PAPUSSA

Production in Aquatic Peri-Urban Systems in Southeast Asia

Participatory Community Assessment in Village 5,

Dong My Commune, Thanh Tri district, Hanoi, Vietnam

From 28th October to 3rd November 2003

by

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Acronyms and terms

HHs: Households

NIHE: National Institute of Health and Epidemiology, Hanoi

PCA: Participatory Community Assessment

VAC: Vuon - Ao - Chuong = Garden - Pond - Livestock

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I. Introduction

This PCA study was carried out on October 28 th, October 29 th and November 3 rd 2003. The RIA1 team first visited the commune on October 28th and worked with the NIHE team on the PCA process on October 29th. After gathering and analysing the information obtained from the PCA on October 29th the team then had a debriefing with villagers in the early afternoon of November 3rd. The fieldwork team consisted of Nguyen Dieu Phuong, Kim Van Van, Nguyen Van Trang and Nguyen Tat Hao from RIA1. with Pham Duc Phuc, Nguyen Thuy Tram, Phan Thu Phuong and Nguyen Dang Tuan from NIHE.

District and commune description

Dong My commune is located in the Southest of Hanoi city. It is belongs to Thanh Tri district, one of the per-urban districts of Hanoi, where agricultural and aquaculture activities integrate in the economic system. Thanh Tri is one of the busiest industrial areas in Hanoi, with a large number of industrial factories and enterprises concentrating in Van Dien town and the neighboring communes downstream of the Kim Nguu and To Lich rivers (both of which are waste water rivers which allow the flow of waste water out of the city), as illustrated in Figure 1.

Dong My commune is bordered by the Red River to the northwest. Its south, east and northern boundaries are adjacent to other communes of Thanh Tri district. The commune itself accommodates very few industrial facilities and its main economic activities are based on agriculture. Dong My is generally low lying land area with a diversified agriculture. Its agricultural systems include rice cultivation, fish farming, vegetable and subsidiary crops, as well as livestock.

Figure 1. Wastewater disposal in Thanh Tri and Dong My commune

The total population of Dong My commune is 5995 with 1512 households. Dong My has an agricultural economy where approximately 63% of the labour force are engaged in farming activities, of which aquaculture, rice and vegetable cultivation are the most important. Of this 63% are agricultural labour, 5% are fish farmers (with the majority being men), whilst 58% are doing agricultural field work (women are dominant here). The rest of the commune's work force (about 37%) is distributed to other occupations,
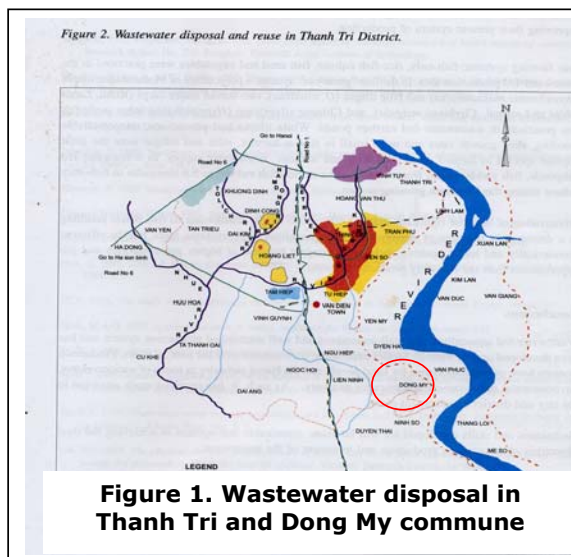
including construction workers, carpenters, small traders, businessmen, trap makers and administrative employment (Nguyen Van Lien, 2003). However, because of its location and low income from purely agricultural work and a large amount of agricultural leisure outside the farming season, many farmers, especially the young and middle – aged group are now doing both farming and factory work at the same time.

II. Methodology of PCA

The method of PCA has shows in Table 1.

Table 1. Details of the PCA Tools

Activity	Group composition	Details of the methodology	Outcome
Well being ranking	Three key informants' : the Chairman of Farmers Union, Vice – Head of village, Chairwoman of Women's Union of the village	Three key informants were requested to carry out well being ranking exercise individually. The participants were given a series of cards each one showing a name representing a registered household and then asked to clarify and separate the village households into well being groups by using their own criteria. The key informants divided the village population into three categories. After analyzing data presented by all three key informants, the households were divided into four groups: better off mens , better off womens, worst off mens and worst off womens groups.	All the villagers in the study area were divided into three well being groups. Ultimately better off and worse off groups were considered for the other PCA activities
Village map	The four group members as described above represented diverse social hierarchies	First the researcher discussed with the participants about the important locations of the village such as the settlement, paddy fields, etc. Then they were assigned into four groups based on well being ranking to draw the village maps separately.	This enabled the study to come up with a more complete map through triangulation. Four groups' perceived differences in drawing the village map were also observed.
Time line	All participants were involved in this activity.	Villagers were asked to sketch the village history using time lines.	More comprehensive overview of the village history was taken.

Seasonal calendar	This activity was carried out by four groups separately	Each group was asked to describe the various factors associated with their livelihoods, cropping pattern, traditional festivals, water availability, pest and disease attacks, cultural activities, health issues, natural disasters, water issues and labor use. Then the participants were asked to indicate the importance of these factors throughout the year.	A comprehensive picture was obtained as to how the overall importance of different activities varied through out the year for the four different groups.
Food consumption	This activity was also carried out by all four groups separately	Each participant within these groups was asked to discuss and write down the food items that they consume throughout the year. The participants were also asked to indicate the source and availability of these food items.	A comprehensive overview of the main food items that they consume and the differences of the food habits amongst the well being groups
Resource mapping	This activity was also carried out by all four groups. separately	Each group was requested to carry out this exercise separately. They were invited to indicate various bio resources available in the community together with the directions of the inputs and output flows.	A comprehensive overview of the bio resources of the village and their exchangeable relationships were taken according to the perceptions of four groups.
Activity matrix	This activity was also carried out by all four groups separately	Individuals of all the four groups were asked to list their day to day activities first separately and collectively. This was carried out by giving each individual an A4 form set. Finally, facilitators at each group were getting them to allocate various activities during a day on the pie graph.	Day to day activities of the villagers' was illustrated on the pie graph.
Problem ranking	This activity was also carried out only by two groups. a) male group, b) female group	At this activity, participants were assigned into two groups based on their profession and gender separately. Individuals of the two groups were asked to list their problems related to aquatic production and health issues. Each group was issued the number of green bean seed twice as much as the number of problems items listed. Relative importance of problem items were ranked by using the given bean seeds.	Highlight primary and secondary problems aquatic production and health issues directly associated with farmer's life quality.

III. Results of PCA

3.1. Selection of the village

Once the tentative commune sample framework had been established, the RIA1 team began its work by making an appointment with Mr. Nguyen Van Lien who is Chairman of the Farmers

Union in the village No.5 of Dong My commune for the morning of October 21st. Through discussion detailed community information was obtained. At the same time, he took us up to visit the gardening, aquaculture and livestock breeding based model in the village.

The village has 236 households (statistics at the end of 2002, Dong My's People Committee) which is made up of 32 households working with gardening, fish farming and livestock breeding based model (VAC system). One particularly noticeable issue of the agricultural system in Dong My commune is that its activities are largely based on wastewater which is taken from traditional canals distributed within the commune since a water supply system network from the Red River has not yet been successfully developed. For the list of selected households see Appendix.

3.2 Well being ranking

In carrying out this study, the guidelines stipulated in the PCA protocol developed by the PAPUSA project team was followed. To begin with three key informants were selected from the village. They were the Chairman of the Farmers Union, Vice President of the Village, Chairwoman of Women's Union. These three key informants were then requested to organize participants for the PCA study. Subsequently, they were asked to categorize the village households three times into distinct well-being groups, using their own criteria. This finally resulted in two distinct well being groups: better off and worse off. These two groups were further divided into four groups based on sex. a) Better off mens b) better off womens c) worse off mens and d) worse off female. All four groups were then asked to draw a map of the village. This activity was followed by the drawing of timelines. Normally, this was performed by the oldest in each group as the rest of the participants proposed that the older participants would have a better knowledge about the history of the village. These four groups were also requested to perform an activity matrix, seasonal calendar, food consumption, resource mapping and problem ranking. Finally, the findings of the entire PCA study were analyzed and then presented back to the participants at a final meeting on the last day in order to validate the findings. Following are shown the three times of well being ranking distinction:

First ranking by Mr. Nguyen Van Lien - Chairman of Farmer Union, village 5

Second ranking: Mr. Nguyen Manh Son - Vice President of the village.

Third ranking: Mrs. Nguyen Thi Oanh - Chairwoman of Women's Union

Table 2. Well being ranking results

Well being Rank	First ranking Mr. Nguyen Van Lien Chairman of Farmers Union, village No5	Second ranking Mr. Nguyen Manh Son Vice President of the Village	Third ranking Mrs. Nguyen Thi Oanh Chairwoman of Woman Union
1- Worse-off HHs	Although investment capita is relatively high caused by buying and selling their own residential land, lack of knowledge related to rice cultivation, fish farming and do not know how to make a good income. Having many children in each family (4-6 children/family).	Many households are low income, poor health and perception. Large number of households engaged to rice cultivation and fish farming.	Many households are low income, poor health and perception, as well as lack of luck in doing a good job. Very large number of households engaged to rice cultivation and fish farming.
2- Medium HHs	Rice cultivation is year round work without any subsidiary jobs, good perception, and lack of capita and labor investment, having motorbikes but no phone.	Higher income as results of how to make good money, luckier, and having an enthusiastic labor investment. Besides, subsidiary jobs such as builders, wholesalers, and traders are contributing to well develop economic system.	These have more subsidiary jobs together with traditional rice cultivation. Having a good social recognition.
3- Better-off HHs	Better perception, more capita investment, experience in fish farming, and know more on how to make money from small or large trading and subsidiary jobs (fish, trading and basket making). Having cement house with very good housing facilities, phone, vehicles, TV, refrigerator and nice furniture in the house.	Know more on how to make a good money from other occupations including small trade and business, hard work with livestock sector, better perception, good and traditional family, more investment capita for husbandry and fish farming.	Some households get a better income caused by buying and selling their own residential land. They are mostly traders and having luxury furniture served for their own life, better understanding and knowledge on society.

3.3. Village mapping

The Village map was drawn by all participants in the four groups (worse off -womens, worse of mens, better off womens and better off mens). The village boundaries were first demarcated by

these groups. Boundaries were marked by using the Red River Dyke, canal systems and roads, rice fields and paddy fields (cabbage, cauliflower, cabbage mustard.), Fish ponds, Roads and paths, Canal systems, Distributor canals, Electric Pumping station Waste water, Power supply station, Houses and home gardens, Kindergarten, Buddhist temple, ect. Figure 2 is an example of village mapping by the Better off-womens group.

Figure 2. Commune mapping drawn by the Better-off Womens group

3.4. Timelines of Dong My village

Table 3. Worst Off Womens Group:

Year	Events
1960-1965	First joined Agriculture-cooperative
1970	Floods
1990	New roads built
1995	Economic system changed
2000	Kindergarten built
2001 up to now	Channels as well as gardening, fish farming and livestock breeding based model (VAC system) built

Table 4. Worst off Mens Group:

Year	Events
Before 1961	Over 100 years of basket making traditional job
1961	Joined Agriculture-cooperative- officially created
1970	Land vegetable cultivation first started
1972	War
1984	Floods and cycles of hunger lasted for a while (20 days)
1989	Floods
1990	New roads built
1995	Agricultural land is appropriately leased for the first time to households in the commune
1997	Floods
2000	Insect damage and mouse attacks to rice and vegetable fields cause much damage
2001	Not well structured gardening, fish farming and livestock breeding based model (VAC system) starts.

Table 5. Better Off Womens Group:

Year	Events
Before 1969	A long tradition of basket making
1969	Migration occurred due to increasing river water levels
1984	Floods
1984-1995	Poor income with traditional agriculture activities
1995	Brick roads built
1996	Electricity power supply completed to village
1997	Agricultural land was appropriately leased to households in the commune
2000	Kindergarten built, pests and mouse attacks on rice and vegetable fields
2001	Early structured gardening, fish farming and livestock breeding based model (VAC system) started.
2002	Higher income from selling local peoples' own residential lands

Table 6. Better Off Mens Group

Year	Events
1959-1962	First joined Agriculture-cooperative
1971	Electricity power supply first brought
1984	Floods, waste water pumping station was built, more people involved in basket making tradition
1987	Agricultural land is appropriately leased for the first time to households in the commune
1993 – 1995	New roads built
1998	Electricity power supply completed to all the village
2000	Kindergarten built, pests and mouse attacks for rice and vegetable fields
2001 – 2002	Commune leasing land for fish cultivation
2003	Fresh water supply/irrigation systems were built, diseases of crops occurred

3.5. Seasonal calendar

In general, climate characteristics, social, cultural and economic events were similarly shown amongst the four groups. The following is an overview picture of these events in the seasonal calendar:

Table 7. Seasonal calendar mentioned by Worst Off women's Group

Month	1	2	3	4	5	6	7	8	9	10	11	12
Social events	Cold and drizzle			Heavy rain		Floods		Dry and cold climate				
	Lunar New Year	Festival						Wedding season				
Rice cultivation	Winter-spring rice cultivation				Harvest							
						Summer-autumn rice cultivation			Harvest			
Vegetable cultivation	Morning glory cultivation							Cabbage, cabbage mustard cultivation				
Fish farming		Fish farming				Harvest		Fish farming		Harvest		
Subsidiary jobs	Basket making											
Livestock Husbandry				Harvest	Cattle breeding			Harvest		Cattle breeding		Harvest
	Cattle breeding											
Income/ Busy months	Buying food for fish, fertilizers, fingerings, and other activities.				Harvest from cattle breeding, rice and vegetable cultivation			Buying food for fish, fertilizers, fingerings, and other activities.			Harvest from cattle breeding, rice and vegetable cultivation	
Migration								Constructional building, candy/sweet making				
Health issues					Cold flu			Rheumatoid arthritis, back pain				

Table 8. Seasonal calendar mentioned by Worse off men's group

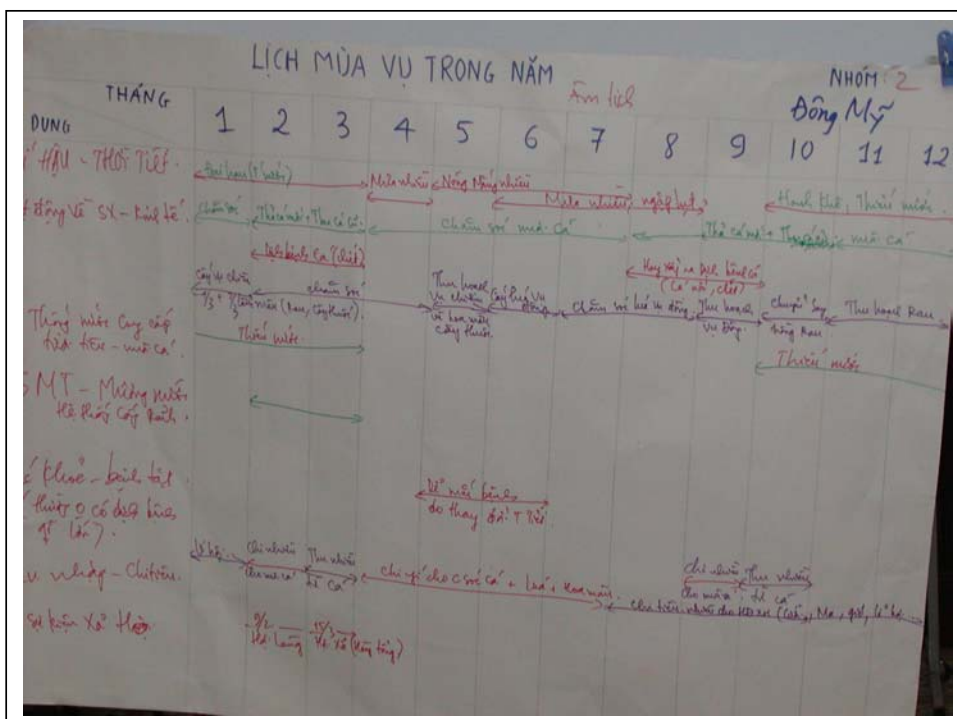| Month	1	2	3	4	5	6	7	8	9	10	11	12
Weather	Dry and lack of water			Heavy rain	Hot, floods					Dry		
Social events		Festival										
Fish farming	Fish farming			Harvest				Fish farming			Harvest	
		Lack of water	Fish diseases					Fish diseases		Lack of water		
Rice cultivation	Winter-spring rice cultivation				Harvest				Harvest	Vegetable cultivation	Harvest	
						Summer-autumn rice cultivation						
Income/ Busy month	Buying fish food, fertilizers and spend more money for festivals and weddings		Higher incomes from fish harvest	Buying fish food, fertilizers , pesticides for pest control				Spend more money for buying fish feed	Fish harvest			
								Spend more money for festivals, funerals and weddings				
Health issues								Colds and flu				

Figure 3. Seasonal calendar drawn by the Worse-off Mens group

Table 9. Seasonal calendar mentioned by Better off Women's group

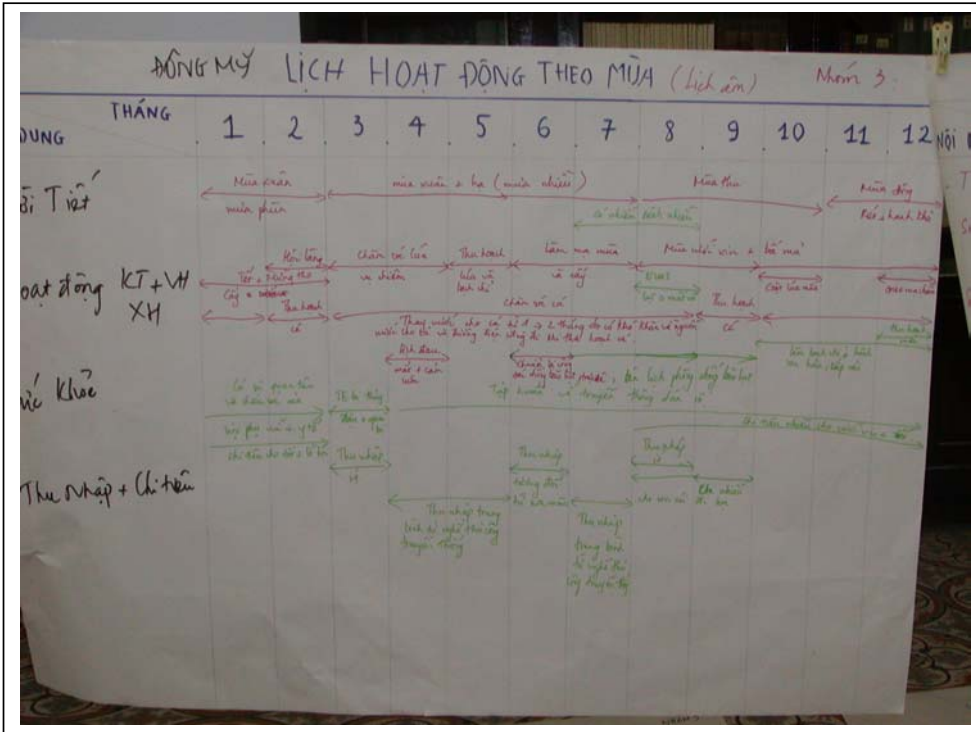| Month	1	2	3	4	5	6	7	8	9	10	12	13
Weather	Spring and drizzle		Summer and heavy rain					Autumn			Winter	
Social events	Lunar New Year, weddings and festivals							Weddings				
Rice cultivation	Winter-spring rice cultivation		Rice and vegetable harvest			Summer-autumn rice cultivation				Rice harve sting		
Fish farming		Fish harve st	Fish raising					Fish harvest		Fish raising		
Vegetable cultivation										Vegetable cultivation		
Income/ Busy month	Spend more money on festivals, new year		Low incom e	Average income from traditional basket making		Relativ ely high income from vegeta ble cultivat ion	Average income from traditiona l basket making	Low income but spends more money on taking care of their children, weddings.				
Health issues			Chick en pox, mum ps				Conjuncti vitis, cold flu.					

Figure 4. Seasonal calendar drawn by the Better-off Womens group

Table 10. Seasonal calendar mentioned by Better off men's group

| Month	1	2	3	4	5	6	7	8	9	10	11	12
Weather	Wet and drizzle		Warm		Hot and heavy rain			Dry season			Cold	
Social events	Festivals						Festivals					
	Wedding season							Wedding season				
Fish farming	Fish raising		Fish harvest		Fish raising				Fish harvest		Fish raising	
Rice and vegetable cultivation	Winter-spring rice cultivation		Morning glory cultivation and harvest									
					Summer-autumn rice cultivation				Vegetable cultivation and summer-autumn rice harvest			
Subsidiary jobs	Basket making, construction work and building											
Income/ Busy months											Spend more money on weddings	
Health issues	Caught, Fever, rheumatoid arthritis										Caught fever, cold flu	
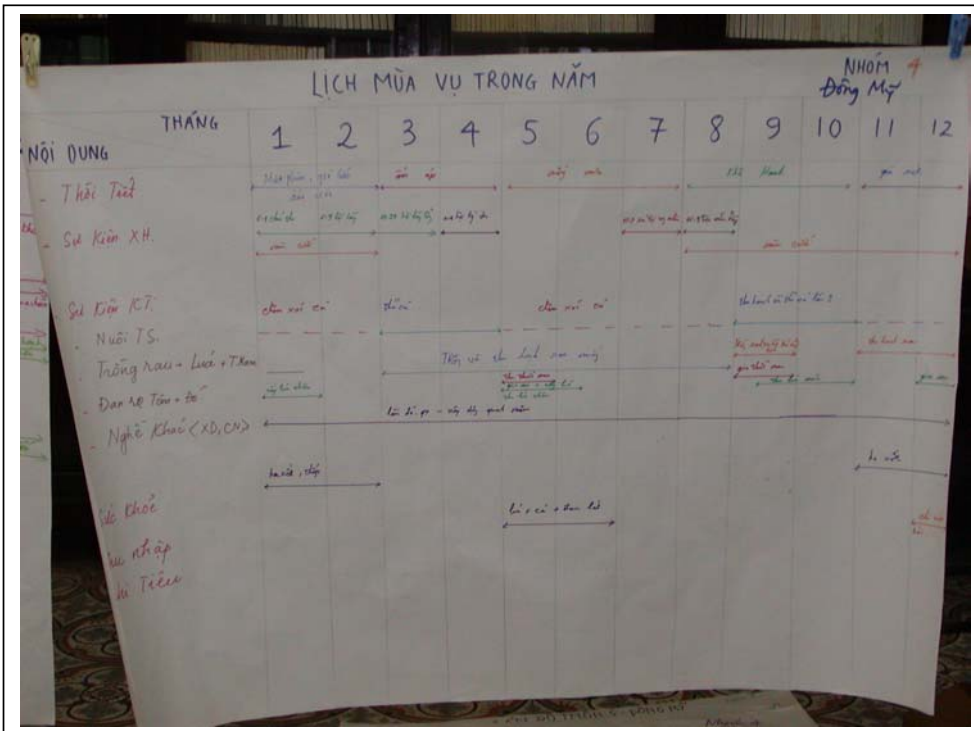
Figure 5. Seasonal calendar drawn by the Better-off Mens group

  Weather:

- From January through to April the weather becomes wetter with drizzle.
- From May through to July, hot weather, flooding and heavy rain.
- From August through to December, dry season and cold climate.
-

3.6. Social events

In comparison to other adjacent communes, village No5 of Dong My commune also has diversified social events including Lunar New Year, traditional festival, ceremony for those who are oldest ones in the commune (during the month of January through March), wedding season (normally in the early three months or late four months of the year). Besides, there are several traditional days which are more common in the northern rural Vietnam such as "banh troi, banh chay" day (March 3rd), "xa toi vong nhan" day (July 15th), and "gao moi" day (October 10th).

3.7. Income

In general, people's income is relatively low within the month of July and August while their higher income fall down to the other months of the year round and mostly come from fish farming, livestock, part time jobs, vegetable and rice cultivation. In contrast, during the

months of January and February, as well as the last four months of the year, farmers mostly use their own money in attending traditional festivals, wedding, buying fish and vegetables.

+ Fish farming:

- Water supply sources available for fish farming, rice and vegetable cultivation were limited between the months of January through to March and October through to December

- There are two crops carried out each year. Fish harvest often starts in the months of February and August, with the rest of the year mostly spent on rearing the fish + Rice and vegetable cultivation:

There are also two rice crops in the year round which last from March through to May and June through to October. Vegetable cultivation is commonly applied to the last three months of the year with all kinds of vegetables such as cabbage, onion, cabbage and mustard.

Health issues: According to the farmers there, specific illnesses that are often contracted by the fish farming workers and rice and vegetable cultivators are chronic back pain, and rheumatoid arthritis. For common diseases such as colds, flu, coughs and fever local people do not go to the hospital and often treat themselves and buy medicines from local private pharmacies.

3.8. Seasonal migration

As previously described, village No. 5 has an agricultural economy where the main activities concentrate in the agriculture sector. The village's work force is distributed to other occupations, including construction workers, carpenters, small traders, business men, basket makers and administrative employment. However, because of its location and low income from pure agricultural work and a large amount of agricultural leisure outside the farming season, many farmers, especially the young and middle – aged, are now doing both farming and factory work at the same time.

3.9. Activities matrix

Worst off Women's Group
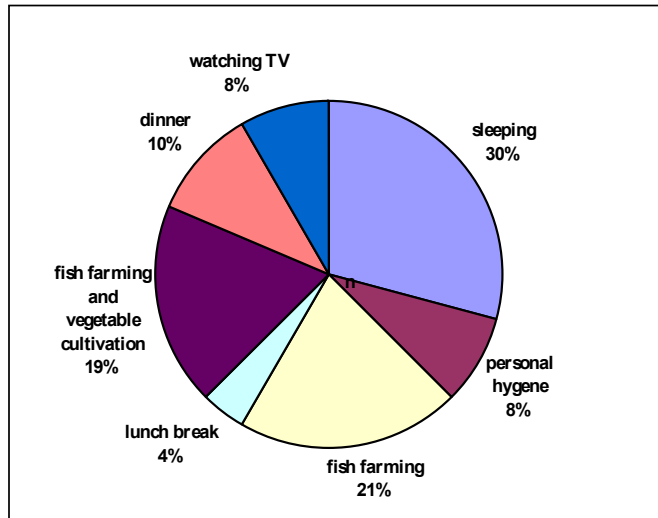
Figure 6. Activities matrix in the worst off women's group

Worst off mens group

Figure 7. Activities matrix in the worse off mens group

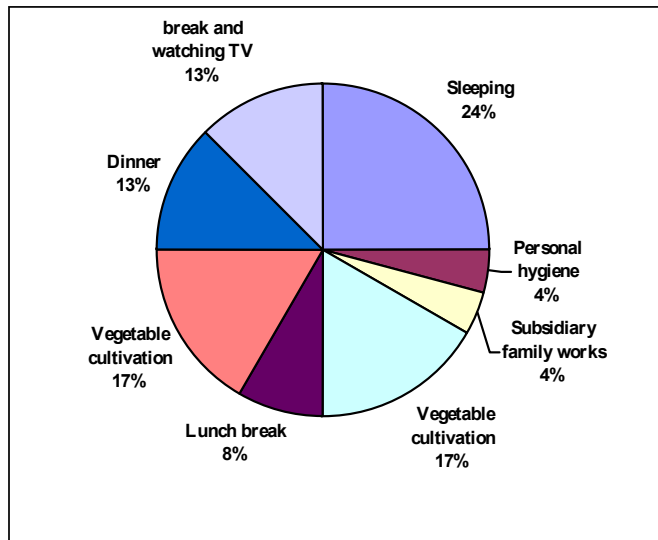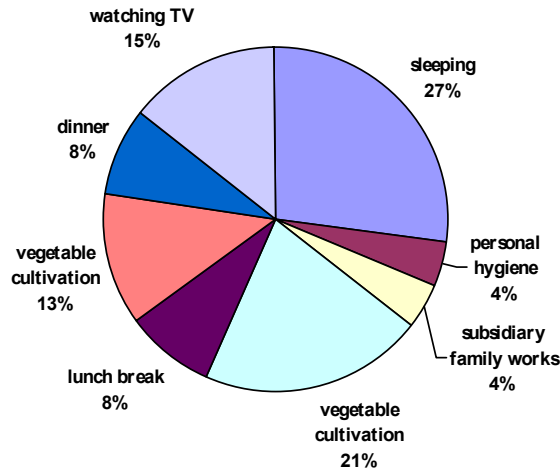**Better off Women's group**

Figure 8. Activities matrix in the better off women's group
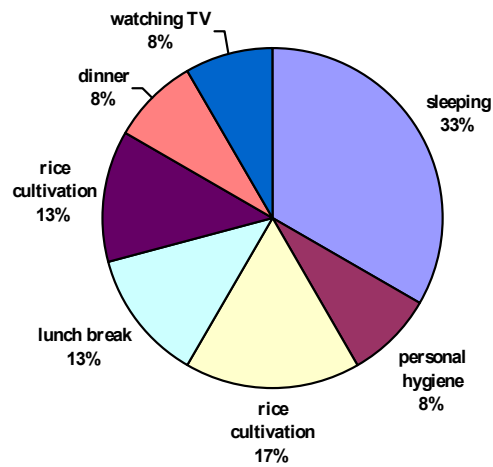
Better off mens group

Figure 9: Activities matrix in the better off mens group

Figures show the differences between the two worst off and better off mens groups. The worst off mens group spent more of their time each day on fish farming, less time on breaks, compared to the better off mens group.

There are no big differences between the two worse off and better off womens groups in terms of the amount of time that they spend on daily activities.

The time sleeping between men and women – men spend more time sleeping – also the better off sleep longer time than the worse off – men seem to have longer lunch breaks.

In general, local peoples activities in aquaculture, rice, subsidiary crops and vegetable cultivation are dominant. The rest of the commune's activities are distributed to other occupations, including construction workers, carpenters, small traders, businessmen, basket makers and administrative employment. Among these four groups, it seems likely that female groups tend to be family subsidiary workers while male groups are more likely fish farmers and rice cultivators.

3.10. Food consumption

Table 11. Food consumption mentioned by Better off Women's Group

Food/month	1	2	3	4	5	6	7	8	9	10	11	12
Sugar					Bought							
Milk					Bought							
Fruit						Bought						
Shrimp		Harvested										
Crab												
Snail												
Morning glory			Produced									
Cabbage turnip									Produced			
Tomato									Produced			
Cabbage												
Onion											Produced	
Potato												
Rice					Produced					Produced		
Mustard green							Produced					
Meat (chicken, pork, duck)						Bought						
Fish	Bought	Produced				Bought		Produced			Bought	
Egg						Produced						

Table 12. Food consumption mentioned by Worse off Mens Group

Food/month	1	2	3	4	5	6	7	8	9	10	11	12
Rice						Bought and produced						
Vegetable		Amaranth produced			Morning glory produced				Cabbage turnip, cabbage produced			
Fish		Harvested							Harvested			
Egg						Bought						
Meat(pork, chicken, beef, duck)			Bought and produced						Bought			
Fruit						Bought						

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Sugar					Bought	
Milk						
Tofu					Bought	

Table 13. Food consumption mentioned by the Worse off Womens Group

Food/month	1	2	3	4	5	6	7	8	9	10	11	12
Vegetable	Herbs (e.g. Curcuma) and amaranth produced			Water morning glory produced			Mustard green produced		Cabbage, tomato, cauliflower , bean produced			
Meat (chicken, duck, pork)	Pork produced and bought								Pork, chicken, duck produced			
Fish	Bought			Harvested			Bought					
Egg	Produced											
Rice	Produced and bought											
Tofu				Bought								
Sugar				Bought								
Milk					Bought							
Peanut										Bought		
Crab				Harvested								
Snail												
Shrimp								Harvested				

Table 14. Food consumption mentioned by the Better off Mens group

Food/month	1	2	3	4	5	6	7	8	9	10	11	12
Meat (pork, chicken, beef)	Bought and produced											
Vegetable	Bought and produced								Bought and produced cabbage, cauliflower			
Tofu	Bought and produced											
Spring roll	Bought									Bought		
Egg	Bought and produced											
Rice	Bought and produced											
Sugar					Bought							
Fish, Shrimp, Snail, Crab				Bought								

Discussion: The following are details related to brought, harvested, and self produced food items used:

- **Self Produced**: These will be rice, different kinds of vegetable (morning glory, mustard green, amaranth, etc.), fish, egg, and tofu, meat (chicken, pork, and duck). Among these food items, rice, meat, egg, tofu is usually consumed in large amounts throughout the year while morning glory is normally eaten in the month of January through to August. Together with this kind of vegetable, cabbage, cauliflower, mustard green etc. are mostly consumed during the last four months of the year. Fish and different kinds of meat are also coming from the harvest during the year.

- Food Bought: Including all kinds of meat such as chicken, pork, beef, shrimp, crab, fish, rice, tofu, sugar, eggs, milk, vegetable etc. Amongst these food items, meat, eggs, rice, and

different kinds of vegetable are traditionally bought from the market, especially by those who do not have agricultural land. Fish, meat, milk, sugar are obviously bought all year round and are highly dependent on individual households.

- Food Harvested: Crab and snail are mostly harvested in the months of April through July when water levels at pond, lake, and river are relatively high while shrimp is harvested only during the months of August through to September.

3.11. Resource mapping

- Credit/Money availability
- Domestic wastewater
- Buying diversified fingerings from sub aquaculture centers
- Fish feed items
- Labor forces: 2/3 available from HHs, 1/3 hired
- Infrastructure (roads, power supply, pumping machine)
- Fishing net (hired)
- Protection home for fish ponds and drainage systems.

Health issues
- Skin diseases
- Back pain
- Rheumatoid arthritis
- Intestinal diseases
- Illness

Fish farming

Health issues

- Aquatic animal production was sold at the fish ponds via traders.
- Reused water for rice and vegetable cultivation.
- Mud obtained from dried up fish ponds was used as a rich nutrient fertilizer.

- Self treatment and buying medicines from local private pharmacies.
- Go to hospital only for those who were getting really sick

Figure 10. Resource mapping by Fish Farmers Men's Group

Vegetable cultivation
- Vegetables have been bought at markets or harvested
- Labor forces availability
- Fertilizers have bought at markets
- Pesticides have bought at agriculture centers.
- Cat breeding to help remove mice
- Irrigation systems
- Infrastructure (roads, power supply, water pumping machine).

Fish farming
- Buy fingerings from aquaculture centers or RIA1
- Labor forces availability or hire
- Fish feed
- Water sources from drainage channels
- Fish net (hired)
- Infrastructure and money availability

Health issues
- Skin diseases
- Back pain
- Rheumatoid arthritis
- Intestinal diseases
- Illness

Fish farming vegetable cultivation

Health issues

– Aquatic animal and plant production sold at the fish ponds via traders.
- Reused water for rice and vegetable cultivation.
- Mud obtained from dried up fish ponds used as a rich nutrient fertilizer for rice and vegetable cultivation.

- Self treatment and buying medicines from local private pharmacies.
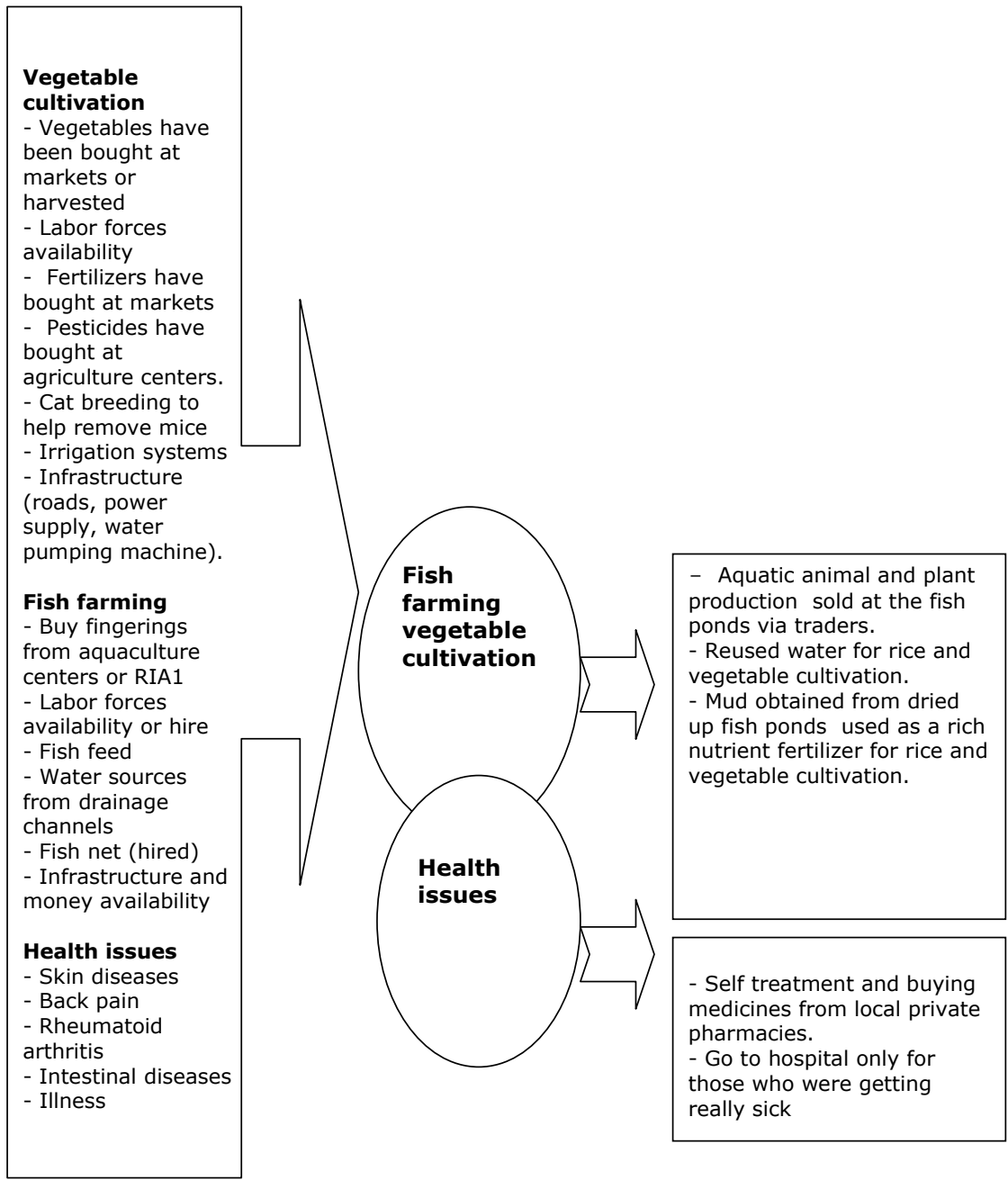- Go to hospital only for those who were getting really sick

Figure 11. Resource mapping by Fish Farmers & Vegetable Cultivators women's Group

3.12. Problems ranking

Table 15. Problems ranking by Mens group who work in fish farming

No	Problems encountered	Number of participants	Total points	Rank
1	Lack of or poor Infrastructure (roads, power supply, water)	9	38	**1**
2	Quality/availability of Fish feed	9	13	4
3	Money/ credit availability	9	27	**2**
4	Quality of Fingerlings	9	6	6
5	Polluted water sources	9	8	5
6	Lack of fresh water supply for fish ponds	9	14	**3**
7	Slow fish consumption – low sales and low price	9	5	7
8	Weather and environment	9	1	8

Discussion: It will be noted that the male group (fish farmers) ranks infrastructure such as roads, power supply, and water supply for fish farming highest on the list. The second highest is money/credit availability in order to extend their own fish ponds, land uses and increase their income from its production. The other problems include lack of fresh water supply for their ponds, fish food, polluted water, fingerings, slow fish consumption, low price.

Table 16. Problems ranking by Womens group who work in fish farming.

No	Problems encountered	Number of participants	Total points	Rank
1	Money/credit availability	7	34	**1**
2	Lack of electricity	7	5	7
3	Lacking fresh water sources for production systems	7	12	4
4	Fish diseases	7	15	**2**
5	Need better or new roads	7	13	**3**
6	Need more info or training on Fish farming techniques	7	10	5
7	Slow fish sales – low consumption	7	6	6
8	Quality and supply of fingerlings	7	1	8

Discussion:

In comparison to the mens groups, it is shown that the womens group ranked money availability as the most difficult problem on the list since local people are mostly working with agricultural jobs without any extra income from other sources. A noticeable issue ranked as the second highest one is fish diseases which very much impacts on fish production and fish farmer's incomes.

Table 17. Problems ranking by Womens group (vegetable cultivation)

No	Problems encountered	Number of participants	Total points	Rank
1	Weather	7	5	3
2	Insect damage to plant	7	8	2
3	Availability of vegetable seedlings	7	8	2
4	**Water issues: Lack of water supply and pollution**	**7**	**11**	**1**

Discussion:

Similar to other groups, the need for fresh water for crop irrigation is one of the most important parts of agricultural activities. The second difficulties are ranked as insect damage, diseases of the crops effect to quality of vegetables. The last one is weather which is impacted less on vegetable cultivation in the village No5 of Dong My commune.

3.13. Health problems

As reported by the local people, the most commonly contracted diseases in Dong My commune are back pain, rheumatoid arthritis, skin and intestinal diseases. There are no statistics of these diseases because most patients do not go the communal health clinic for treatment but to the district hospital or hospitals inside Hanoi. For common diseases such as diarrhea or cold flu, local people often treat themselves and buy medicines from local private pharmacies. According to the local people, specific diseases that are often contracted by the fish farmers and vegetable workers are chronic itching. For those who work with fish farming, rice and vegetable cultivation that use wastewater, diseases with high prevalence are skin diseases (chronic itching and nail mycosis). Trachoma and conjunctivitis are also sporadic, and they are not often associated with epidemics of these diseases occurring in the city of Hanoi.

Table 18. Health problems mentioned by Mens group (fish farming)

No	Problems encountered	Number of participants	Total points	Rank
1	Weather	9	5	4
2	**Hard work**	**9**	**14**	**3**
3	**Polluted water sources**	**9**	**27**	**1**
4	Skin diseases (itching)	9	2	6
5	Headache	9	4	5
6	Hospital visiting services	9	2	6
7	**Money availability for hospital visiting services**	**9**	**16**	**2**

Discussion: Using a potentially unsafe water source (mainly domestic wastewater) for aquaculture activities has been a long tradition and has also been a big problem here. As a result, several kinds of skin diseases appeared to have high prevalence (data not shown) with mostly chronic itching and nail mycosis. Besides, money availability for hospital or doctor visiting is limited for those who have lower incomes or no extra income sources. Moreover, local people themselves have not arranged their working time a day appropriately so that several occupational diseases are appeared including headache, back pain and some other skin diseases as mentioned previously. Finally, the impact of weather is also a particularly noticeable issue in this group.

Table 19. Health problems mentioned by Womens group
(fish farming and vegetable cultivation)

No	Problems encountered	Number of participants	Total points	Rank
1	**Back pain**	**7**	**44**	**1**
2	Illness	7	16	5
3	Rheumatoid arthritis	7	20	4
4	**Headache**	**7**	**26**	**2**
5	Intestinal diseases	7	7	7
6	**Hard working, sleeping and eating less**	**7**	**23**	**3**
7	Gynecological diseases	7	8	6

Discussion:

As reported by participants, since none of them in Dong My commune is reportedly using the water supply from a water plant, the main sources of domestic water are drilled and dug sunken wells, while rain water serves as the only source of drinking water and domestic waste water serves as the source of water supply for aquaculture . The most common illnesses in this group are back pain and headaches. Moreover, those people who are usually exposed more to water especially in the colder months of the year tend to have a higher risk of cold flu disease and rheumatoid arthritis.

IV. Conclusions and recommendations
4.1. Conclusion
- Because of its location as discussed in the introduction section, it is shown that leasing land for fish cultivation is a good model to motivate economic development of the

village. Households owning the areas used for aquaculture group together and put in a tender or bid. The bidders who win the tenders are responsible to manage and cultivate the ponds and each lease contract lasts for 3-5 years. Poultry breeding is also common in the commune. These situations truly bring up high fish, vegetable and poultry productivity as well as higher income for local people in recent years.

- Application of well structured gardening, fish farming and livestock breeding based model (VAC system) and gradually introducing newly developed techniques to the main production activities of Dong My village are making them more and more efficient and increasing local farmers' living standards.

- Some infrastructure which is directly required for aquaculture and agriculture activities have not been completely invested in yet (road construction and provision of electricity).

- The impact of using wastewater (mainly domestic wastewater) for fish farming, rice and vegetable cultivation is causing some related health problems for the local farmers being more easily infected with specifically infectious diseases.

4.2. Recommendation

- Create a good knowledge of how to build a well structured gardening, fish farming and livestock breeding based model (VAC system).

- Take the advantage of using the existing local channels and irrigation systems to pump water from the Red River (considered a fresh water source) served for agricultural and aquaculture production instead of using traditional wastewater.

- Improve the infrastructure reserved for aquatic production by getting direct support from local government e.g. local roads and electricity supply.

- Equip farmers with appropriate skills and transfer new technologies to farmers who have daily work with aquaculture, rice, subsidiary crops, livestock husbandry and vegetable cultivation.

IV. Appendix

Appendix 1: List of household selected for PCA activities in village No5 of Dong My commune

No	Name	First rank (3)	Second rank (3)	Third rank (3)	Note
1	Nguyen Manh Son	3	3	2	Vice President of village
2	Nguyen Van Lien	3	3	3	Farmers Union
3	Nguyen Duy Thuy	1	1	3	Fish farmer
4	Pham Van Hong	3	3	1	Fish farmer
5	Nguyen Ba Phi	2	3	1	Fish farmer
6	Nguyen Quang Gian	2	3	1	Fish farmer
7	Nguyen Van Vu	1	1	1	Fish farmer
8	Nguyen Van Hong	1	2	1	Fish farmer
9	Nguyen Van Phuong	3	2	1	Fish farmer
10	Nguyen Van Thanh	2	3	2	Farmer
11	Nguyen Ngoc Lien (Luong)	2	2	1	Fish farmer
12	Nguyen Van Minh	3	3	3	Fish farmer
13	Nguyen Huu Tan	3	3	1	Fish farmer
14	Nguyen Thi Tam	1	1	1	Fish farmer
15	Nguyen Huu Dan	2	1	1	Fish farmer
16	Nguyen Huu Trieu	2	1	1	Fish farmer
17	Hoang Van Huong	2	3	1	Head of Agriculture cooperative
18	Hoang Van Tinh	1	1	3	Fish farmer
19	Hoang Van Oanh	1	1	2	Fish farmer
20	Nguyen Van Hanh	1	1	1	Fish farmer
21	Nguyen Van Hien	1	1	1	Fish farmer
22	Hoang Van Thanh	1	2	1	
23	Pham Van Dac	3	3	1	Farmer
24	Nguyen Van Nga	2	2	1	Farmer
25	Nguyen Van Them	2	2	1	Farmer
26	Nguyen Van Tao	2	2	1	Farmer
27	Hoang Van Va	1	2	3	Farmer
28	Nguyen Van Thang	2	2	1	Farmer
29	Nguyen Thi Them	3	3	2	Farmer
30	Pham Van Sinh	3	3	3	Fish trader
31	Nguyen Thi Luyen	3	3	3	Fish trader

Appendix 2: Results of well being ranking

No	Group 1 (Worst Off Womens) Pham Van Trang	No	Group 2 (Worst off Mens) Pham Duc Phuc
1	Nguyen Duy Thuy (wife)	1	Nguyen Van Hong
2	Nguyen Van Vu (wife)	2	Nguyen Huu Dan
3	Nguyen Ngoc Lien (Luong)	3	Nguyen Huu Trieu
4	Nguyen Thi Tam (wife)	4	Hoang Van Tinh
5	Hoang Van Oanh (wife)	5	Nguyen Van Hanh
6	Hoang Van Thanh (wife)	6	Nguyen Van Hien
7	Nguyen Van Thang (wife)	7	Nguyen Van Nga
		8	Nguyen Van Them
		9	Nguyen Van Tao
No	**Group 3 (Better Off Womens) Nguyen Thuy Tram**	**No**	**Group 4 (Better Off Mens) Nguyen Tat Hao**
1	Nguyen Van Thanh (wife)	1	Nguyen Manh Son
2	Nguyen Quang Gian (wife)	2	Nguyen Van Lien
3	Nguyen Van Phuong (wife)	3	Pham Van Hong
4	Nguyen Van Minh (wife)	4	Nguyen Ba Phi
5	Pham Van Dac (wife)	5	Nguyen Huu Tan
6	Hoang Van Va (wife)	6	Hoang Van Huong
7	Nguyen Thi Them (wife)	7	Pham Van Sinh
8	Nguyen Thi Luyen (wife)		