from deep wells, accounting for 77.9% and 40.0% within groups respectively, while only 34.12% of the poorest households use water from deep wells as the most important water source. In contrast, a large percentage of poorest households, accounting for 48.2%, considers water from open sources as the most important sources for drinking and cooking, while only a small percentage of non-poor households (8.3%) considers water from open

source as the most important. Comparing the quality of the three types of water, water from deep wells seems to be highly regarded by local people for drinking purposes.

For clothes washing and bathing water, the ratio of non-poor households using water from deep well is the largest (55.1% and 60.0% within this category, respectively), followed by less poor households. Very few of the poorest households use water from deep wells for washing clothes and bathing (18.8% and 20.0%, respectively). They mainly consider open source as the most important source of clothes washing and bathing. Compared with drinking water, the percentage of households using water from open sources for clothes washing and bathing water is higher. According to local people, in the shortage of water from deep wells for drinking, using water from open sources is considered as a way to save water.

Only a very small number of the interviewed households use water from gravity-fed piped-water system as the most important source. Although such water systems are built in several villages under the Programme 135, many local

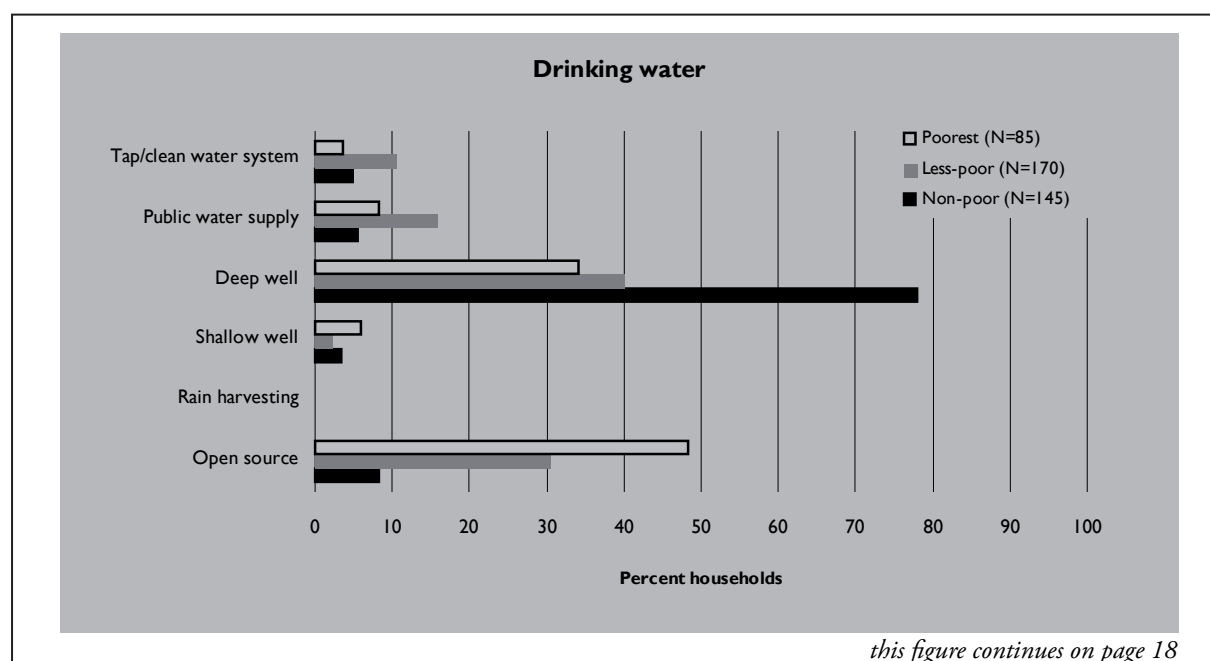


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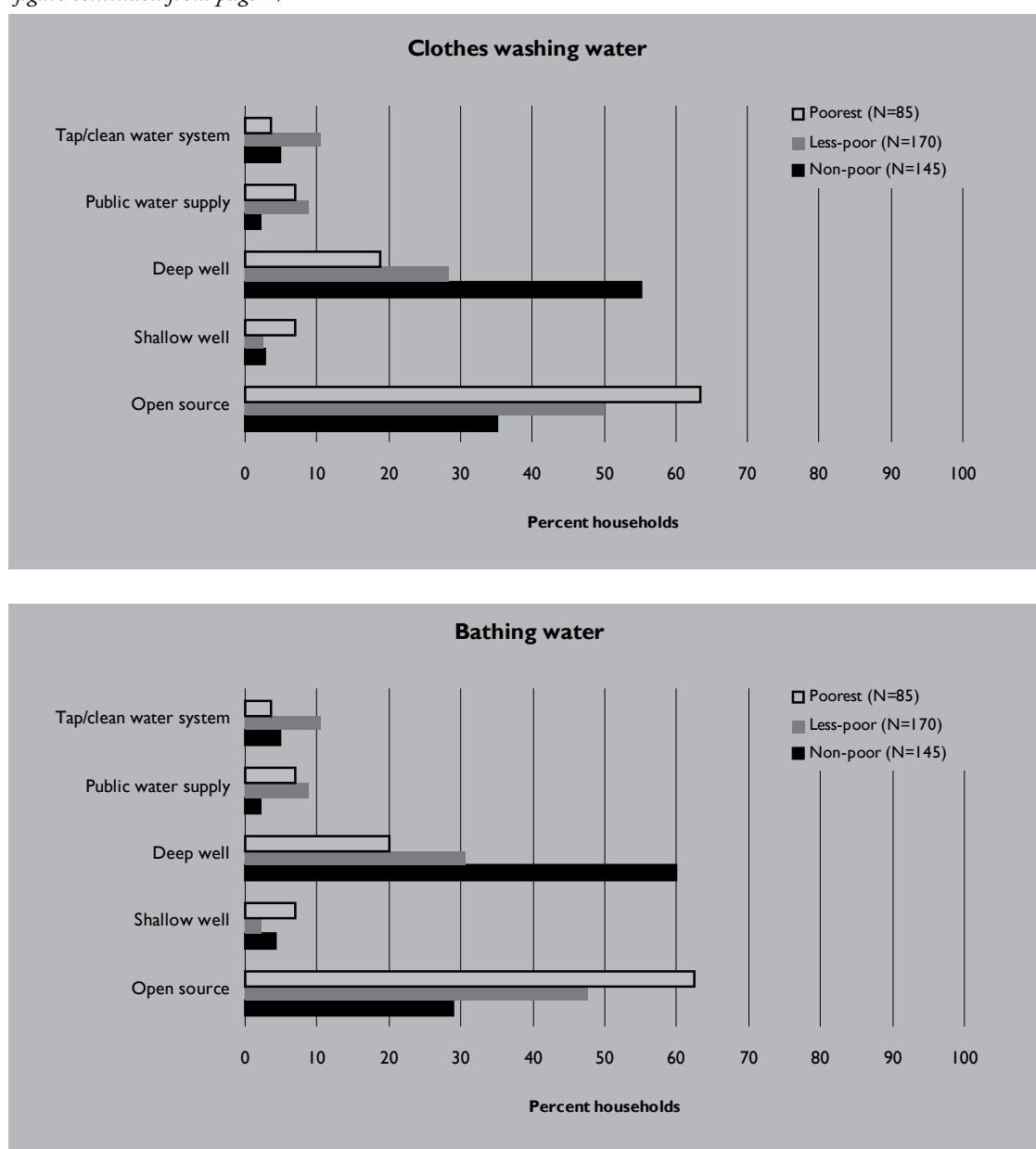


Figure 4.1. Most important water source for domestic uses, by poverty level
Percent households per poverty category

people prefer using water from open sources. A reason may be the short distance to such open sources. Another reason is that many water systems are damaged and no longer supply water to local people.

As analyzed above, a higher share of the non-poor households access better-quality water sources, including water from deep wells, than of the two other categories for domestic purposes.

4.2. Distance to most important source of domestic water

Figure 4.2 provides information on the average distance to the most important water source used for domestic purposes by poverty levels. Non-poor households enjoy the highest degree of proximity to their most important water source for domestic purposes, as the majority of the non-poor households get domestic water in or near their houses or spend only 0-5 min-

utes to get water. The less-poor households can take water near their houses/in the compound or spend 0-5 minutes or even 10-20 minutes to get water. In contrast, more than half of the poorest households spend more time, mostly 5-40 minutes, to go to the most important water source. Therefore, many of the poorest households may find it difficult to get water to their houses due to the rough roads in the rural mountainous areas in Vietnam.

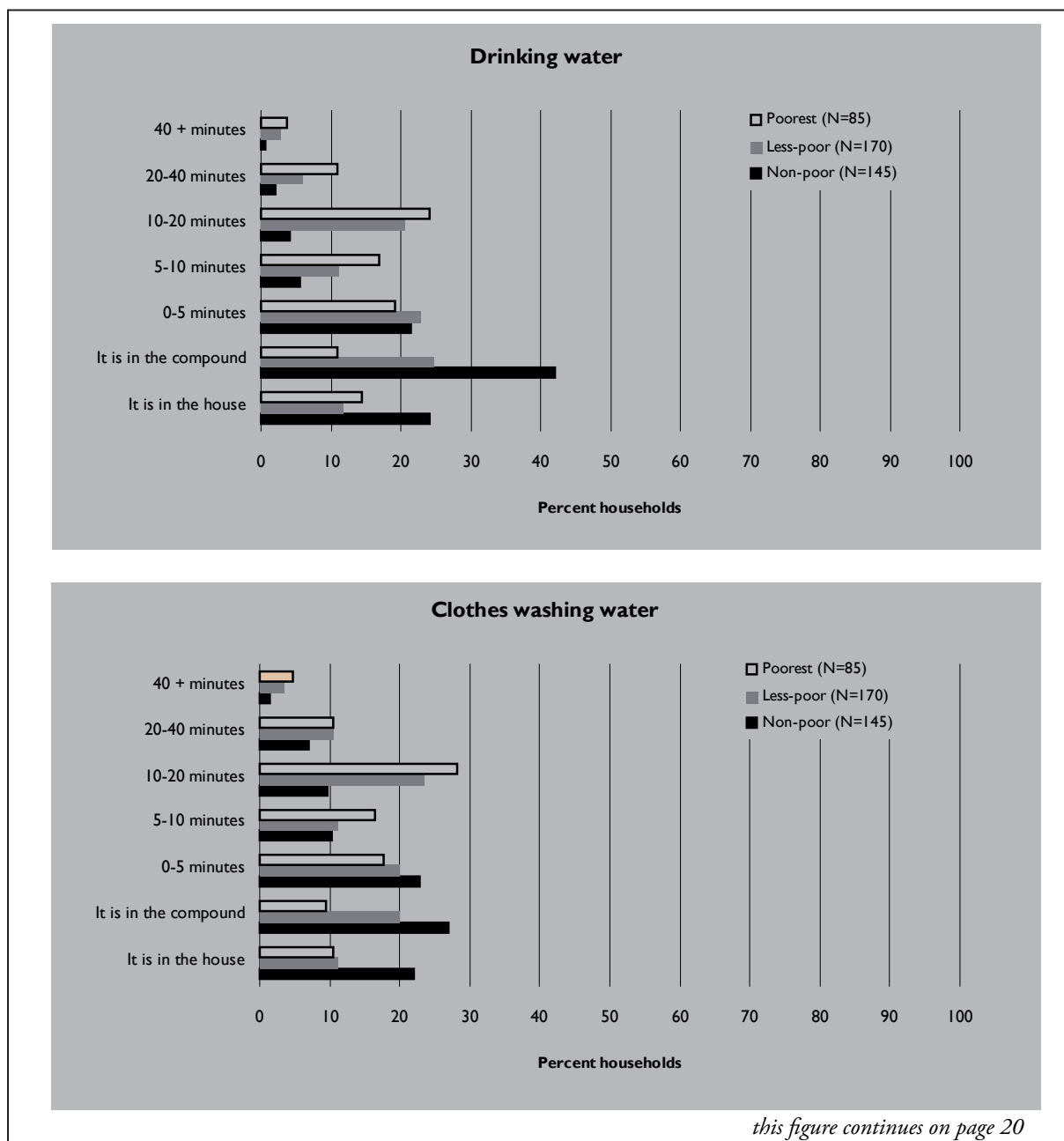


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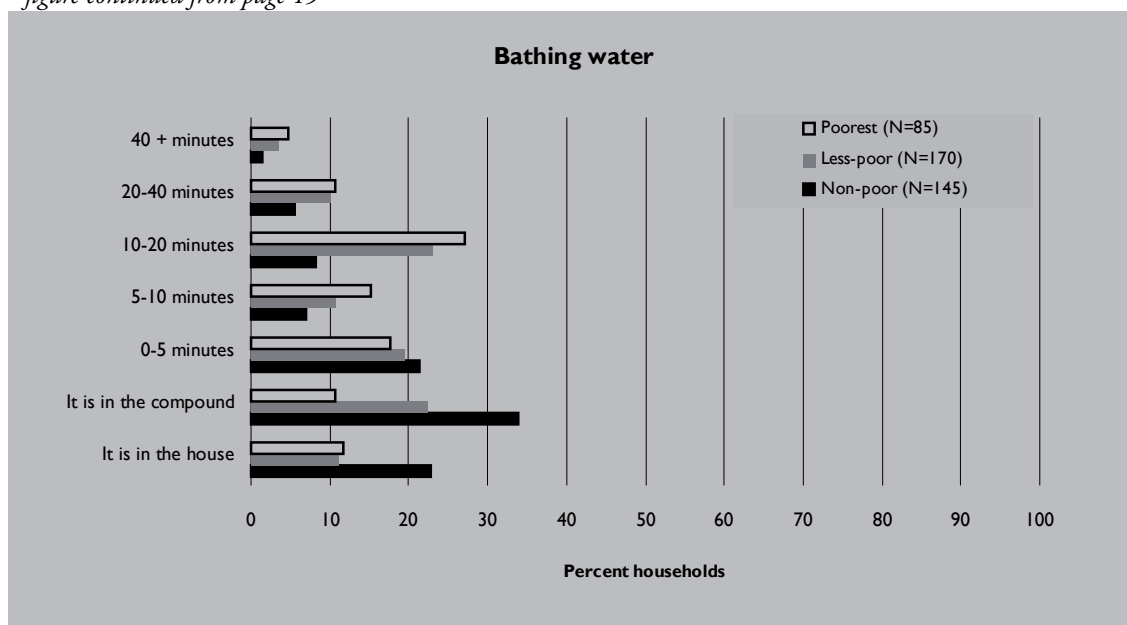


Figure 4.2. Distances to most important source of domestic water, by well-being levels

4.3. Means of domestic water transportation

While 71% of the poorest households have to carry their drinking water on foot from the

water source to the house, this is the case for only 35% of the non-poor households and for 58% of the less poor households (Figure 4.3).

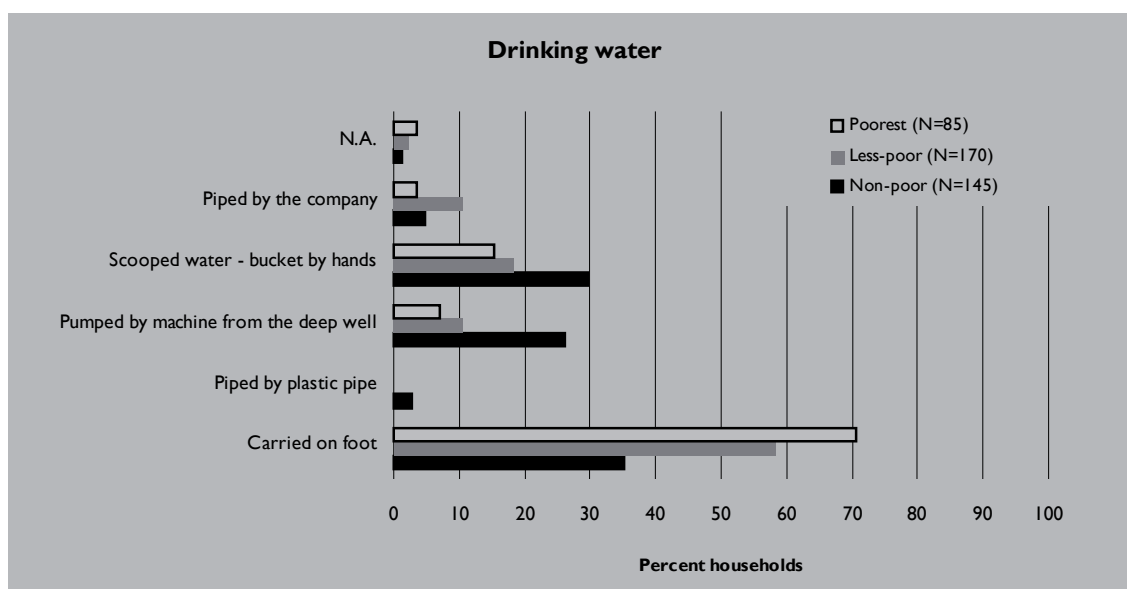


Figure 4.3. Means of transportation of drinking water from water source to house, by poverty levels

Percent households per poverty category

4.4. Ownership of most important source of domestic water

Prominently, non-poor households primarily use water from sources owned by themselves. This is represented by the largest percentage of non-poor households owning their most important water source, making up for 76.5% in drinking water, 56.5% in clothes washing water, and 60.7% in bathing water (Figure 4.4). This owes to the fact that non-poor households primarily get their domestic water from deep wells. Such deep wells are expensive to dig and not all households, particularly the poorest households, can afford to construct such wells.

While non-poor households tend to use water owned by themselves, poorest households

and less-poor households normally use water owned by other owners, e.g. relatives, another private household or water from sources that are shared by a certain group in the community. The percentage of households using water owned by such owners declines from poorest to less-poor and then non-poor households for the three types of domestic water (Figure 4.4). In some villages, some households, above all poorest households, form a certain group and share a water source. In this way, households within a group can share costs for using water. In addition, among the three household groups, the percentage of poorest households using water owned by the whole community is also the highest. The sources owned by the whole community are normally open sources.

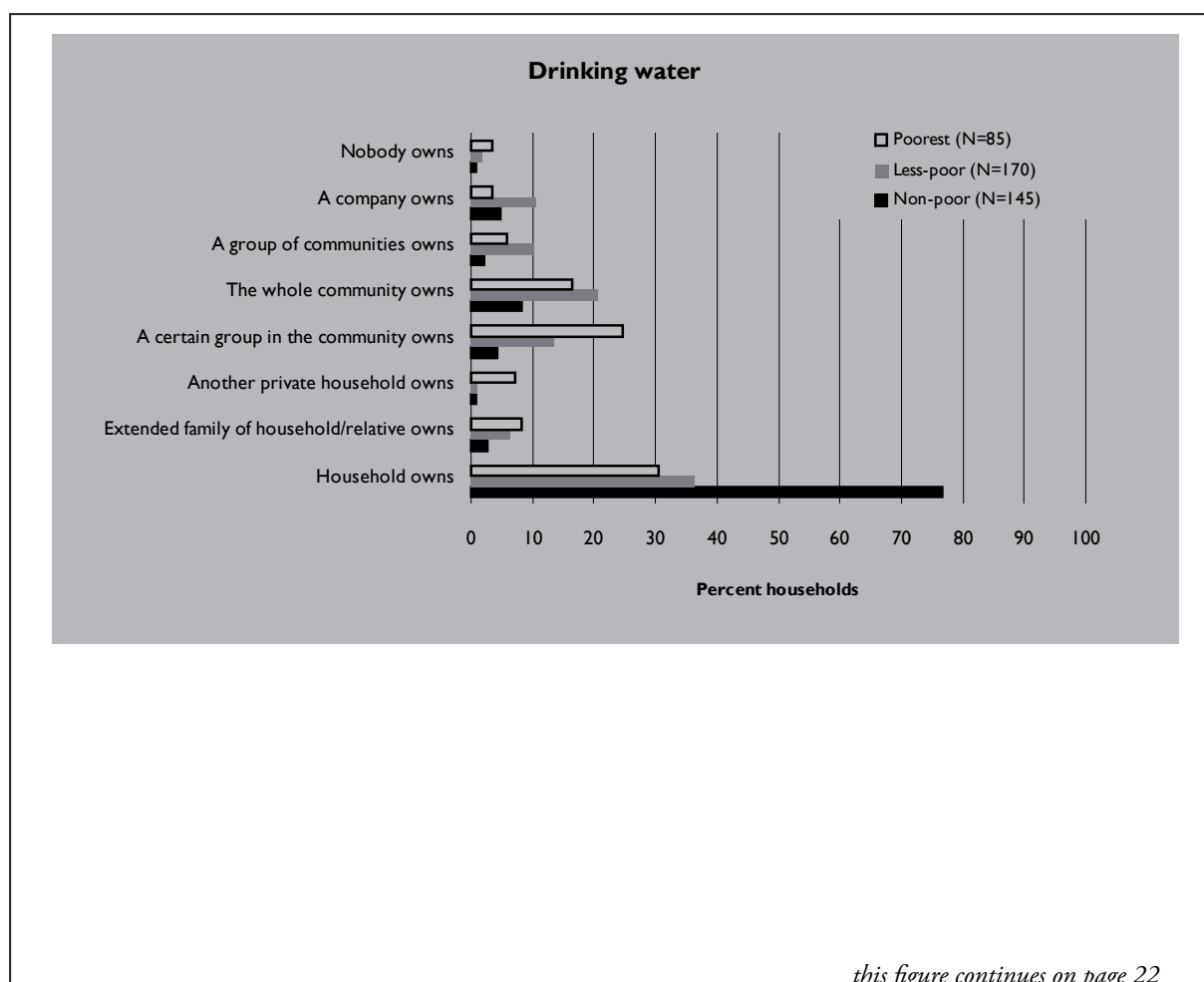


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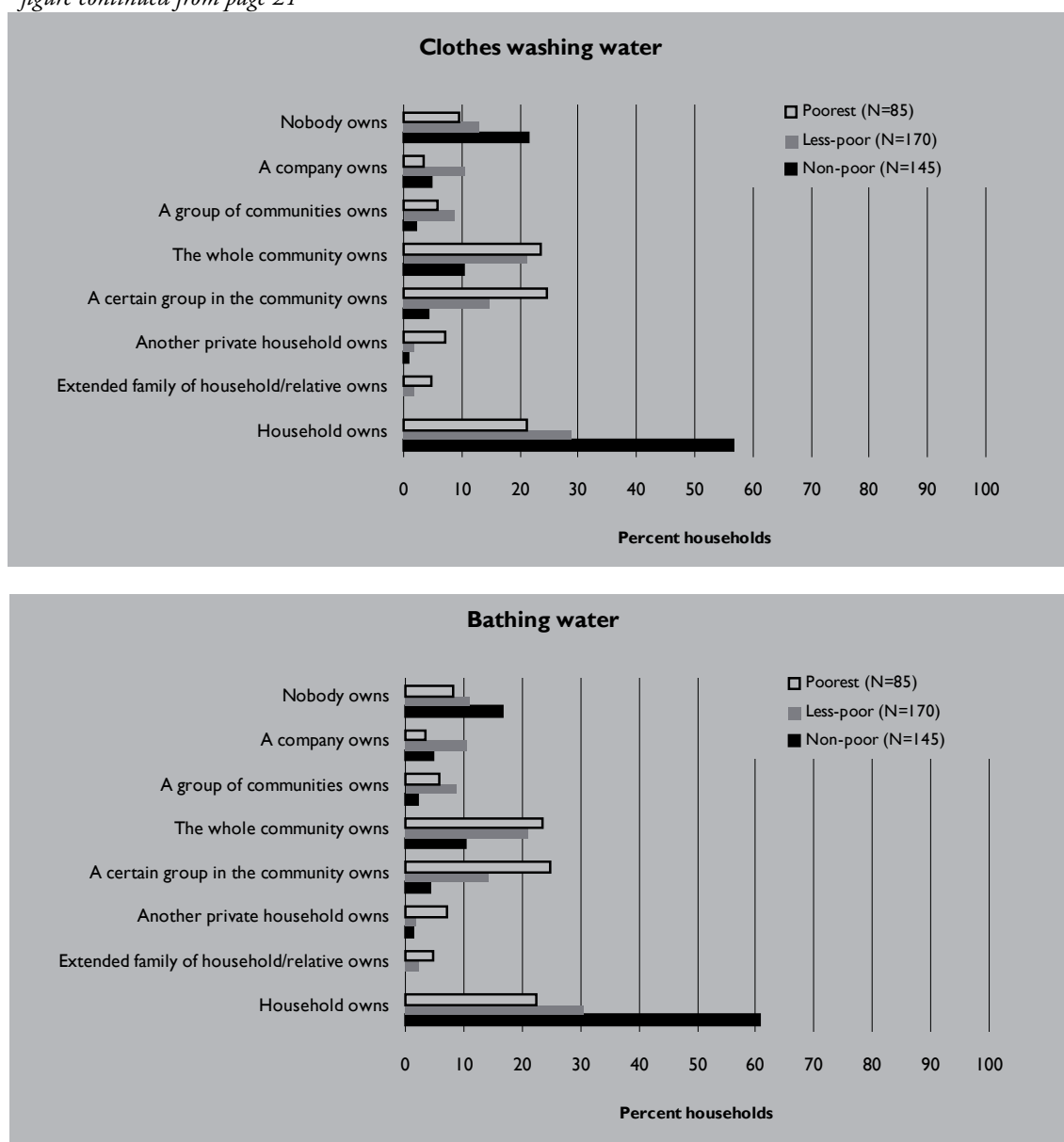


Figure 4.4. Ownership of most important source of domestic water, by poverty level
Percent households per poverty category

4.5. Sharing of most important source of domestic water

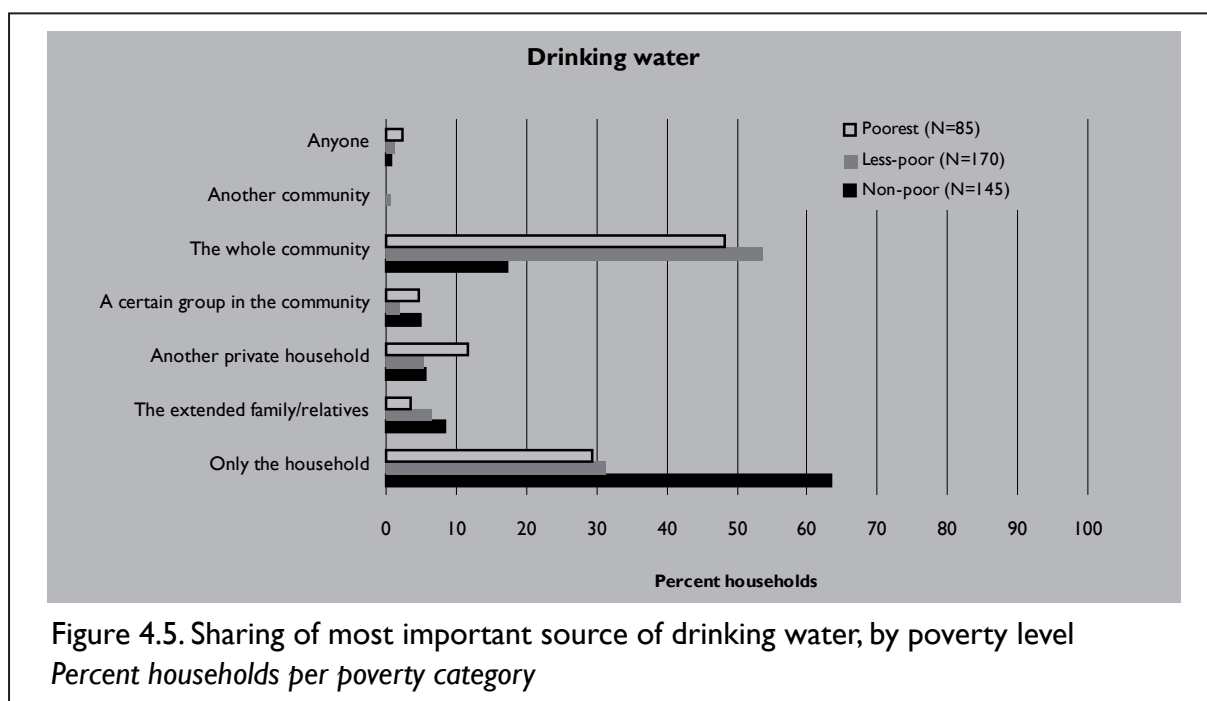
Sharing of water seems to be common among rural households, especially among the poorest and less-poor households. The percentage of households using water for domestic purposes that is shared with any other households is relatively high, accounting for 40-50% of

non-poor households, 70-75% of less-poor households, and 72-80% of poorest households (Figure 4.5).⁹ Thus, due to having better

⁹ Figure 4.5 only shows information for drinking water sources.

conditions of ownership of water source, non-poor households mostly use water without sharing with other households. This finding is consistent with results in the inventory work in which cooperation in well water sharing for domestic purposes is very common (Yen et al., 2010)

occupies a small part of the households sharing water sources with others, around 4.9-8.5% of non-poor households depending on the type of domestic use, 13.9-16.3% of the less-poor households, and 12.4-16.3% of poorest households (Figure 4.6). This is due to the fact that many households using water from deep wells



Sharing of water can be with relatives or another private household, usually with respect to deep or shallow wells, a certain group in the community sharing a deep well or a gravity-fed piped water system, or with the whole community, typically sharing an open water source or a gravity-fed piped-water system.

4.6. Permission to use most important source of domestic water

Permission to use most important source of domestic water

Permission to use water seems not to be common in Con Cuong district. The percentage of households needing to ask for permission

own the wells either alone or sharing with a group, whilst many households using water from open sources do not necessarily ask for permission except when the source is owned by a private owner. Among the three household groups, non-poor households, who ask for permission to use water, record the lowest percentage, making up about 4.9% for clothes washing water to 8.5% for drinking water.

Although there is not much differentiation in the percentage of households asking for permission to use drinking water and clothes washing water as well as bathing water, actually local households seem to be more concerned about asking for drinking water, because drinking water is directly related to health.

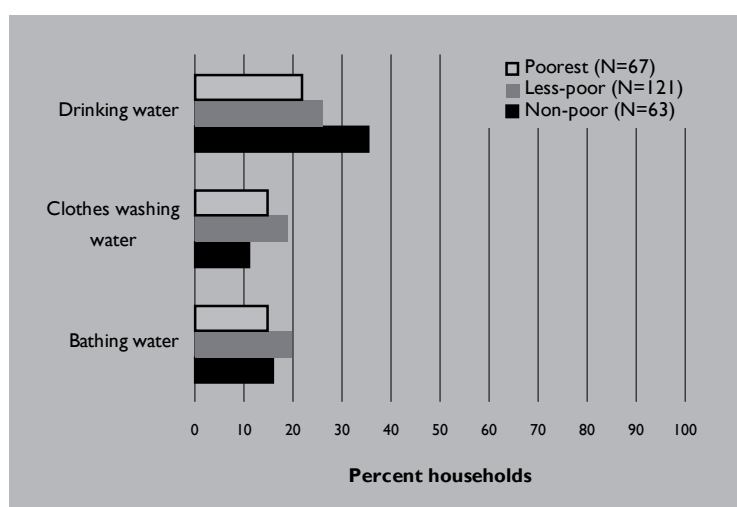


Figure 4.6. Permission is needed to use most important source for domestic water by poverty level

Percent households per poverty category

(The number of households in each category for drinking water differs from the corresponding numbers of households sharing water for laundry and bathing : Poorest (N=34), Less-poor: (N=108), Non-poor (N=59),

4.7. Agreements with other domestic water users

Agreements to use most important source of domestic water

Agreements about water use among households sharing a water source are common in the study site. Agreements can be considered as an effective way for water sharers to be more responsible in keeping water clean, saving water, and further protecting water sources. The data in Figure 4.7 indicate that a higher proportion of the poorest households tend to make agreements with other domestic water users than of the non-poor households, since fewer of them own water sources.

Types of domestic water agreements and other parties to agreements

In the study site, the three types of agreements among water sharers are verbal agreement not endorsed by a third party, written agreement

Box 4.1. An agreement to share water from a community well

In Tong Chai community in Chi Khe commune, a well was built for a kindergarten of the community in July 2005. However, at the beginning of 2007, the well is still unused, because the kindergarten has not operated due to lack of children. Therefore, five households who do not have their own wells share water from the well together. An agreement on water use has been reached among the five users. Following this agreement, water users jointly pay money to purchase scoop and rope. Every season, water users together dredge the well and keep it clean.

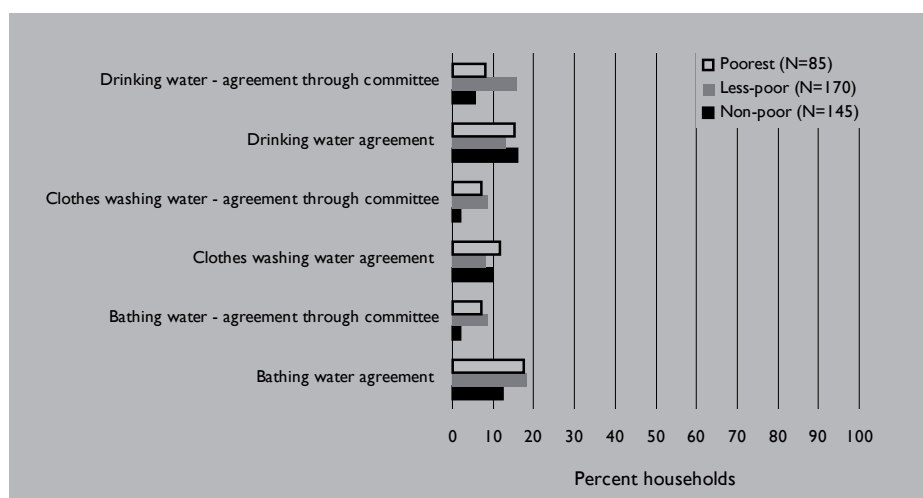


Figure 4.7. Agreements with other water users for domestic water
Percent households per poverty category

endorsed by a third party, and verbal agreement endorsed by a third party. Of these types, the first two are more frequent than the latter one (Figure 4.7). As observed in the survey, verbal agreements are primarily related to the water sources that belong to individuals (deep wells, etc.), whereas written agreements are closely related to water sources owned by the community or certain groups (gravity-fed piped-water system, etc.).

4.8. Payments for domestic water use

Payment in cash for domestic water use

The information about payment in cash in Figure 4.8 indicates that poorest households primarily choose to use drinking water from sources for which no cash payment is required, while the non-poor households tend to draw their drinking water from sources where cash payment has been paid either to meet initial construction costs (particularly in the case of

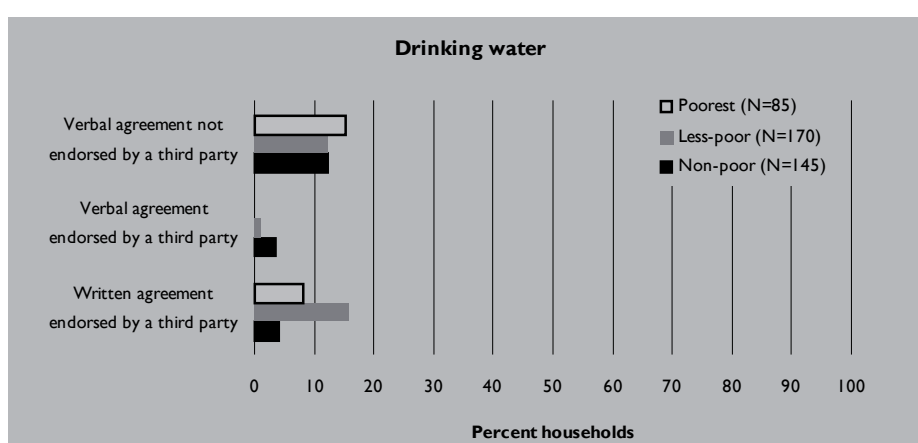


Figure 4.8. Types of agreements with other users for most important source for drinking water by poverty level
Percent households per poverty category

deep wells) or where a regular fee (monthly or depending on use) is required. This regular fee is used to cover electricity consumption (e.g. where water is pumped).

Payment in kind for domestic water use

Approximately two-thirds of the poorest households do not contribute in kind in return for their domestic water use. This is due to the fact that most of them use water from

open sources. The ratio considerably decreases from poorest households to less-poor households and non-poor households. As shown in Figure 4.9, 85% of the non-poor and almost 60% of the less poor households do make in-kind contributions either on a regular or on an occasional basis, e.g. for the construction or maintenance of wells.

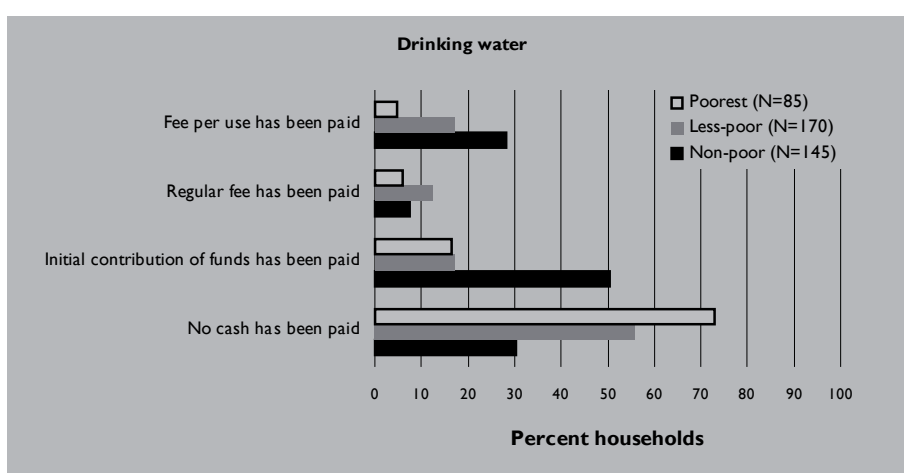


Figure 4.9. Payment in cash for drinking water use by poverty level
Percent households per poverty category

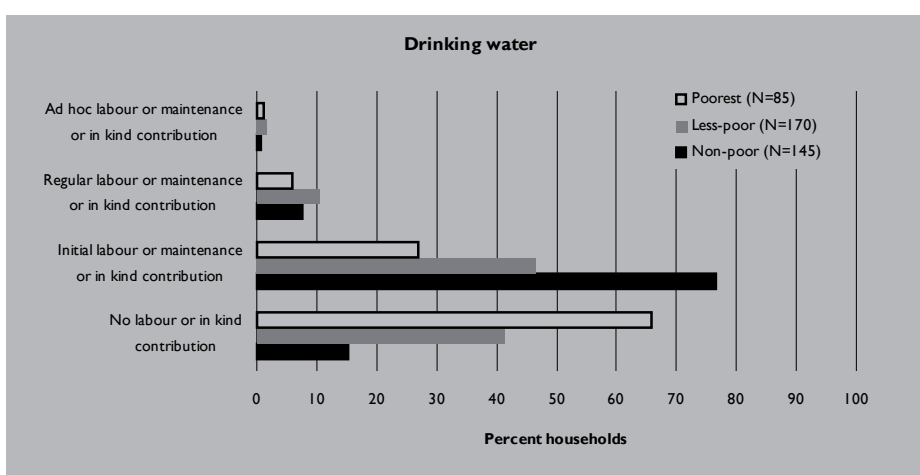


Figure 4.10. Payment in kind for drinking water use by poverty level
Percent households per poverty category

4.9. Perceived problems of domestic water use

Due to better access to good water sources, as analyzed in the above parts, more non-poor households face no problems in using domestic water than the other two groups (Figure 4.11).

In general, local people in the study site are encountering numerous difficulties in domestic water use. Among 14 problems faced, sediment/dirty water, polluted water, and distance to water source are the most prominent. In addition, problems related to maintenance of water point, costs to get water, volume of water used by others, and lack of water in the dry season are also problems worthy to note.

The poorest households in the study site are vastly challenged with the water quality. Due to having to rely mainly on open sources, the relatively high percentage of poorest households, 50-60%, suffers sediment/dirty water or polluted water.

Distance to get to water sources is also considered as one of the major problems perceived by many local people, mainly the poorest households as shown above. Under the condition of poor infrastructure in mountainous areas, getting water from a water source located far from home is inconvenient and time consuming.

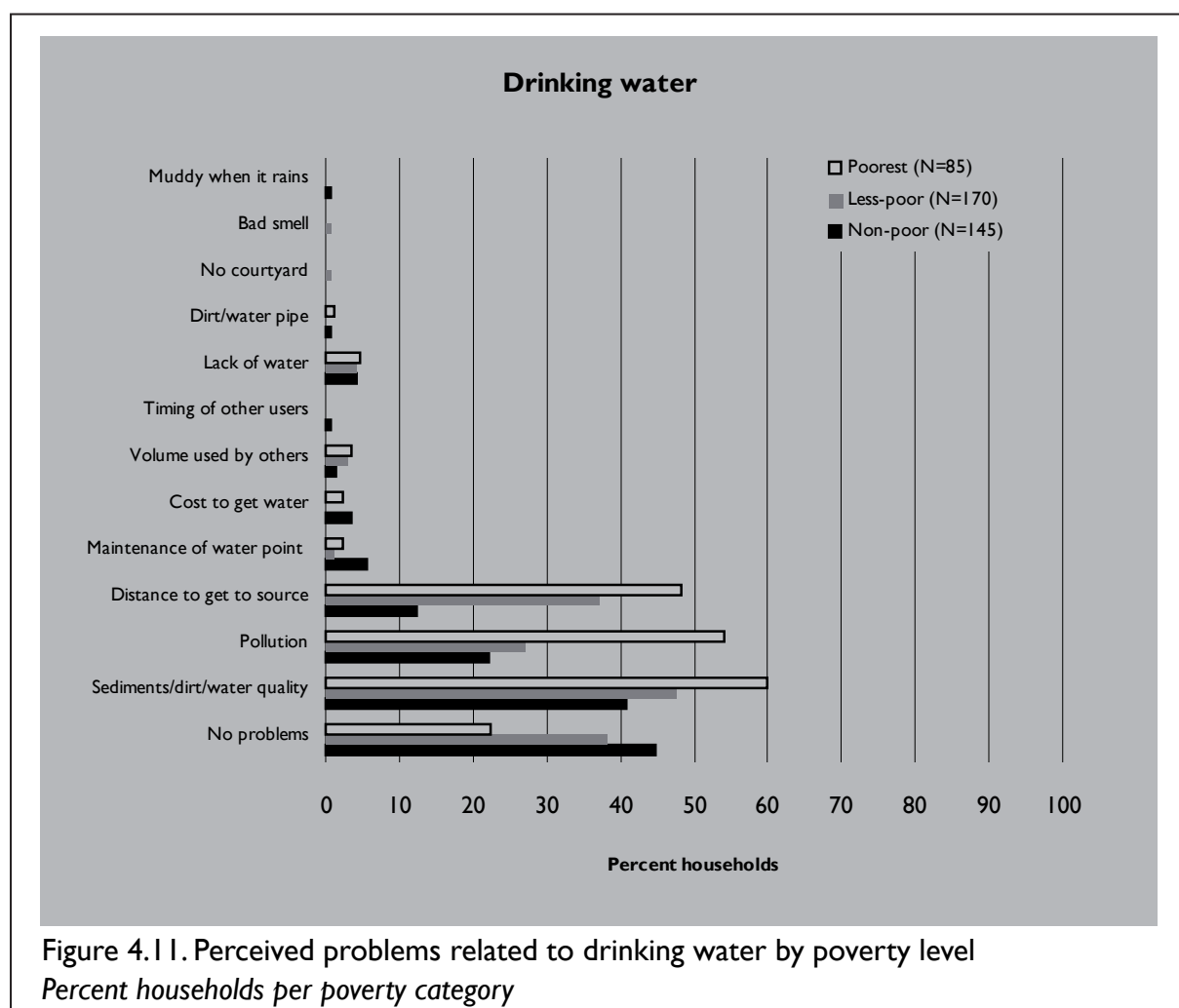


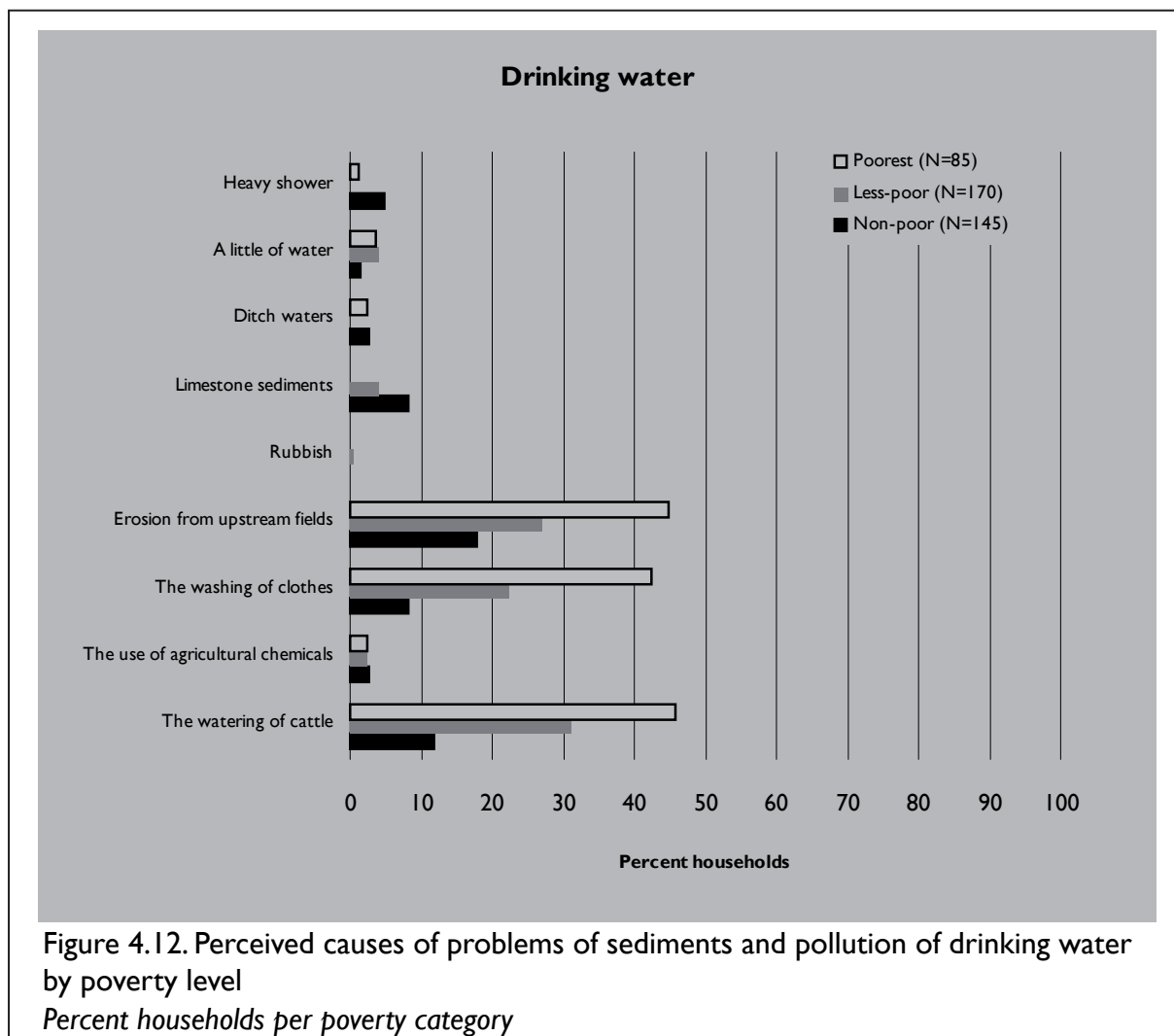
Figure 4.11. Perceived problems related to drinking water by poverty level
Percent households per poverty category

4.10. Perceived causes of domestic water sediments and pollution

Considering perceived causes of domestic water sediments and pollution, four main reasons were mentioned by the respondents. They comprise watering of cattle, use of agricultural chemicals, washing of clothes, and erosion from upstream fields (Figure 4.12). In addition, other causes including rubbish, limestone sediments, ditch water, lack of water, and heavy showers are also discovered.

Of the main perceived causes, watering of cattle, washing of clothes, and erosion and

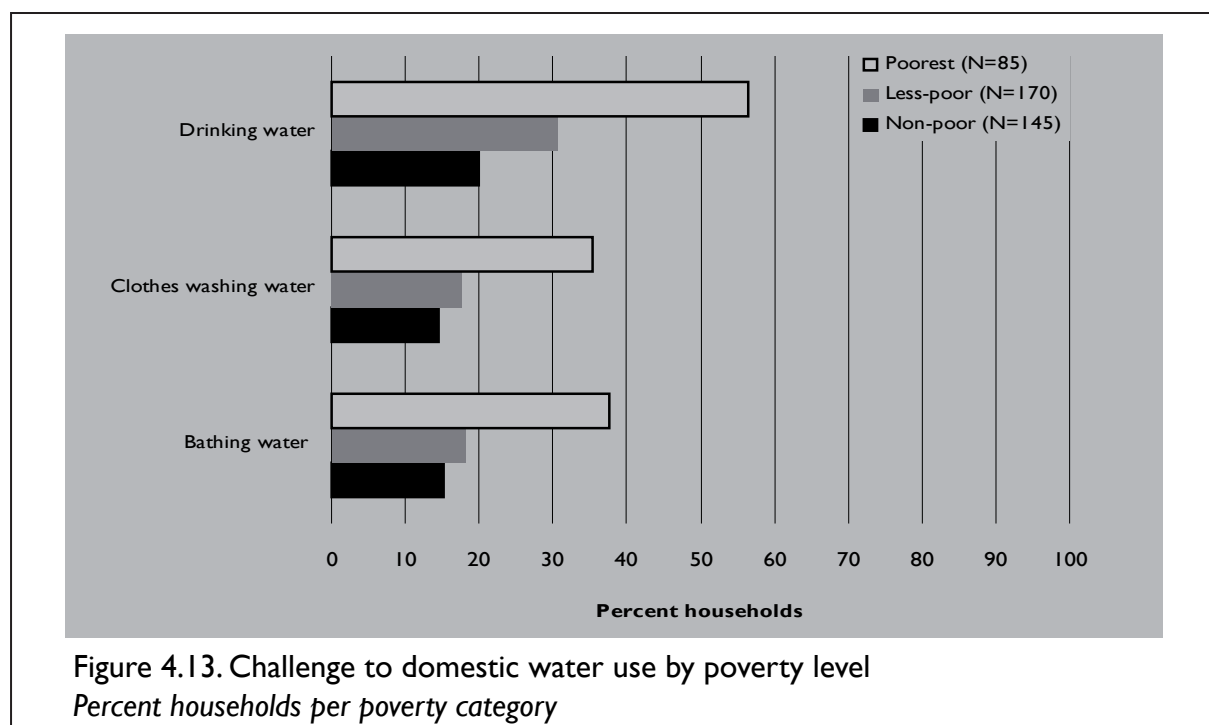
run-off from upstream fields are perceived more frequently by the poorest households of whom a significant share rely on open water sources. Free grazing and the habit of washing clothes in the stream induce pollution and sediments of water. It is interesting to note that the percentage of non-poor households, who considers the use of agricultural chemicals as a cause of pollution, is little higher than that of the two other groups. This may owe to the fact that the non-poor households are more aware of the agricultural chemicals used in the area.



4.1.1. Challenges to domestic water use

Figure 4.13 provides general information on the percentage of households being challenged by other domestic users with respect to their domestic water use. It is easily recognized that poorest households are more frequently

being challenged on the basis of the amount of water used for domestic purposes. These kinds of challenges always occur in the dry season among households in areas where water scarcity is recognized. In the study site, challenges to amount of drinking water are normally realized in terms of use of water from deep well



challenged with respect to their domestic water use. These consist of challenges relating to the amount of water used, the ways in which domestic water is used, and their right to use water from a specific source for domestic purposes.

Challenges to amount of domestic water use

Figure 4.14 shows that over 40% of the poorest households are being challenged with respect to the amount of water used for domestic purposes during the past two years, and that this proportion decreases as the poverty level decreases, as 22% of the less poor and 15% of the poorest households have experienced

or gravity-fed piped-water system (example in Box 4.2). The explanation for the highest occurrence of challenges in the poorest group and also relatively high in the less-poor householding been challenged, have only been so once or twice. Only a few households face challenges every half year holds is that sharing of water is mainly found in these groups.

The frequency of perceived challenges to quantity of water is not so high. During the past two, the majority of the households having been challenged, have only been so once or twice. Only a few households face challenges every half year.

Box 4.2: Challenges to amount of drinking water from gravity-fed piped-water system

Mr. Luong Van Huynh's household and 15 other households in Que village in Binh Chuan commune share domestic water from a tank that belongs to the gravity-fed piped-water system constructed by the Programme 135. In the dry season, the amount of water running into tanks is limited. One day when Mr. A came to get water from the tank for drinking, he saw a lot of households standing in a queue waiting to get water before him. He asked them to leave water for his household; however, the amount of water taken by other households was so much that he did not get any water. On that day he had not enough water for his household. Although saying nothing to his neighbours, he felt uncomfortable.

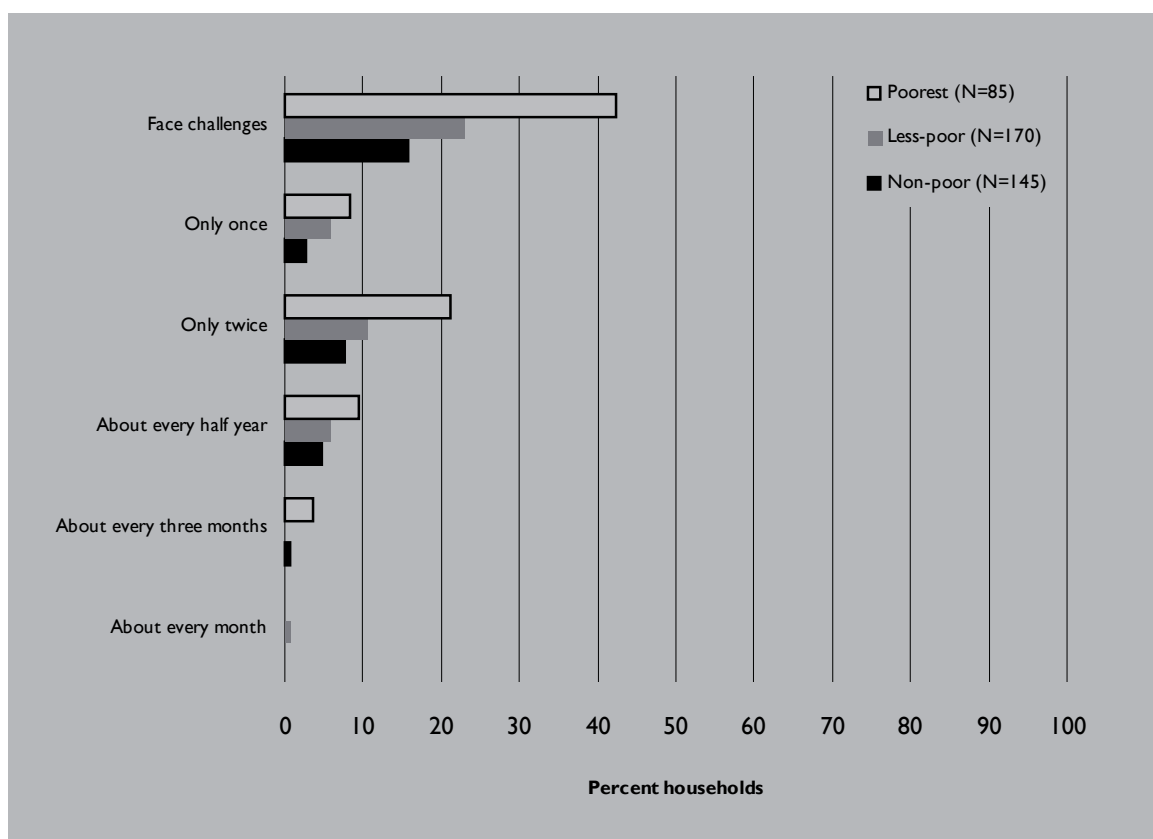


Figure 4.14 Frequency of being challenged with respect to the amount of domestic water used by poverty level
 Percent households per poverty category

Challenges to ways in which domestic water is used

Water users, especially the poorest users, are also challenged concerning the ways in which domestic water is used (see Box 4.3 for an example). Of the poorest households, 36% have experienced being challenged with respect to the way they use water for domestic purposes, compared with 18% of the less poor and 15% of the non-poor households.¹⁰

Challenges to domestic water use right

In addition to challenges in quantity of domestic water and ways in which water is used, local people face challenges to with respect to their right to use water for domestic purposes from a particular source. Compared with the above types of challenges, challenges to water use right are less commonly perceived, being mentioned by less than 10% of the households.¹¹

Box 4.3. Challenge to ways in which clothes washing water is used

Many households in Tong Chai village used water from the Chai spring running along the irrigation canal near the main road of the village for drinking, clothing, and bathing. A lead mining company has been operating for four months. Since then, lead sediments discharged from the lead extracting process were released 3 or 4 times every day directly to the Chai spring and irrigation canal. Water was contaminated with the appearance of black colour and scum. According to local villagers, lead sediments were often released during night time but also sometimes during day time. Before the operation of the company, water users normally had the habit of washing clothes in the early morning. However, at present, local people change to washing clothes in the afternoon or when they feel that the water is clean enough.

Box 4.4. Challenges to domestic water use right

Mr. Ngan Van Hoa's household and some other households residing in Tan Son village in Mon Son commune are using water from a deep well owned by one of his neighbours. Since the owner of the deep well is his immediate neighbour, Mr. Hoa's household can use water for drinking, laundry and bathing events in the dry season. Other households are only permitted to use water for drinking. Sometimes in the dry season, Mr. Hoa gets water for laundry and bathing when his neighbour is absent from home, but the other households create difficulties for him, such as keeping scoop and rope.

¹⁰ Figure not shown.

¹¹ Figure not shown.

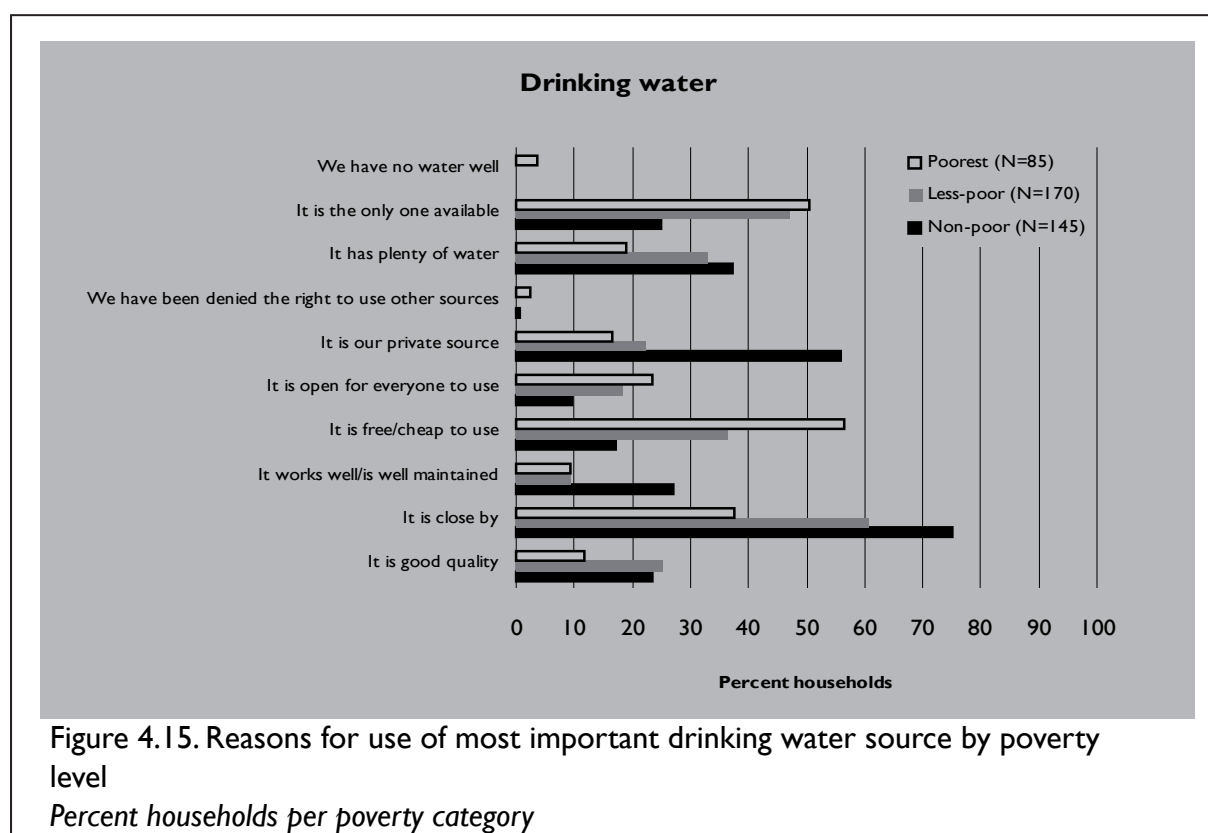
4.12. Reasons for use of most important domestic water source

Reasons for use of the most important domestic water source are different among the three household groups (Figure 4.15). Indeed, the non-poor and less-poor households often attach more special importance to the distance to get water and ownership as well as quality of water source (including quality of water and maintenance of water source). In addition, non-poor households also mention the volume of water as an important reason. Meanwhile, the poorest households tend to be more concerned with issues related to costs of use and mere availability of water to everybody. As living standards have improved, households with better economic conditions are more concerned about water quality than the households living under worse economic conditions.

Many households in the study site choose to use a specific water source as their most important source of domestic water because it is located closely to their households. In particular this applies to the non-poor households who as described above often own their own water source.

Free or cheap costs for water use are one of the reasons attaching the high ratio of poorest households, accounting for over 50% of the households in this category.

In the previous section, the high percentage of poorest households was found to be more challenged with sediments or pollution of water than the two other groups since many of them use water from open sources. The question rises why the poorest households do not avoid such problems. The answer is that most of the poorest households facing this problem have no alternative source of domestic water.



4.13. Number of household domestic water sources

In regard to number of domestic water sources, most households use only one source, accounting for over 70% of households (Figure 4.16). Non-poor households seem to be more flexible in using water in case one water source become exhausted, as the percentage of non-poor households using two sources and more domestic water sources is higher than for the less poor and poorest households. Thus, it can be seen that non-poor households have better access to water sources.

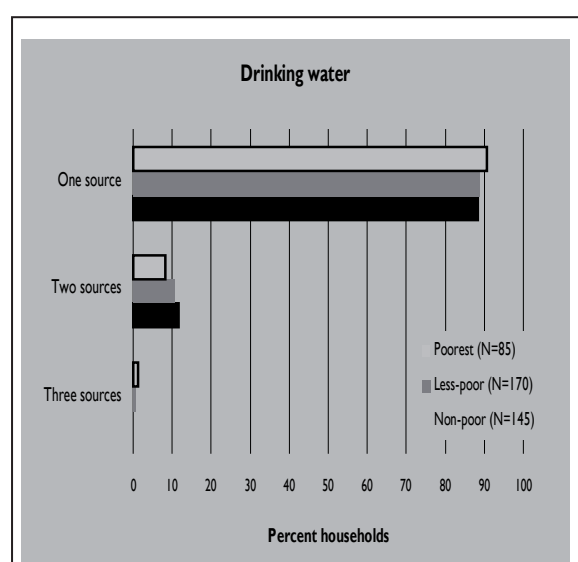


Figure 4.16. Number of household drinking water sources by poverty level
Percent households per poverty category

5. POVERTY AND ACCESS TO IRRIGATION WATER

This section provides a comprehensive analysis on the relationship between poverty and access to productive water, including irrigation water. Difficulties faced by local farmers in using water for irrigation purposes are also identi-

fied in this section. The analysis is done within households with land watered/irrigated.

5.1. Household's watered/irrigated land area

Figure 5.1 below presents detailed information on land areas of farmers which have irrigation or are watering crops during wet and dry seasons. It can be easily recognized that more non-poor than less poor and poorest households own watered/irrigated land areas. Around 80% of the non-poor households own land that is watered/irrigated land during the two seasons, in comparison to only around 44-54% of the poorest households during the wet and dry season, respectively. In the study site, watered/irrigated land is mostly paddy areas or home gardens where vegetables and fruit trees are grown. Other crops such as cassava, maize, soybean, etc. are also cultivated in upland areas; however, these crops are rain-fed crops. For home gardens, local farmers often water plants during dry season if they can get access to water. But during wet season, they let them be watered by rain water.

Households in general have better access to water during wet season than during dry season. Nevertheless, in some studied villages where arable land is rather sunken, crops are unable to be cultivated during wet season, since the fields are mostly flooded. Therefore, crops are easily cultivated on this land during dry season. In these cases, local farmers, therefore, find accessing water more difficult during wet season than dry season.

The watered/irrigated land area of non-poor households is obviously larger than that of less poor households and poorest households. The percentage of households having a land area of less than half a hectare is nearly identical among the three groups while this ratio of non-poor households owning a land area of between half and two hectares is much higher. Beside agricultural land area allocated

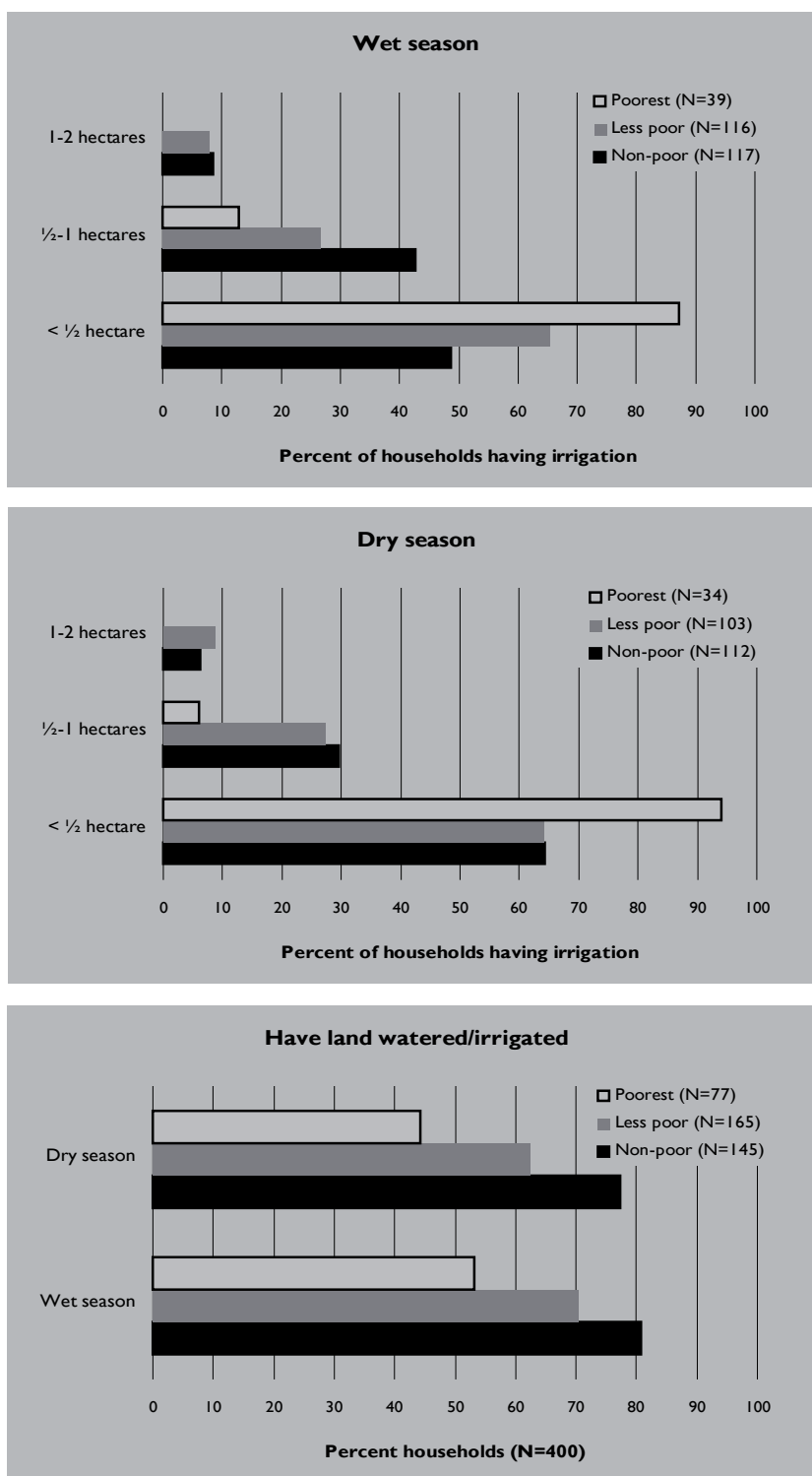


Figure 5.1. Ownership and acreage of watered/irrigated land area in the wet and dry seasons by poverty level
 Percent households per poverty category

per capita by the government,¹² many non-poor households in the study site can actually reclaim alluvial land area where water is available for cultivation. Under self-sufficiency economy, being the general situation of many areas in the uplands of Vietnam, land ownership and better access to irrigation water are advantageous to local farmers.

5.2. Means of conducting water to the field

Water is conducted to the fields through many different ways as shown in the figure 5.2. Means of conducting water to the field of non-poor households seems to be more diverse than the other groups.

Conducting water through canals, including cement-lined canals and unlined-earth canals, is mainly for paddy fields. In the study site, the cement-lined canal system is constructed by funds from the government of Vietnam. The unlined-earth canal system is constructed by the community or by individuals. Non-poor households are more likely of using cement-lined canals to get water to their fields than the less poor and poorest households particularly in the dry season. This is simply because non-poor households' fields are located near good irrigation infrastructure¹³.

Another means of leading water to the field, which is regarded as good irrigation infrastructure, is through plastic tubes established by pri-

vate households with enough financial capacity. Normally, plastic tubes are for cash crops cultivation in home gardens. Thus, some non-poor households have better conditions to transfer water into their fields. In addition, buckets are also used as an effective means of transferring water to the field. Only a few households use water reels to get water into the field.

Differences in conducting water are identified in terms of cement-lined canals and unlined earth canals compared between the two seasons. The data shows that for all poverty categories, the proportion of households transferring water through cement-lined canals increases in the dry season, while the proportion of households getting water through unlined earth canals increases in the wet season. The explanation is that during the dry season, when water availability is lower, water from the river cannot run into the field, but is normally pumped by the irrigation committee and transferred to the field through cement-lined canals.

12 According to Decree 64-CP dated on 27th September 1993 on agricultural land area allocation to individual households to use in a time duration of 20 years for agricultural production, a certain amount of agricultural land was allocated to each capita, based on land areas reclaimed before by local farmers and part of it based on casting lots. In addition, land reclamation is still encouraged in the locality.

13 In fact, the cement-lined canal system, which is considered the good irrigation infrastructure system, is constructed after land is allocated to individual households.

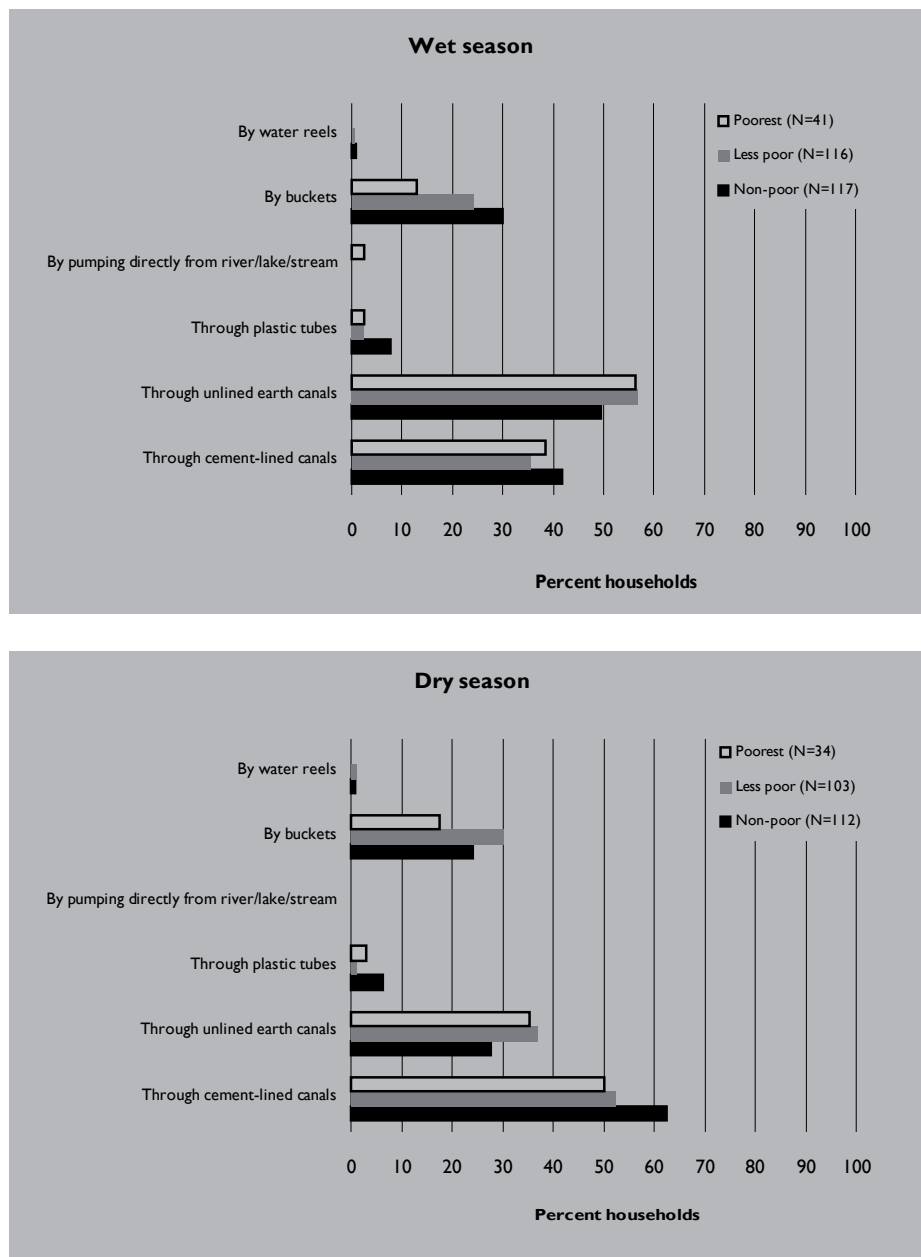


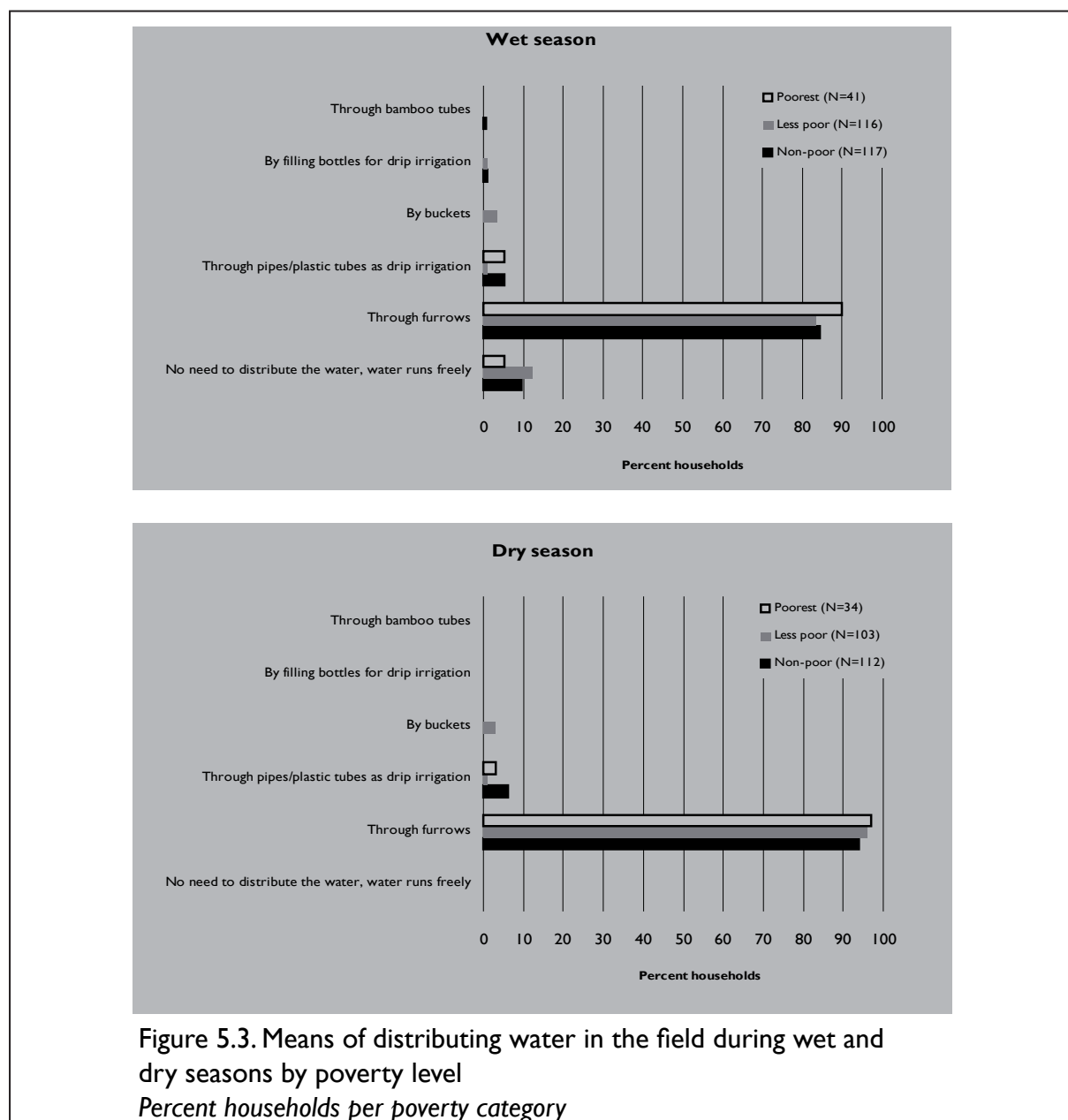
Figure 5.2. Means of conducting water to the field during wet and dry seasons by poverty level
Percent households per poverty category

5.3. Means of distributing water in the field

There are many alternative ways to distribute water during rainy and dry seasons in the field of which distributing water through furrows is the most common (Figure 5.3). During wet season water is distributed in order to avoid waterlogging, while distribution of water during dry season is to supply enough water to the crops. Distributing water through furrows is

primarily carried out by basic tools such as hoe and shovel. No remarkable differences among the three poverty categories have been found with respect to the means of distributing water in the field.

Some other ways to distribute water in the field are also used by local people, including using pipes/plastic tubes for drip irrigation, using buckets, filling bottles for drip irrigation, or using bamboo tubes.



5.4. Most important source of water for irrigation

The vast majority of the households having land under irrigation (approximately 90%) use water from open surface water sources for irrigation as the most important source during both rainy and dry seasons (Figure 5.4; only dry season is shown). This situation is common in many mountainous areas in Vietnam due to the fact in this way, costs for irrigation are low or even free. Another way that local people mention is “saving money by using water from the nature”. Only a small percentage of households utilize water from deep wells and public water supply tanks for mainly vegetable crop cultivation. Actually, the volume of irrigation water per use taken from deep wells and public water supply tanks is much less than that of water obtained from open sources. No significant distinction among the three groups with regard to the selection of source of irrigation water is found.

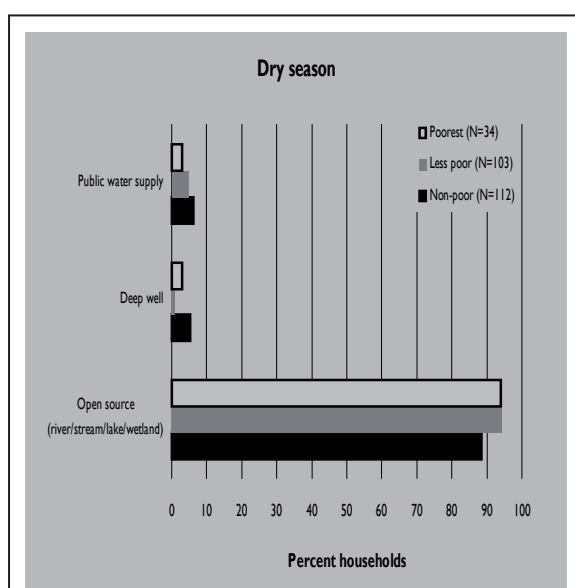


Figure 5.4. Most important source of irrigation water during dry season by poverty level
Percent households per poverty category

5.5. Ownership of most important source of water

In regard to ownership of most important source of water, the data indicate that water for irrigation during both wet and dry seasons is mainly owned by communities (Figure 5.5; only dry season data is shown). Few households water their crops using water that is regarded as privately owned and when this happens, it is mainly for vegetables grown within home gardens. No significant correlation is found between poverty level and ownership of water source is detected in the study site.

5.6. Sharing of most important source of water

Sharing of water for irrigation is relatively common in the study site due to the fact that water for irrigation from open sources mainly belongs to the community as analyzed above. There is only a minor ratio of households, less than 10%, using irrigation water that either is not shared with any other household or that is only shared within a certain group of households within the community (Figure 5.6).

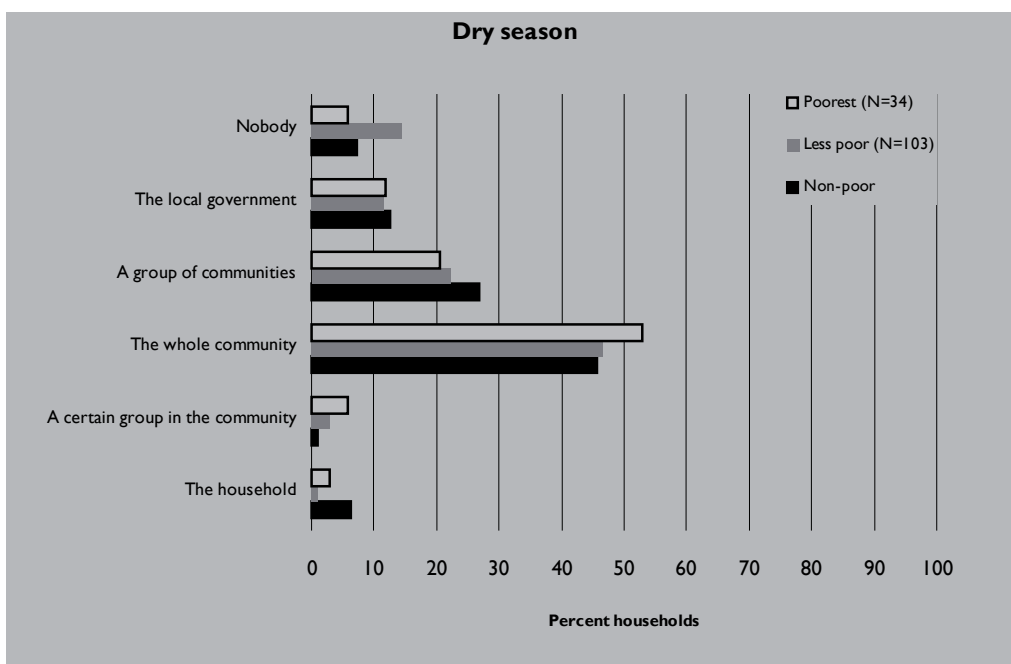


Figure 5.5. Ownership of most important source of irrigation water during dry season by poverty level
Percent households per poverty category

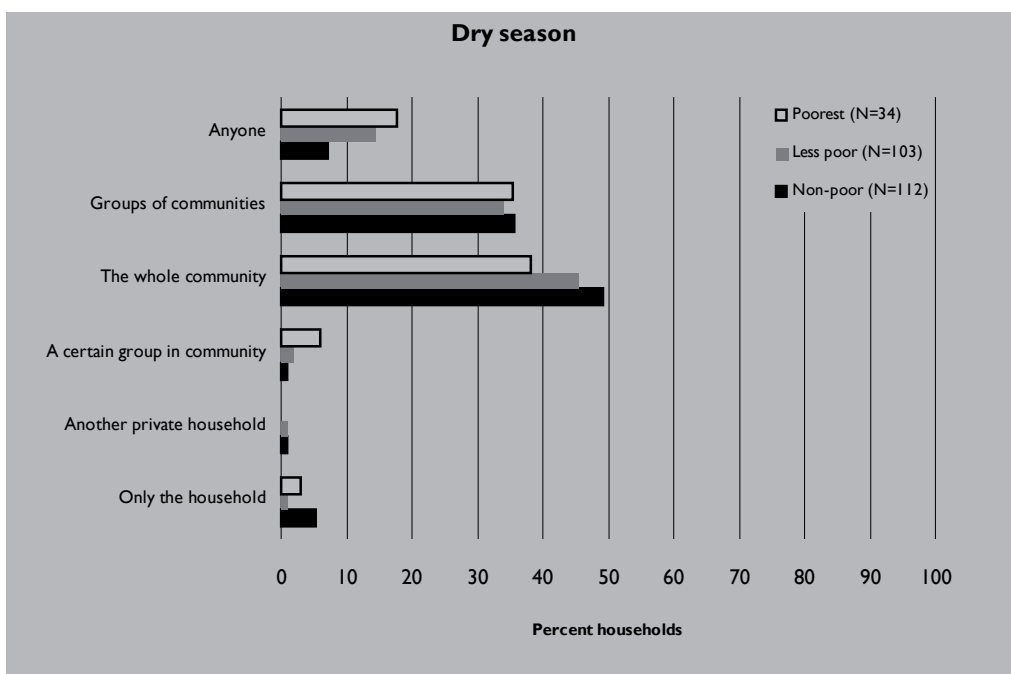
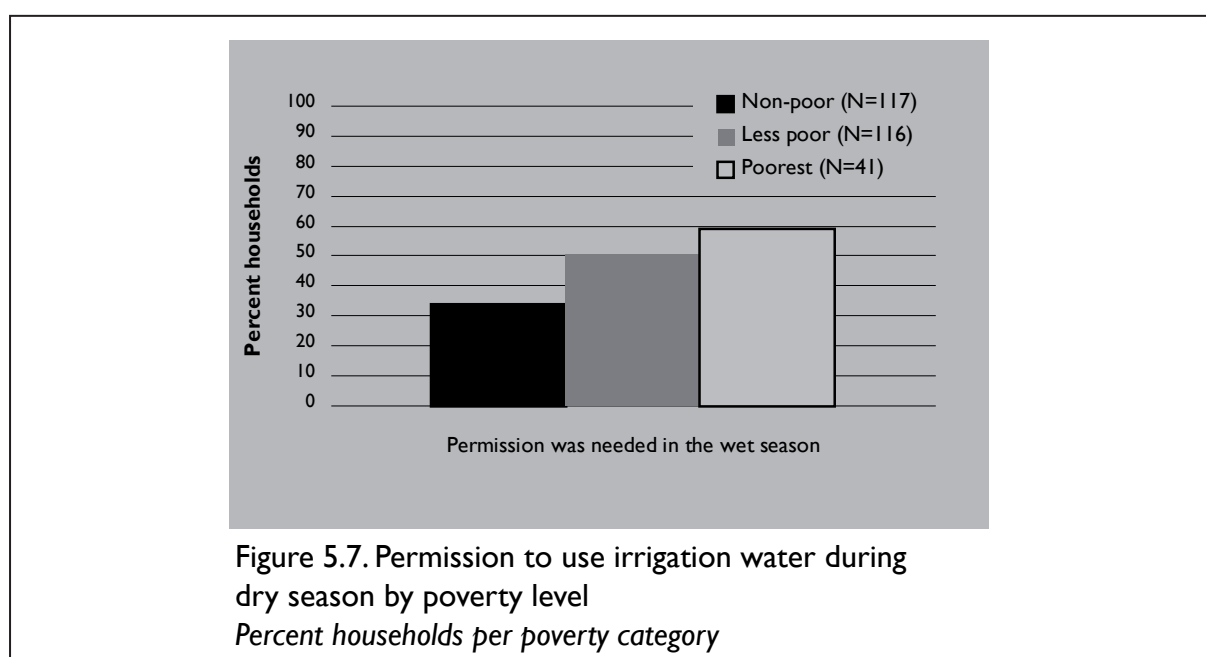


Figure 5.6. Sharing of most important source of irrigation water during dry season by poverty level
Percent households per poverty category

5.7. Permission to use most important source of irrigation water

Even though water sources for irrigation are shared within the community, permission to use irrigation water is necessary due to the fact that water needs to be distributed into the fields by the community irrigation committee. Local farmers have a right to get water from open sources for irrigation; however, in order

households need to ask for permission to use irrigation water. Therefore, more non-poor households keep their own initiative in using irrigation water. It is noted that many non-poor households can reclaim land located in alluvial areas where permission to use water is unnecessary.



to make use of this right, costs for pumping water to the field during dry season have to be met and these costs may be high, especially if fields are located far from the source. Thus, the irrigation committee is responsible for controlling water and issues related to unequal water distribution. Households using irrigation water distributed by the committee must pay an irrigation water fee or participate in the annual maintenance.

As shown in Figure 5.7, more among the poorest households having land watered/irrigated, than the less poor and the non-poor

People who are asked for permission and ways in which permission are asked

Permission to use irrigation water in the field is asked from village committees and the local government, represented by irrigation workers, village leaders, or private owners (Figure 5.8). Actually water users do not select the person to ask for permission but rather seek to obtain permission from the representatives from the above mentioned institutions which they happen to meet.

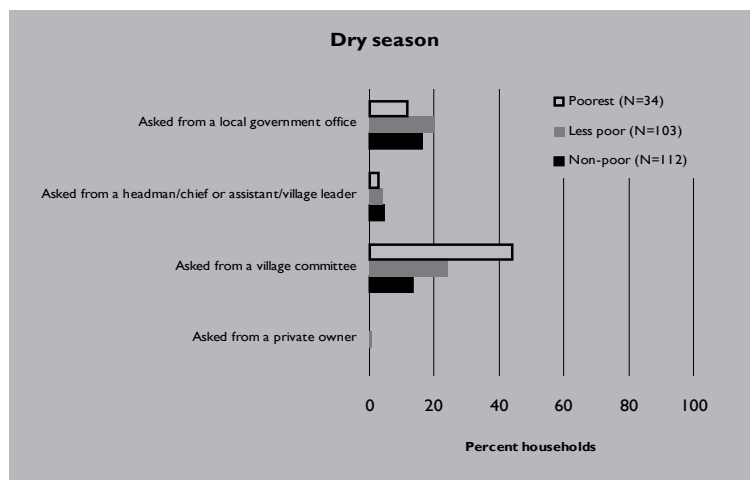


Figure 5.8. People who are asked for permission to use water for irrigation during dry season by poverty level
Percent households per poverty category

Based on the practical situation in each village, ways in which permission were asked comprise permission in writing, verbal agreement, through a third party or a household meeting. For example, in some villages where the Farmer

Association is responsible for granting permissions to use water for irrigation, permission is asked verbally.

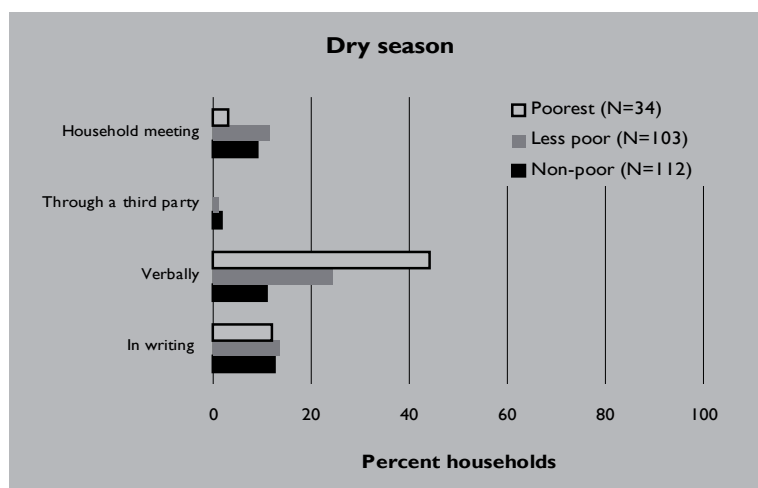


Figure 5.9. Ways in which permission was asked during dry season by poverty level
Percent households per poverty category

5.8. Agreements with other water users

Agreements to use most important source of irrigation water

In order to diminish conflicts related to the distribution and use of irrigation water, agreements are made among irrigation water users. The data shows that most of households being challenged with respect to their irrigation water use cooperate with other users to find the most effective solution for water sharing. Agreements are reached both during wet season and especially during dry season (Figure 5.10). This is explained by the fact detected in the inventory work that conflicts related to irrigation are much more frequent during the dry than during the wet season (Yen et al., 2010).

Comparing the households belonging to the different poverty level, poorest households are found to be more likely to make agreements concerning irrigation water use than the

less poor and the non-poor households. Almost 70% of the poorest households took part in agreements with respect to irrigation water during the dry season whereas this was the case to only a quarter of the non-poor households. A reason might be that poorest households primarily cultivate in terrace fields where many conflicts occur, while several non-poor households can utilize alluvial areas where conflicts are less common due to water availability. An example is shown in Box 5.1.

In addition to agreements reached after conflicts among water users, some agreements are made by the irrigation water committee. Such agreements contribute a lot to reduce conflicts among water users.

Box 5.1: Agreements between farmers with upper fields and those with lower fields

Due to the geography of the uplands, farmers normally cultivate paddy rice in terrace fields. During dry season water normally becomes too scarce. During cultivation time, households with upper fields often keep water, so households with lower fields do not get enough water for cultivation in time. In some cases, lower fields are flooded by the water let out from upper fields when they have just been fertilized. Conflicts related to such issue frequently occur among water users. In order to evade them, households with lower fields made an agreement with other users about cultivation time. In this way, households with upper fields will keep water and cultivate earlier, whereas households with lower fields will cultivate and use fertilizer a little bit later as soon as water is released from upper fields.

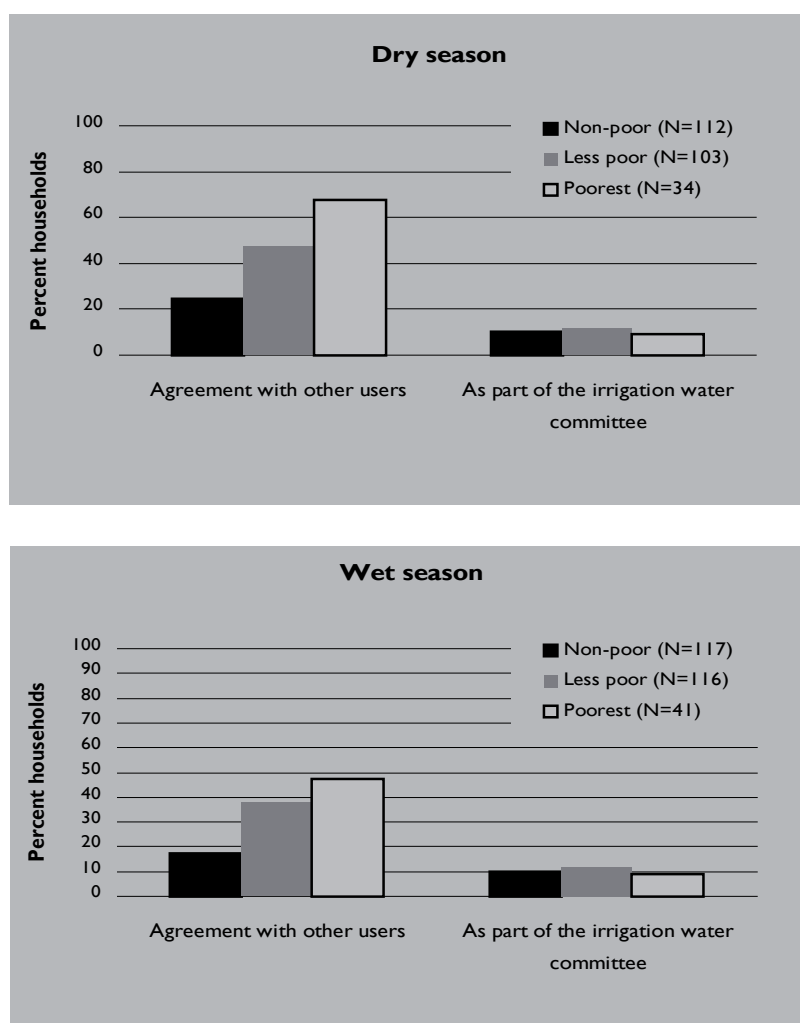


Figure 5.10. Agreements with other users during wet and dry season by poverty level
Percent households per poverty category

Types of irrigation water agreements and the involvement of third parties to agreements

Types of irrigation agreements comprise written agreements and verbal agreements either endorsed or not endorsed by a third party (Figure 5.11). According to local farmers, agreements among individuals, mainly poorest households, are normally verbal agreements, while agreements with the irrigation commit-

tee or community council are in writing (Figure 5.12). Written agreement is also requested in cases that involve the entire community. However, when agreements are reached among individuals after mild conflicts with the involvement of a third party working in the irrigation committee or village committee, they do not have to be written down.

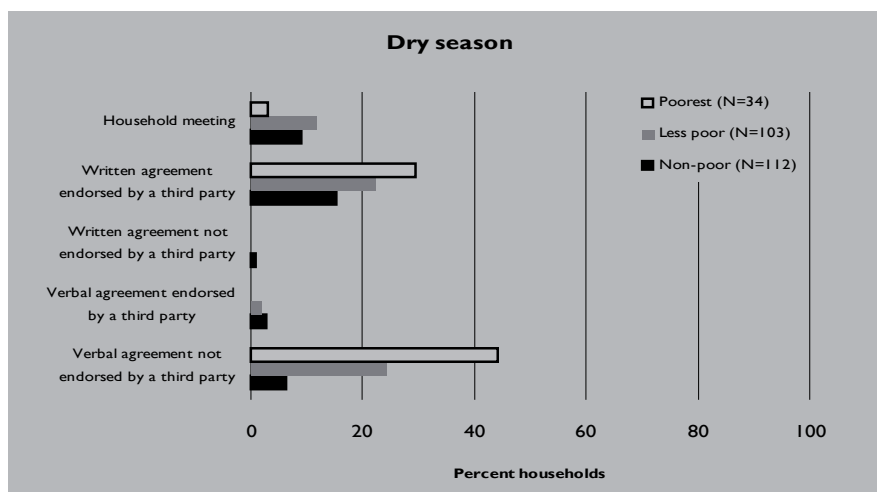


Figure 5.11. Type of agreement with other users during the dry season by poverty level
Percent households

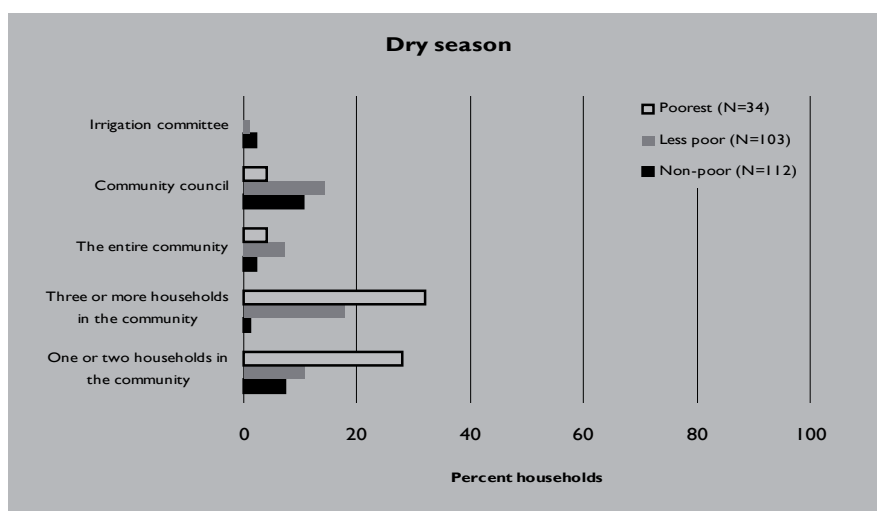


Figure 5.12. Party with whom agreement is made about water use for irrigation during the dry season by poverty level
Percent households per poverty category

5.9. Perceived problems related to irrigation water use

Figure 5.13 provides detailed information on perceived problems related irrigation water use during wet and dry seasons. A large numbers

of households in the study site are encountering difficulties related to the use of water for irrigation: around 70-80% of households during dry season and around 60-70% of households during wet season.

Of the 12 types problems faced by farmers, distance from the water source to the field of the individual household is the most frequently mentioned problem, particularly by the of poorest and less poor households both with respect to the wet and the dry season (Figure 5.13). Thus, favourable location of field provides more non-poor households with better access to irrigation water.

Poorest households are more likely to encounter problems with respect to the amount of water reaching their fields during dry season due to water shortage, and with respect

to obtaining permission to use water source during wet season as well as right to use water. Meanwhile, the non-poor households more frequently mentioned problems related to the costs of getting water to their fields or related to the maintenance of the water point.

Pollution is also one of the major problems faced by a fairly high proportion of the households. In addition, farmers, especially non-poor households, are also challenged with sediments and bad quality of water.

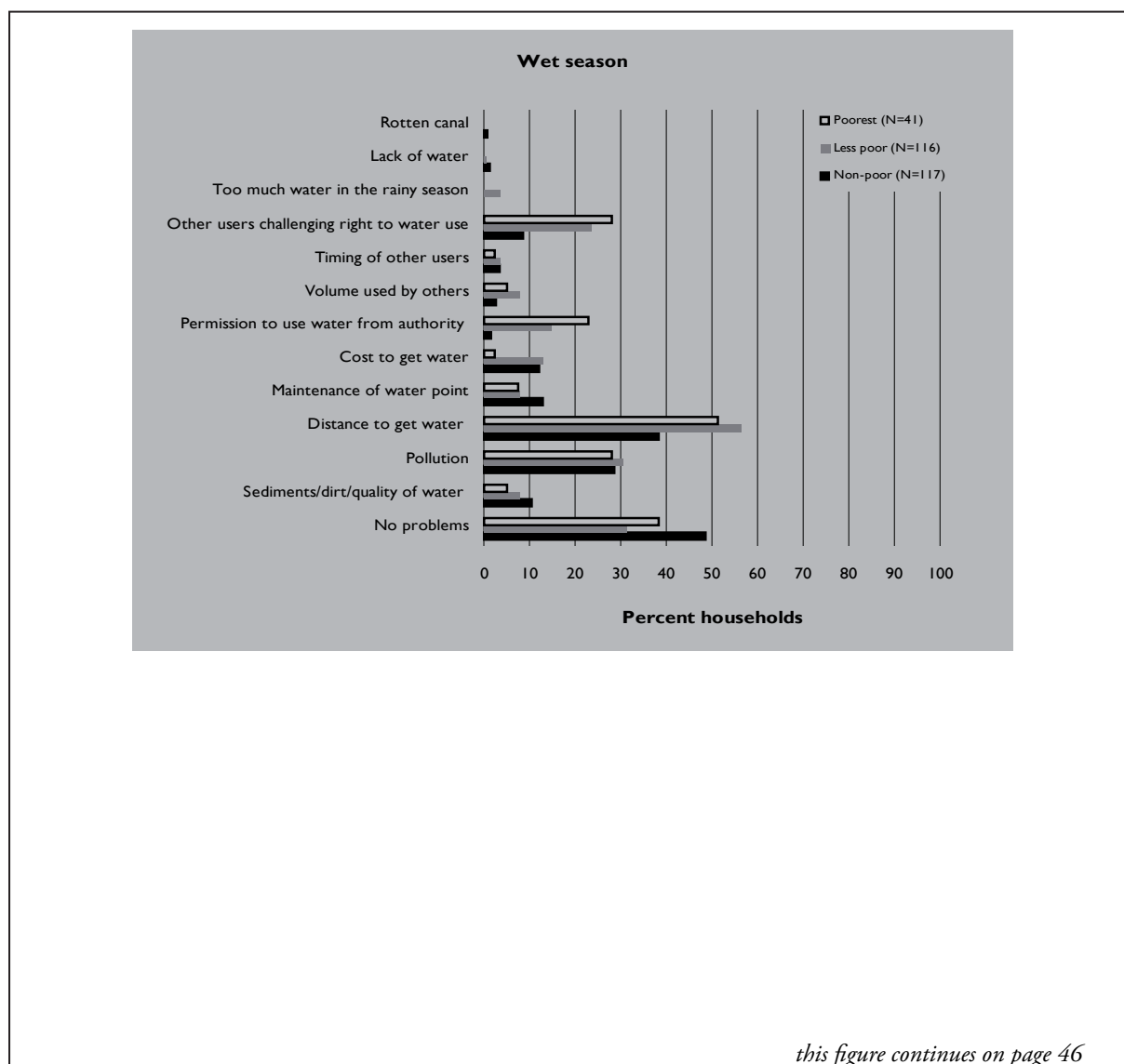


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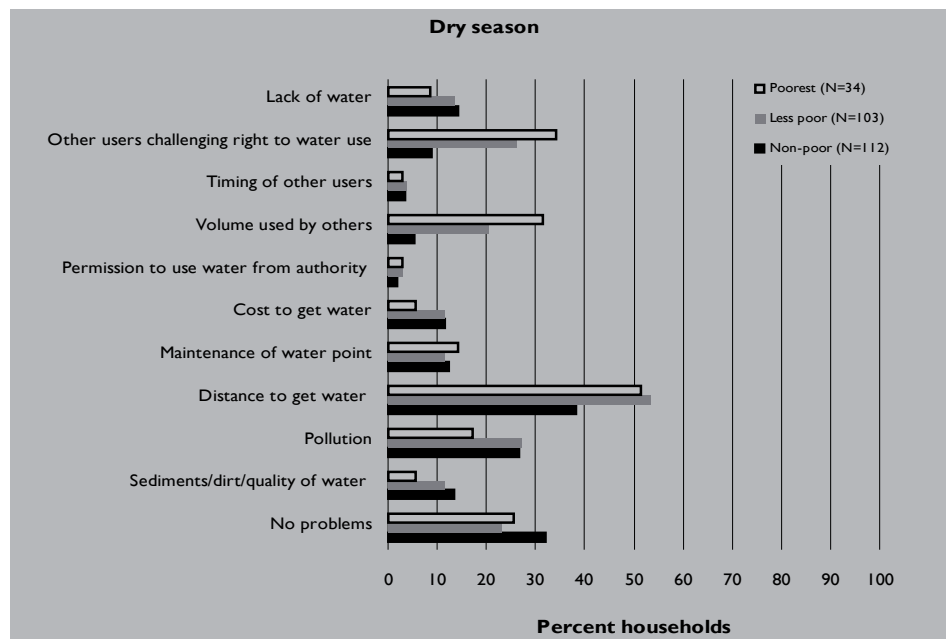


Figure 5.13. Perceived problems of irrigation water use during wet and dry season by poverty level
Percent households per poverty category

5.10. Perceived causes of irrigation water pollution

Perceived causes of water pollution and quality identified in the above section are presented in Figure 5.14. Water is polluted due to cattle watering, agricultural chemical use, clothes

washing, and erosion from upstream fields. Nevertheless, water pollution caused by agricultural chemical use is much less than the two others, since agricultural chemicals have not commonly been used in the locality.

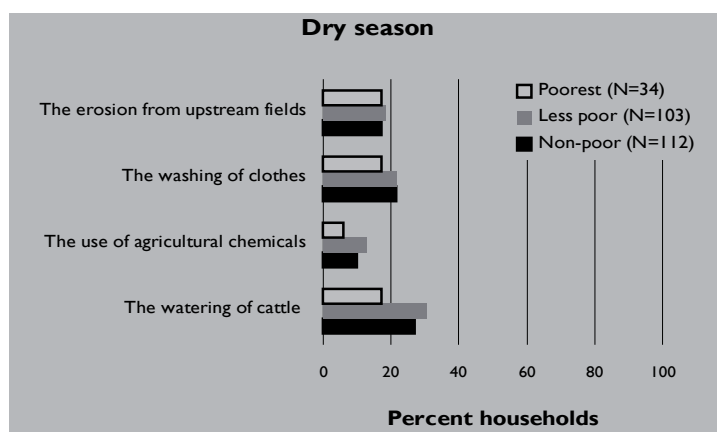


Figure 5.14. Perceived causes of water pollution during the dry season by poverty level
Percent households per poverty category

5.1.1. Challenges to irrigation water use

As shown in Figure 5.15, a larger share of the poorest households have experienced being challenged with respect to their use of water for irrigation than of the less poor and non-poor households. The reason is as explained above that the poorest households normally cultivate in areas less convenient for accessing irrigation water than those of non-poor households. More households face challenges during dry season than during wet season due to the occurrence of widespread water shortage during dry season, a main cause behind conflicts among water users.

Challenges with respect to the amount of water

As predicted, households mainly face challenges to amount of water during dry season due to water shortage and uneven surface of terrace fields. Nevertheless, based on the survey data, it is interesting to note that challenges with respect to the amount of irrigation water also appear in the rainy season when water is abundant (Figure 5.16), thus being caused by poor or inconsiderate water management. An example is provided in Box 5.2.

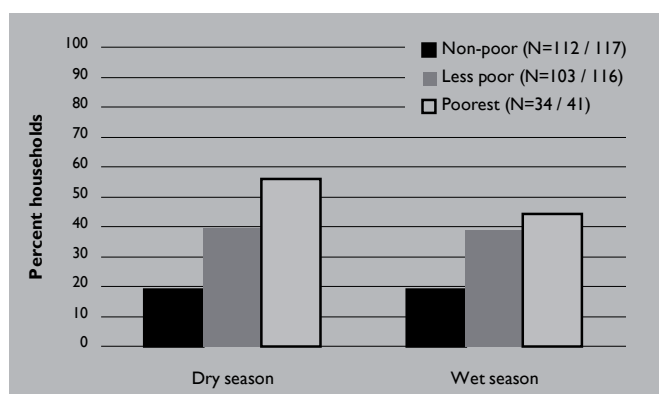


Figure 5.15. Challenges to irrigation water use during wet and dry season by poverty level
Percent households per poverty category

Box 5.2: Challenges with respect to amount of water for irrigation during wet season

In Tong Chai village of Chi Khe commune, one lead mining company has been operating for four months. In order to exploit lead, hundreds of tons of soil are excavated. Due to inconsiderate actions of the company, this amount of soil has blocked the flow of the only irrigation water source for fields of farmers in Production Group 3 in Tong Chai village and part of fields of farmers in neighbouring Lien Dinh village. As a result, even during wet season, a lot of arable areas lack water for cultivation which leads to a serious conflict between farmers and the company.

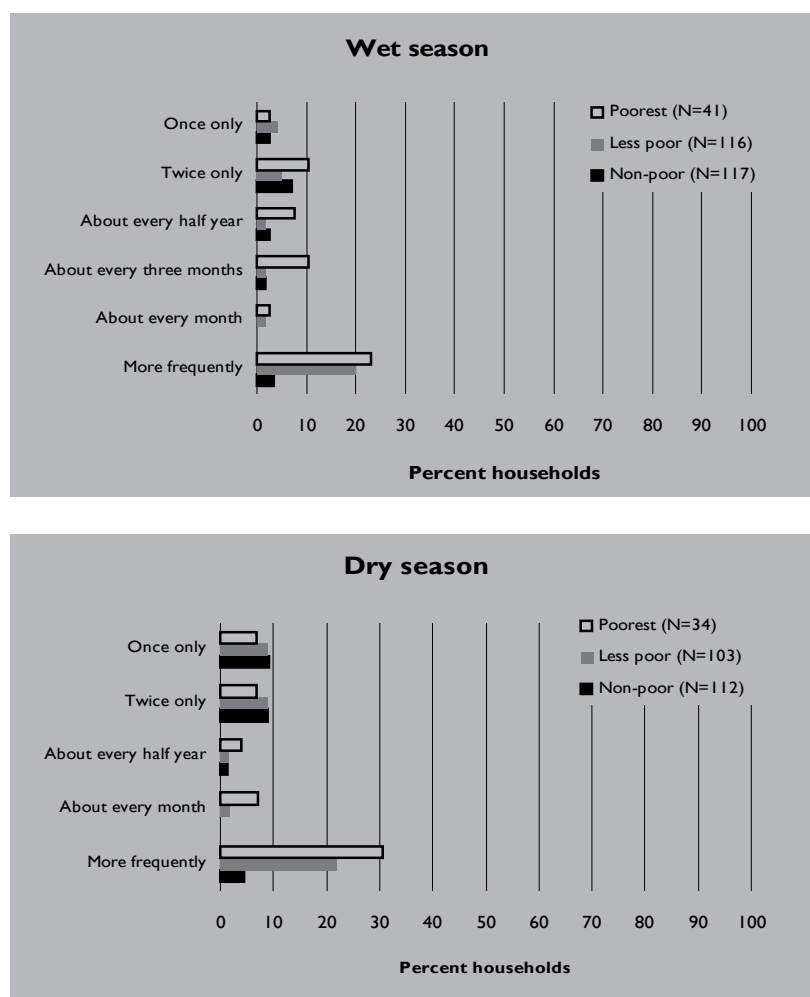


Figure 5.16. Challenges to amount of water during wet and dry season by poverty level
Percent households per poverty category

Among the three household poverty categories, it is clear that the poorest households followed by the less poor households are more frequently challenged with regard to quantity of water than the non-poor households. According to local people, these challenges occur frequently, even every year, and are still going on. This is explained by several reasons. One

reason is that many non-poor households can be active in accessing water source when using alluvial areas for cultivation. Another reason is that according to local farmers, land areas of non-poor households are normally more convenient to irrigation water than other households.

Box 5.3: Challenges to amount of water for irrigation during dry season

The paddy field of Mr. Vi Van Kien’s household in Ke Trai village in Thach Ngan commune is located lower than those of other households within the community. During wet season, no conflict occurs since water is available. However, water shortage became more serious during last summer. Water runs from the upper parts to the lower parts. During cultivation time, households with upper fields often kept water, which caused Mr. Kien’s household to be unable to transplant in time. A conflict was thus unavoidable in this situation. Agreement about cultivation time was reached between his family and water users with upper fields.

Challenges with respect to the way in which water is used

The way of using irrigation water is also challenged during wet and dry seasons (Figure 5.17; only data for dry season is shown). Non-poor households are less challenged with respect to the way they use water than less-poor and poorest households.

Box 5.4: Challenges to way of using water for irrigation

Coming back to the example of Mr. Vi Van Kien in Box 5.3, he normally let water run freely into his field every cultivating season. However, during last season, he needed to dig a drain-ditch in order for water to run only into his field after the agreement reached between him and other water users.

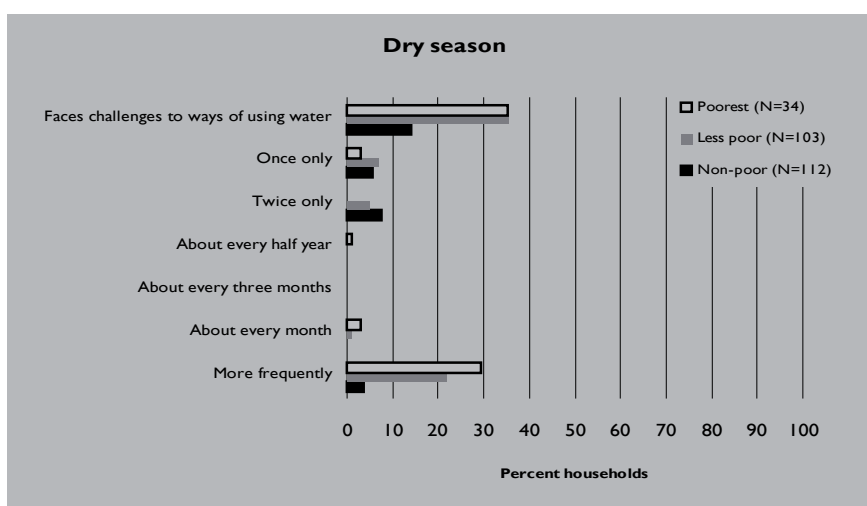


Figure 5.17. Challenges with respect to ways in which water is used during dry season by poverty level
 Percent households per poverty category

Challenges with respect to the right to use water for irrigation

Approximately one fifth of the less poor and the poorest households reported that their right to use water for irrigation had been challenged, particularly during the dry season (Figure 5.18), whereas this was the case for less than 10% of the non-poor households. These challenges occur mainly to households sharing water from deep wells and public water supply systems, and to a lesser extent to households using water from open sources.

Box 5.5: Challenges to right of using water for irrigation

Mr. Ha Van Tuan's household and other households share water from a public water supply system constructed by the 135 Program. Water sharers make an agreement that water provided by the system is mainly used for domestic purposes and only for irrigation in cases when water is abundant. However, Mr. Tuan's household as well as other households consider water from the system as the most important source for irrigation during dry season.

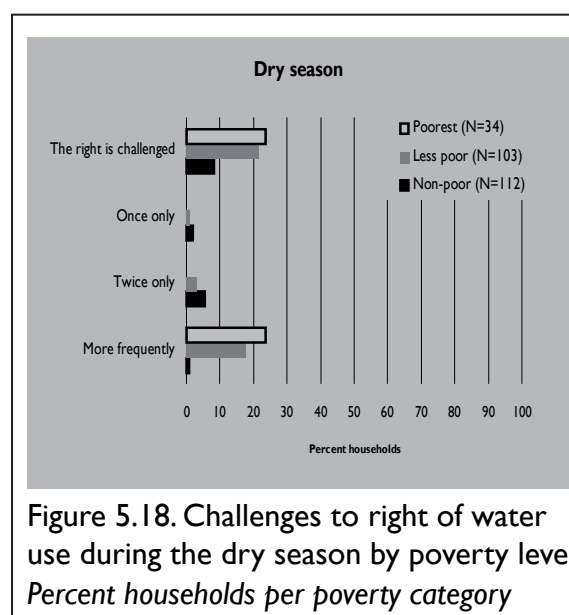


Figure 5.18. Challenges to right of water use during the dry season by poverty level
Percent households per poverty category

5.12. Reasons for use of most important water source

Concerning reasons of for choosing a particular water source as the most important for irrigation, most households do not appear to have the option to select their water source. The data shows that a large percentage of households, particularly the poorest and less poor households, use only one water source for irrigation because it is the only one available (Figure 5.19).

The openness of a water source is one of the reasons attracting many water users, including the non-poor. The volume of water available is also mentioned a reason for choosing a particular water source of irrigation by close to one third of the households. In addition, particularly the poorest and less poor households mention low or no costs of accessing a particular water source and the fact that they have been denied other sources of water as reasons for choosing a particular water source for irrigation. While the non-poor households to a higher extent mention good maintenance and short distance to water source among the reasons for choosing a particular water source.

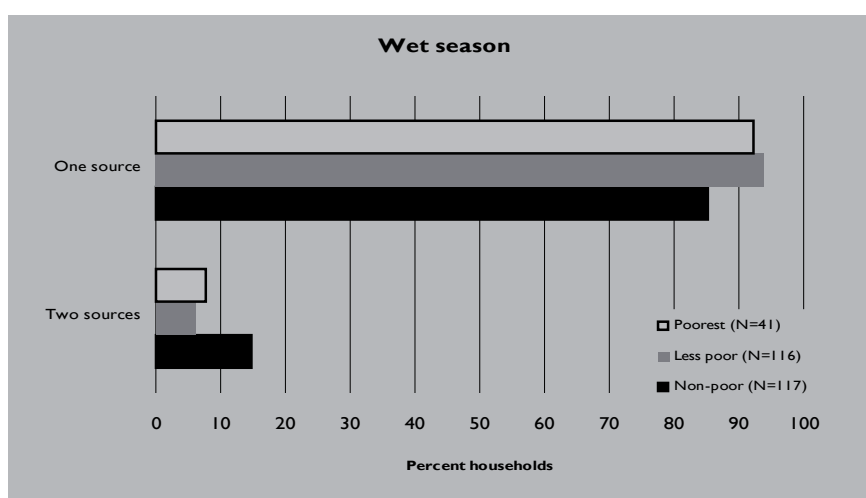


Figure 5.19. Reasons for use of most important water source for irrigation during the dry season by poverty level
Percent households per poverty category

5.13. Number of water sources

The lack of deliberate choices for most farmers with respect to the source of irrigation water is also reflected in the number of water sources which households access for irrigation. Most households use water for irrigation from only

one source (Figure 5.20). Though making up a small percentage, more non-poor households than less poor and poorest households are able to access two water sources for irrigation, especially during the dry season.



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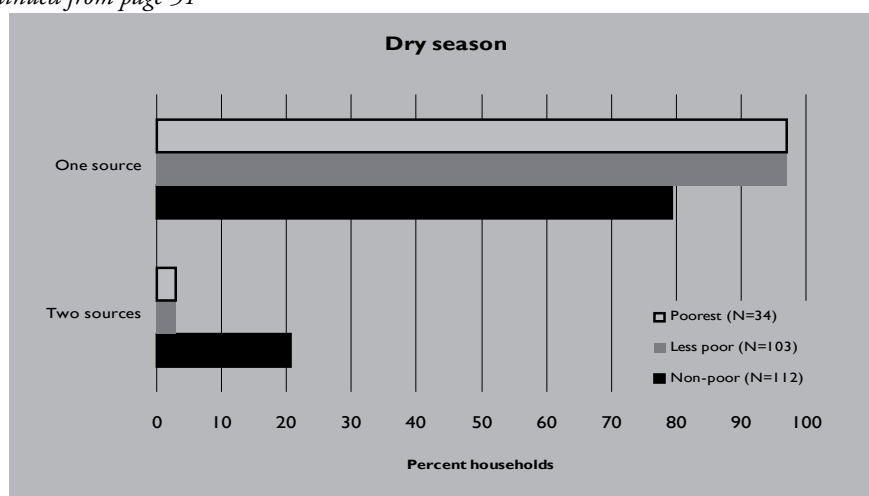


Figure 5.20. Number of water sources for irrigation during wet and dry season by poverty level
Percent households per poverty category

6. POVERTY AND WATER ACCESS FOR ANIMAL HUSBANDRY

6.1. Most important source of water for animal husbandry

When asked about the most important source of water for animal husbandry, farmers only mentioned water for pigs and cattle raising, but not for chicken. This is due to the fact that the number of chicken raised per household is relatively small, so the volume of water consumed is insignificant. Another point to be noticed is that due to a custom of grazing, cattle, including buffaloes and cows, are normally brought to the water source to drink or bathe. Only water for pig raising is carried from the water source to animals. Water for cattle is all from open sources, water for pigs mainly from open sources and to a lesser extent from deep wells. Moreover, while close to all non-poor households (94%) own pigs or cattle, this is the case for only half (49%) of the poorest households and 80% of the less poor households.

The majority of the households owning pigs or cattle, ranging from a bit more than 60% of the non-poor households to close to all of the poorest households consider water from open sources as the most important source of water for animal husbandry (Figure 6.1). By contrast more than two thirds of the non-poor households mentioned deep wells as the most important source of water for animal husbandry compared to less than 10% of the poorest households. Indeed, under the condition that accessibility to domestic water is still limited, only households, mainly non-poor households, who really have better access to domestic water can afford to use water from deep wells or shallow wells for animal husbandry.

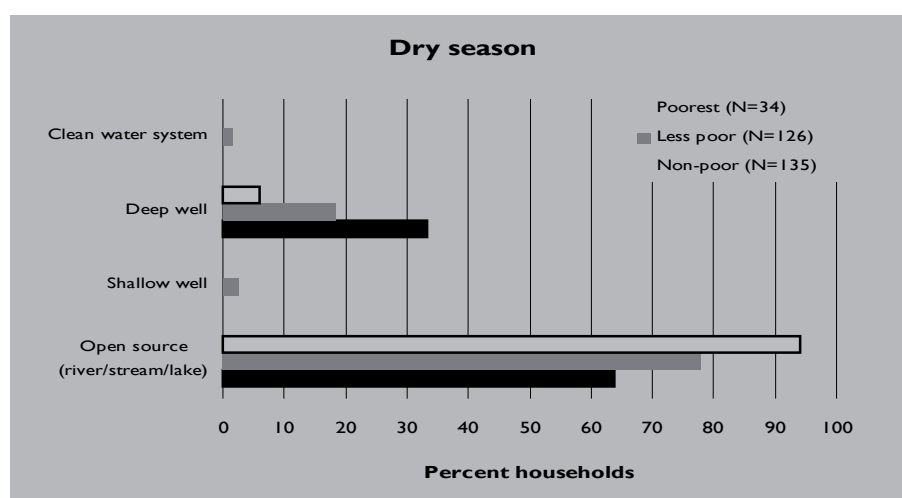


Figure 6.1. Most important source of water for animal husbandry during the dry season by poverty level
Percent households per poverty category

6.2. Permission and agreement to use water for animal husbandry

In general, permission to use water for animal husbandry do not appear to be necessary to ask, since animals normally consume water from open sources. Agreements related to this issue are also rare among water users in the study site. Only two non-poor households reported to have asked for permission and reached an agreement to use water for pig raising.

6.3. Payment in cash or in labour and kind to use water for animal husbandry

As a result of mainly using water from open sources, the majority of the poorest and less poor households have made no cash or in-kind contribution for water use for animal husbandry. In contrast, due to the higher proportion among the non-poor households relying on water from deep wells, more non-poor households report to have made an initial contribution in order to obtain access to water for animal husbandry.

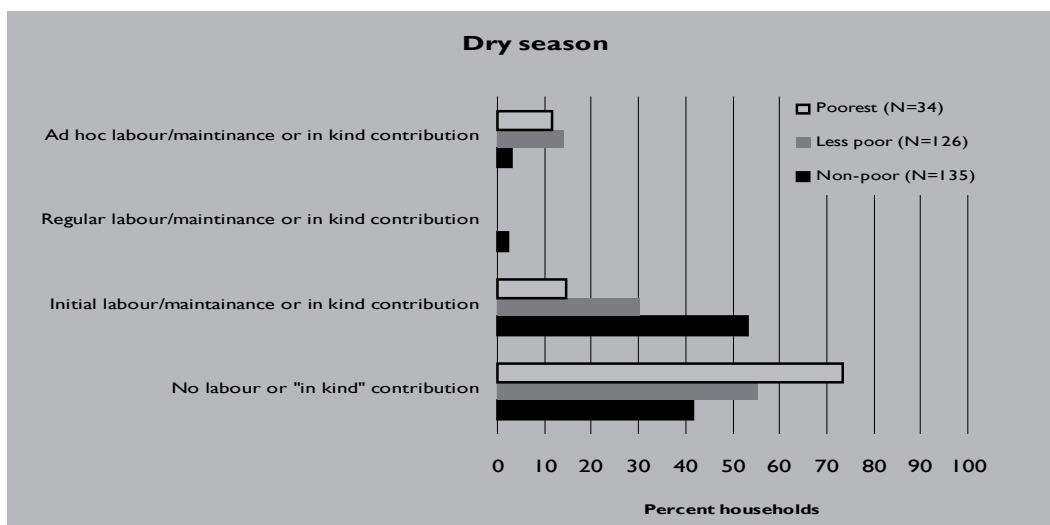


Figure 6.2. Payment in cash or in labour or in kind to use water for animal husbandry by poverty level
 Percent households per poverty category

6.4. Perceived problem of water use for animal husbandry

Information on perceived problem of water use for animal husbandry associated with household poverty is presented in Figure 6.3. Of households raising animals, non-poor

households are more advantageous in accessing water sources for animals. Problems related to distance to water source and dirt in the water used for watering animals are more frequently reported by less poor and poorest households than by non-poor households, and as much as

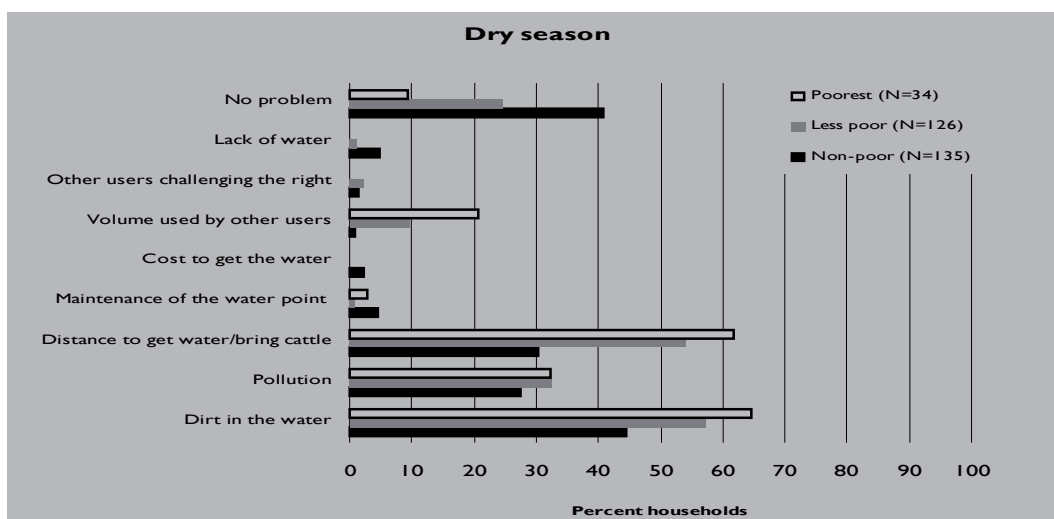


Figure 6.3. Perceived problem of water use for animal husbandry during the dry season by poverty level
 Percent households per poverty category

40% of the non-poor households do not report any problems relating to obtaining water for their animals during the dry season.

6.5. Challenges with respect to water used for animal husbandry

Although the volume of water used for animals is limited, since the number of heads of animals per household are small, challenges to water use are unavoidable because of a custom

of grazing. The data in Figure 6.4 show that approximately a quarter of the households owning pigs or cattle, irrespective of their poverty level, have experienced being challenged in relation to the amount of water used for animal husbandry. Animal owning households are to a lesser extent challenged in respect to the way and their right to use water for animal husbandry.

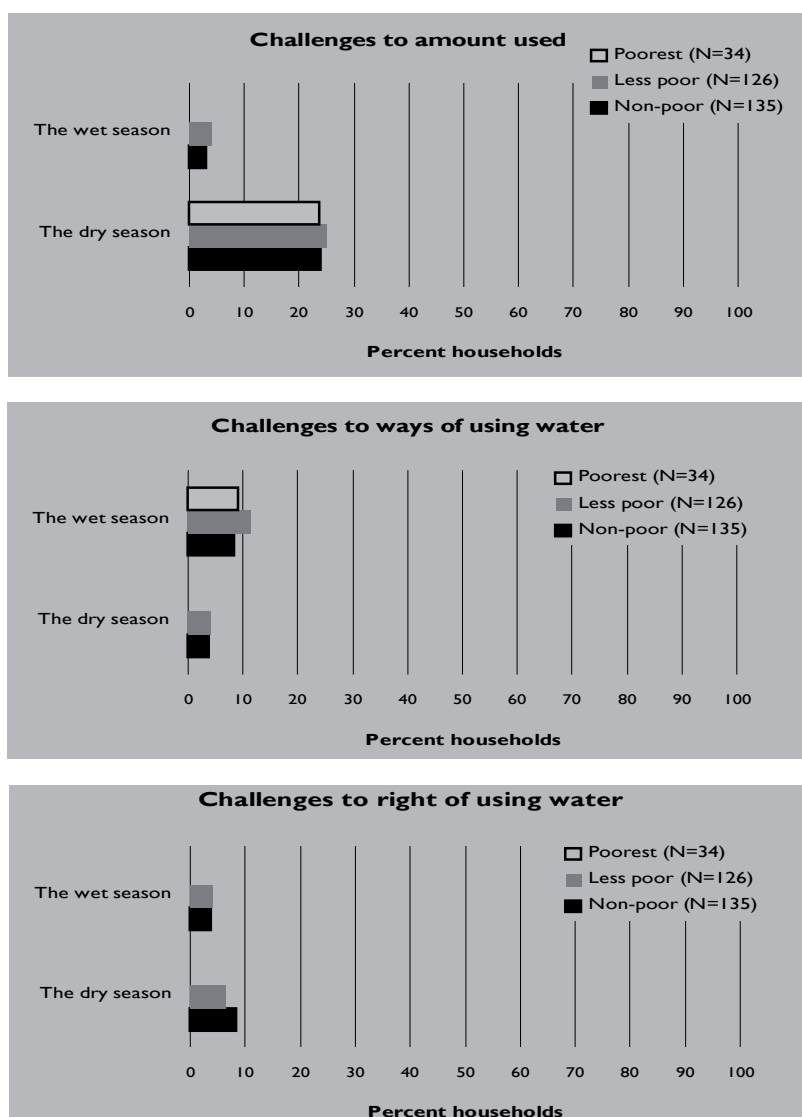


Figure 6.4. Challenges with respect to water used for animal husbandry by season and poverty level
 Percent households per poverty category

6.6. Reason to use water source for animal husbandry

As for irrigation water, the non-poor households tend to be more concerned with good quality of water, steady supply, good maintenance...

households have less options for making deliberate choices and therefore are primarily concerned about costs and water accessibility.

6.7. Number of water source used for animal husbandry

Non-poor households enjoy the largest degree of flexibility with respect to the number of sources they can access to obtain water for ani-

30% of the non-poor households have access to water from two sources during the dry season while this is the case for 17% of the poorest households owning pigs or cattle.

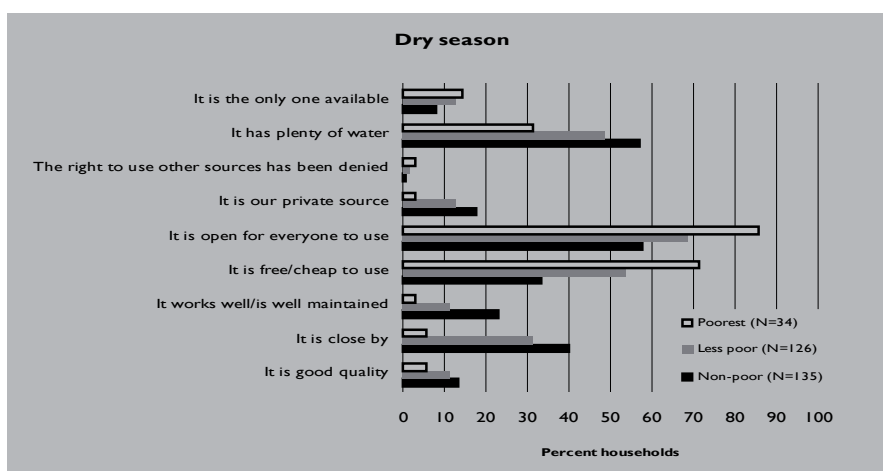


Figure 6.5. Reason to use water source for animal husbandry during dry season by poverty level
Percent households per poverty category

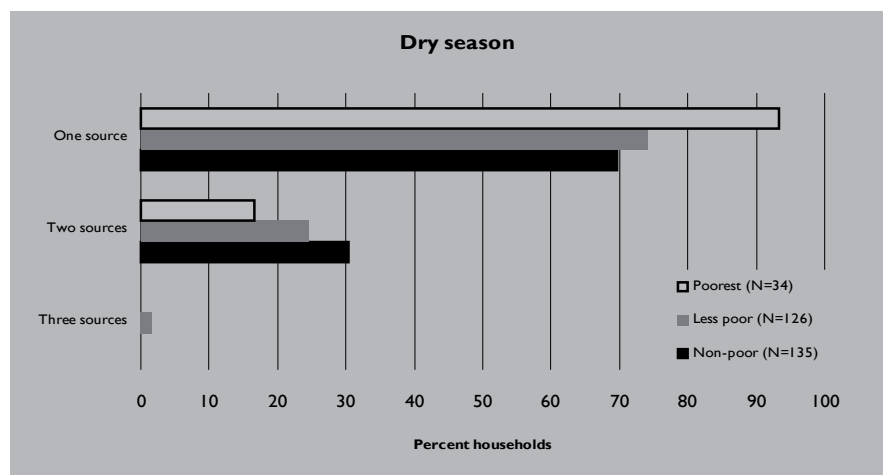


Figure 6.6. Number of water source for animal husbandry during dry season by poverty level
Percent households per poverty category

7. CONTACT OF HOUSEHOLDS WITH LOCAL INSTITUTIONS

7.1. Contact of households with institutions

An analysis on contacts of households with local institutions is carried out in order to consider communication of households with outsiders, especially those in higher positions. As shown in Figure 7.1, most households, regardless of their poverty level, had contacts with one or more local institution at least once during the last two years. Non-poor households followed by less-poor households had most contacts with local institutions.

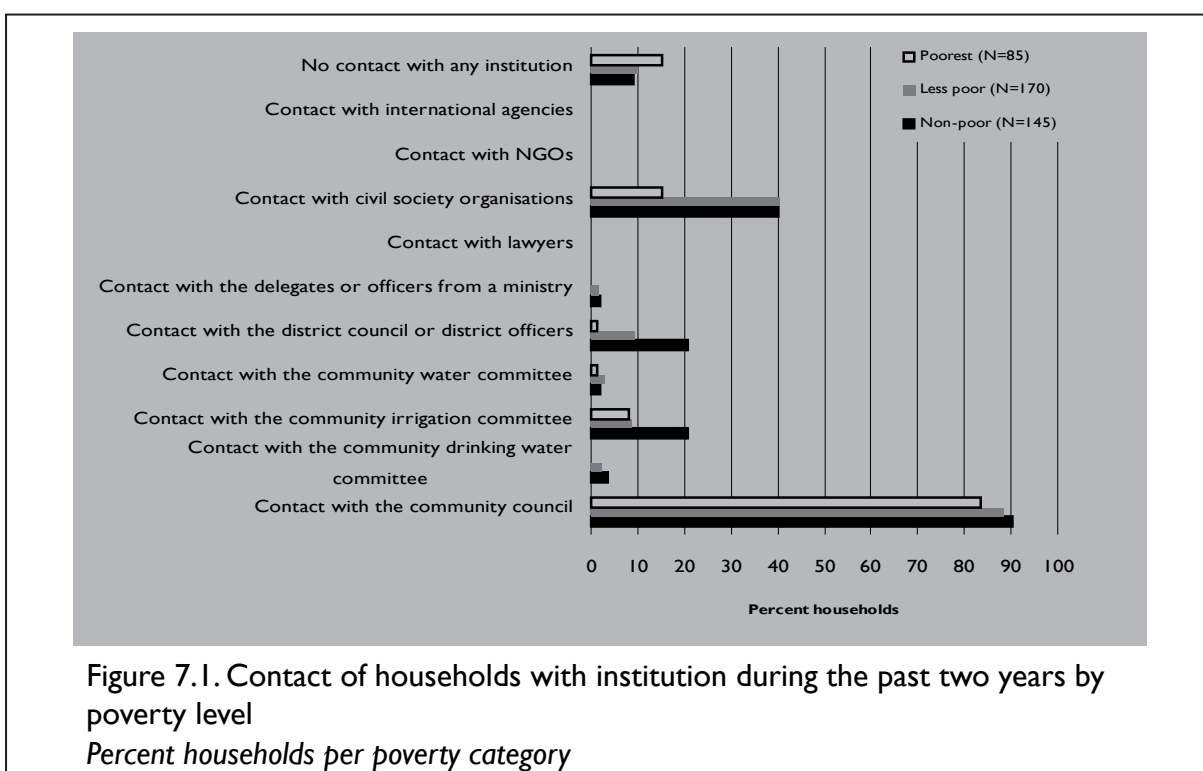
Households find it easier to contact with institutions at the local village level. Of households having contact with local institution, all households contacted someone in the community council/village committee. This means that the community council plays an indispensable role in solving issues occurred within the community. Beside the community council,

social organisations such as Farmer Associations, Women Associations, Veteran Associations, Elder Associations, and Youth Unions also play a very important role.

In addition, a few of the non-poor households have contacted institutions at the district level such as district councils or district officers or delegates from a ministry. It needs further studying to understand why the poorest households have little contact with levels beyond community level. There is no evidence of contact with non-government organisations or international agencies.

Concerning contacts with water organisations, households mainly have contacted the community irrigation committee, while only an unremarkable number of households have communicated with the drinking water committee.

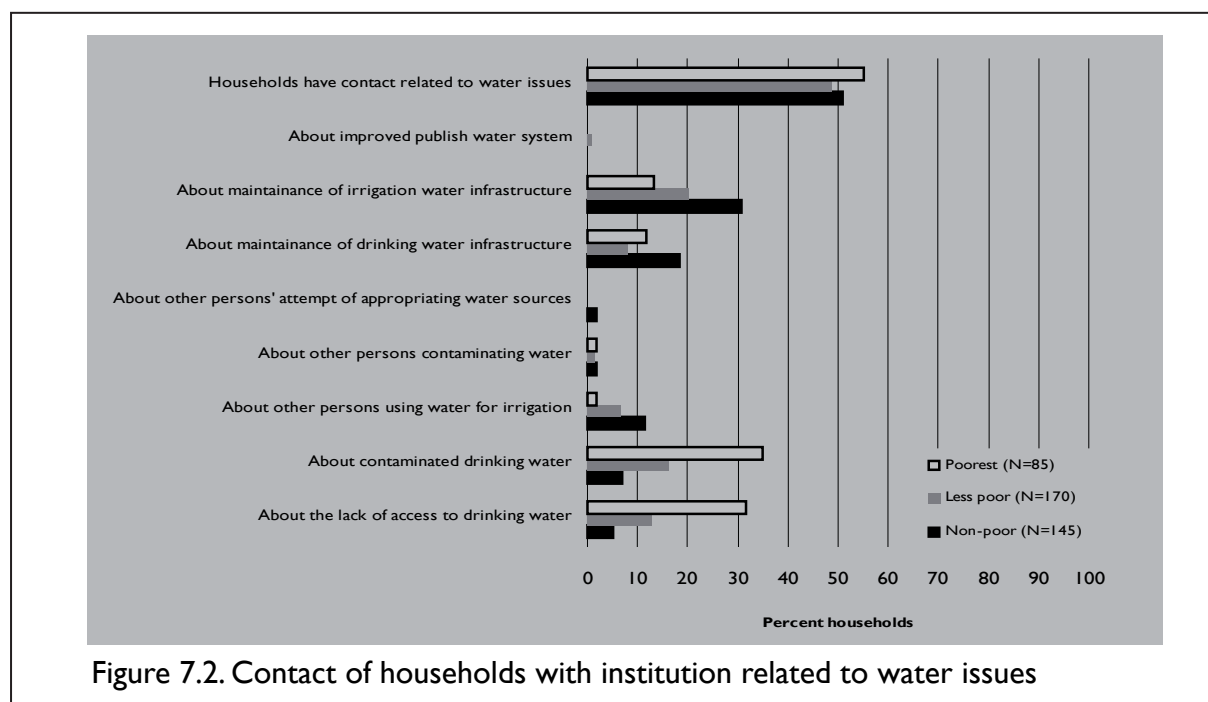
In this section, the general problem-solving role of institutions is partly identified. Their role in solving water-related issues is discussed in the following section.



7.2. Contact of households with institution related to water issues

Approximately half of the households within each of the poverty categories have contacts with institutions related to water issues (Figure 7.2). However, while the water-related contacts

to institutions contacted first, '2' to institutions contacted second, '3' to institutions contacted third, and 4 for institutions that were not mentioned. An average score is calculated for each household category. The average score



with institutions of the non-poor households primarily concern irrigation infrastructure, the water-related contacts made by poorest households primarily concern issues to contaminated drinking water or lack of drinking water.

7.3. Expected role of institutions in solving water-related issues

Respondents were asked which institution they would contact first, second and third in the hypothetical case that their most important drinking water source would run dry, that someone would use so much water that less water would be available to the respondent, and that water was contaminated. To facilitate the analysis of the responses, responses were converted into scores so that the score '1' would be assigned

varies from 1 point to 4 points. The closer to 1 the point is, the sooner this institution would be contacted by individual households.

Institutions contacted if drinking water source dried out

Figure 7.3 shows that the community council/village committee plays an important role for the households by constituting the institution which people would contact first if their water source were to dry out. The average point of households contacting with this institution is the smallest, around 1.9 points. The community council is obliged to report occurred water issues to higher authority levels (Yen et al., 2010). The second party to be contacted are their neighbours.

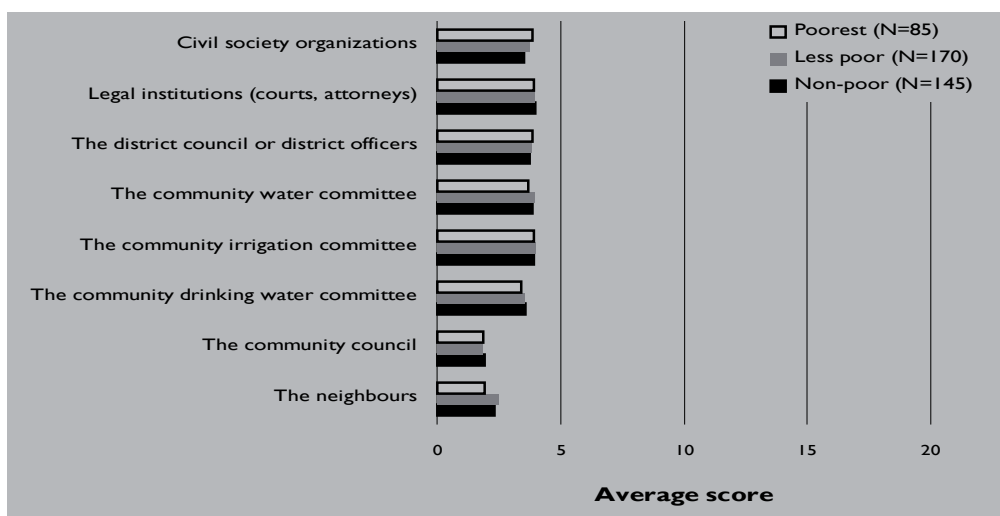


Figure 7.3. Institutions contacted first, second and third by households in case their most important drinking water source would dry out by poverty level
Average score per poverty category (the lower the score; the sooner the contact)

Institutions contacted someone used so much water that too little drinking water was left
Once again the importance of the community council/village committee as the institution which most household would contact first is affirmed, also in this hypothetical case

of someone within the community using so much water that too little was left for drinking water for the interviewed household. Second, households would contact the person responsible while third they would contact their neighbours to hoping to find a joint solution.

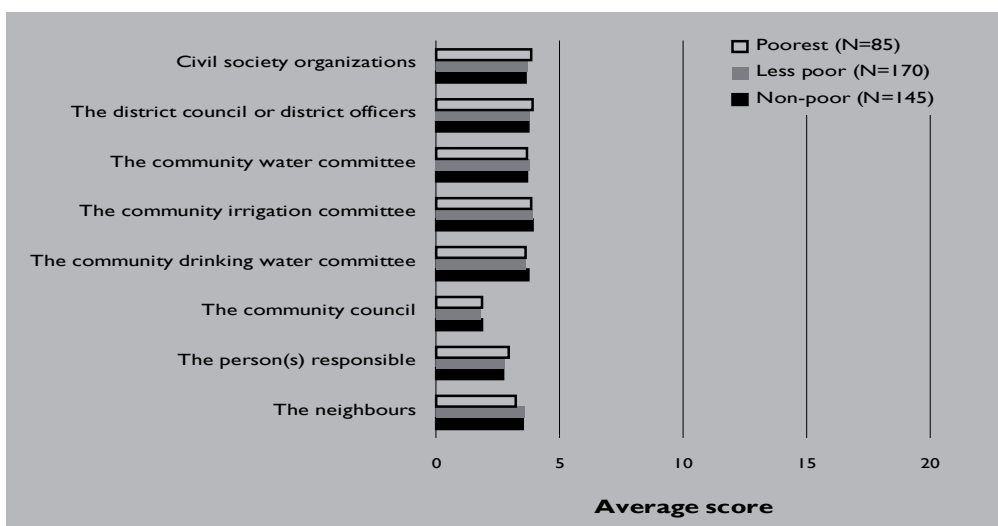
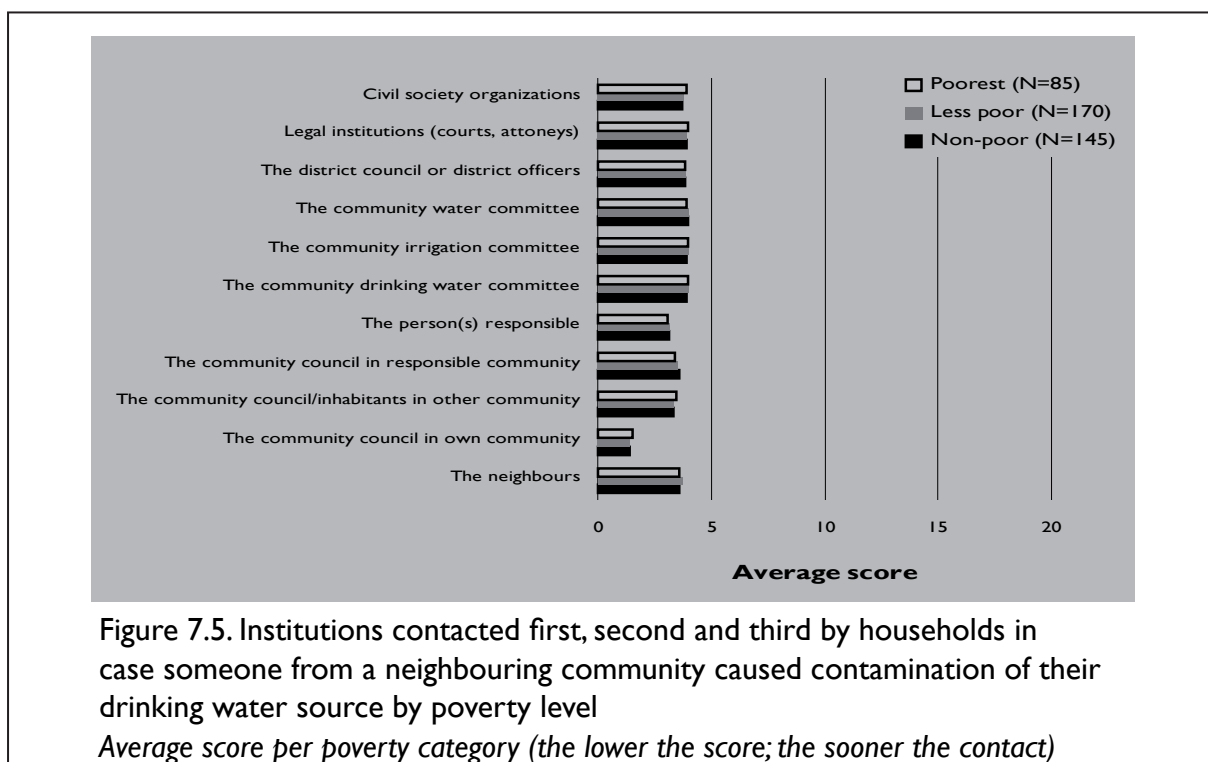


Figure 7.4. Institutions contacted first, second and third by households in case someone within the community used so much water that not enough drinking water was left by poverty level
Average score per poverty category (the lower the score; the sooner the contact)

Institutions contacted someone in a neighbouring community caused water contamination to their drinking water supply

The community council plays a particular role in this hypothetical example where water problems are caused by someone in a neighbouring community and the average score allocated to the community council is thus lower than in the two hypothetical examples examined above, indicating that more households would go to the community council as their first option. When asked this question, most households considered that this was a big problem,

actually taking place in several communities. Second, people would go to the person who caused the contamination or to the community council in the community of the person causing the contamination. Both in this case and in the two above cases, households would rarely contact with other institutions, because they consider the community council as the appropriate representative to report to higher level authorities. Therefore, the community council is considered the most important party that households can contact directly.



8. CONCLUSIONS

This analysis has aimed at exploring the relationship between household poverty and access to water for domestic as well as productive purposes. The relationship between poverty and cooperation as well as challenges in water use among households is also identified. The analysis manifests strategies of upland households to maintain and control their access to water. The difficulties that each household group suffered when utilizing water are also clearly identified. Further, an insight into the role of institutions in solving water issues according to the perception of local households is provided.

8.1. Conclusions on the relationship between poverty and water access to domestic water

Non-poor households are able to access better quality water sources during dry season. Non-poor and less-poor households mainly use water from deep wells as the most important water source, while poorest households to a much higher extent use water from open sources, even for drinking purposes. The number of poorest households using water from deep wells for washing clothes and bathing is lower than that of non-poor households. A very small number of interviewed households use water from public water systems or gravity-fed piped-water systems as the most important source. Non-poor households often do not have to go so far to get water for domestic use, as the less poor and poorest households do. Non-poor households enjoy more flexibility in terms of having access to more water sources in cases one water source becomes exhausted as more non-poor households can access two water sources or more.

Households with better economic conditions primarily use water from sources owned by themselves. Poorest households and less

poor households, in contrast, normally use water owned by other owners, such as private households or relatives, or they use water from sources shared by a certain group in the community or the whole community.

Permission to use water seems not to be common in the study site. The percentage of households needing to ask for permission occupies a small part of less than 10% of non-poor households, and around 15% of the less poor and the poorest households. Permission to use water is mainly asked for in the case of wishing to accessing water from wells owned by neighbours.

Due to their limited financial capacity, poorest households primarily choose to use domestic water from sources that are open to every one or where they do not have to pay a fee. Meanwhile, many non-poor households pay money, i.e. for electricity consumption, to use water. Also most of poorest households give no labour or in-kind contribution, since they use water from open sources. Therefore, the financial advantage facilitates non-poor households' access to better quality domestic water.

More among the poorest households face problems with respect to their access to domestic water than among the less poor and non-poor households. Since the poorest households mainly use open water sources, they find it more challenging when water is contaminated. The distance to get to water sources is also considered as one of the major problems perceived by many local people, especially the poorest. During the dry season, the poorest households are very much challenged especially with regard to amount of water and ways in which water is used.

8.2. Conclusions on the relationship between poverty and water access to productive water

Poverty and water access to water for irrigation

Most households, more or less 90%, irrespective of poverty level of the households having land under irrigation, use water from open sources for irrigation as the most important source during both rainy and dry seasons. Non-poor households are better able to use water for crop cultivation from deep wells. In general, more households have better access to water during wet season than during dry season.

Non-poor households have better access to irrigation water than the less-poor and poorest households. Around 80% of the non-poor households own watered/irrigated land. Meanwhile only around 40% of poorest households have access to water for irrigation. Similar to domestic water, though making up only a small percentage, more non-poor households are able to access two water sources for irrigation, especially during the dry season.

Water for irrigation during both the rainy and the dry seasons is mainly owned by communities. Only few households water their crops by water owned by themselves.

Non-poor households are more active in using irrigation water and several households have no need to ask for permission, since more of these households can reclaim land located in alluvial areas where water is more easily available. Meanwhile, permission needs to be asked by a larger proportion of the poorest households.

Due to facing more challenges with respect to the amount of water and ways in which water is used than non-poor households, the poorest households usually have to reach agreements with other water users, especially during dry season, in order to access water for irrigation and avoid conflicts. Actually, poor-

est households primarily cultivate in terrace fields where many conflicts related to unequal distribution of irrigation water occur, thus causing need for agreements, while several non-poor households can utilize alluvial areas where conflicts are more rare due to better water availability.

Thanks to better economic conditions, more non-poor households can pay fees for use of irrigation water than the less poor and poorest households. Paying a fee is normal in households using water for cultivation from deep wells as payment for electricity in connection with water pumping is required.

In regard to suffering problems in using water for irrigation, like the use of domestic water, distance to get water during wet and dry seasons is considered as the most prominent problem to many households, particularly less poor and poorest households. Favourable location of fields can facilitate more non-poor households to get better access to irrigation water. Poorest households encounter difficulties in volume of water available, while non-poor normally suffer problems related to costs to get water or maintenance of water point.

Poverty and water access to water for animal husbandry

Households with better economic conditions also have better access to water for animal husbandry. Especially the poorest households consider water from an open source to be their most important source for water for animal husbandry. More non-poor households, who really have better access to domestic water, can use water from deep wells or shallow wells also for animal husbandry. Most households take full advantage of public water sources.

Permission to use water for animal husbandry has been unnecessary to ask since animals normally consume water from open sources. Therefore agreements related to this

issue are not common among water users in the study site.

Of households raising animals, non-poor households obviously face fewer difficulties in accessing water since they live closer to water sources than the other households do.

Non-poor households, however, seem to face slightly more challenges to water use in comparison with the two other groups, probably because they raise more animals.

8.3. Conclusion on role of institutions in solving water problems

The community council is beyond doubt the institution which people would first resort to in case their drinking water source would dry out, someone within the community used so much water that not enough was left for others or that somebody from a neighbouring community caused contamination of their water source. This owes to the fact that the community council is considered as the most appropriate institution representing the community and its inhabitants to higher level authorities.

8.4. Discussion and conclusion on differences between domestic water and productive water

When water is in short supply during the dry season and local households suffer many difficulties, water from deep wells is given a priority for domestic purposes. Production activities, such as crop cultivation, and animal husbandry, would then mainly have to rely on water from open sources. Asking for permission to use domestic water is as uncommon as asking for permission to use productive water, since domestic water is owned by many households, while productive water is owned by the collective.

Although public water supply systems such as gravity-fed piped-water systems have been

built in many villages under the Programme 135, only few households use water from this source. Several tanks as well as taps have been damaged just after a few years in operation, so they are no longer used. This situation raises a question about the quality of implementation of state programmes.

Agricultural land areas were allocated to households before the irrigation infrastructure systems, including cement-lined canals, were constructed. The land area per capita allocated to each household to use for 20 years is mainly based on the land areas they reclaimed and by casting lots. Although many households using unlined earth canals have good access to irrigation water, it seems that households using cement-lined canals, mainly non-poor households, have field locations that are more favourable in terms of available water sources than others. The question is whether these non-poor households still have better access to irrigation water in a few years when agricultural land is reallocated.

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