

人類生態班

Present situation of Lahanam and transition over a decade
: Changing communities of Savannakhet Province, Lao P.D.R.

Kaneda Eiko¹, Moji Kazuhiko¹, Tiengkham Pongvongsa², Bounngong Boupha²

¹Nagasaki University Institute of Tropical Medicine, ²Malaria Centre, National Institute of Public Health

INTRODUCTION

A significant change in society can be explained by the use of the word transition, and various factors bringing about this change are called transitional factors. Decrease in the mortality rate observed in developed nations and subsequent decrease in the birth rate are termed as demographic transition. In the initial period of demographic transition, the speed and the factors promoting this transition were uneven. However, the overall trend of decrease of the mortality rate and birth rate was observed commonly in most regions. The type of diseases also changed simultaneously with demographic transition; this major trend is known as epidemiological transition. An epidemiological transition is a cause of demographic transition; at the same time, it is a result of demographic transition in that the demographic structure changes with the advance in demographic transition, thereby accelerating epidemiological transition. Epidemiological transition is mentioned in relation to the changes in the causes of death. Nowadays, however, attention is paid to diseases that do not cause death and change from the health point of view, thus leading to the use of the term health transition. Moreover, the nutritional status in developed countries improved and the decrease in daily life activities continued. Consequently, problems of nourishment and food changed from those of scarcity to those of surplus, from those of thinness to those of obesity. This phenomenon is named nutritional transition.

All the demographic, health, and nutritional transitions are related to transitions of our way of living in the changing human society and its environment. These changes can be termed as human ecological transition, an integrated entity of ecology of human being in the so-called "modernisation process"

The aim of the research in Lahanam in Lao P.D.R. is to observe and analyse the process of human ecological transition from a long-term perspective in the context of changing natural, societal, political, and economic environments. We believe that every human ecological transition is unique for a certain society at a certain time, although the phenomenon would be common for all the human societies. Because of this uniqueness and commonness, human ecological transition is worth studying.

To make an empirical research on human ecological transition, construction of a demographic surveillance system (DSS) would be a very promising method to collect basic information continuously. DSS executes the following for the local populace: (1) An initial population census is conducted, and the system that monitors vital statistics, namely, death, birth and immigration, by regular house visits is established, (2) the incidence of demographical and epidemiological events, deaths according to the cause of death and a specific disease in a regional group or pertinent persons belonging to a regional group, is clarified by regular house visits for the interview, observation and inspection of the cause or factor of investigation. (3) Nutritional information can be collected using the frame of DSS. The Lahanam DSS is the first one in Lao. P. D. R. This brief report introduces the information on situation of Lahanam collected by interviews and shows the basic data collected by DSS since February 2004 when the investigation in the village began.

1. LAHANAM DSS SITE DESCRIPTION

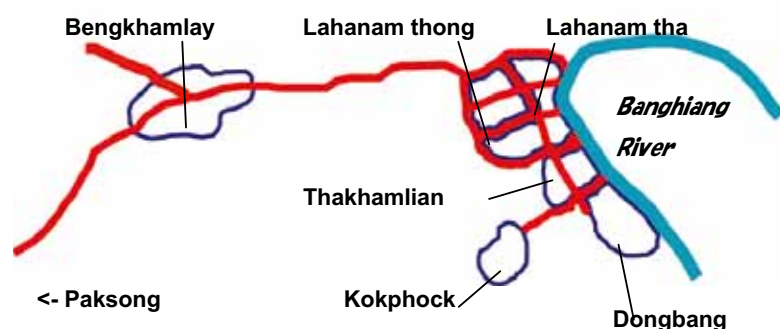
1.1. Physical Geography of the Lahanam DSS Area

The Lahanam DSS established in Lahanam zone is located in Songkhone district, Savannakhet province (map 1). This area is situated at 16°16' north latitude and 105°16' west longitude, at an altitude of c140 m. Lahanam zone covers c30 km² (2,950 ha). Wet rice fields cover the large area leaving small patchy forests and settlements. It is 85 km away from the centre of Kaysone Phoneviham district, which is the capital of Savannakhet province. The travelling time is approximately 2 hours by minibus and the one-way charge is 15,000 kip (c1.5 US dollar). The centre of Lahanam zone is approximately 10 km from Paksong, the centre of Songkhone district. The main transportation in Lahanam is public taxi, which is known as *TukuTuku*, and the travel fare amounts to 7,000 kip from Paksong to central Lahanam. It takes approximately 20 minutes in dry season. But, in the rainy season, it may take more.

The Lahanam DSS comprises all the six villages of the zone: Bengkhamlay, Lahanam thong, Lahanam tha, Thakhamlian, Dongbang, and Kokphock (map 2). The first three are in the northern region, and the last three are in the southern region. The two regions are also the unit of administration. Bengkhamlay is apart from other five villages locating between the Paksong and the centre of Lahanam. The main ethnic group is Phuthai for Lahanam thong, Lahanam tha, Thakhamlian, Dongbang, and Kokphock, and Lao in Bengkhamlay (where Lao:Phuthai = 8:2). It is said that Phutai people migrated from the eastern part of Savannakhet province to Songkhone district approximately 250-300 years ago, while Lao people, the majority in the lowland Lao P.D.R. and the same ethnic group with Lao-Isarn living in the northeast Thai are the majority of the district.

Four villages are near the Banghiang River, a tributary of the Mekong River. Kokphock is a 2km away from the river. Two large villages, Lahanam thong and Lahanam tha, form the central area of Lahanam. It was the capital of Songkhone district until 1975.

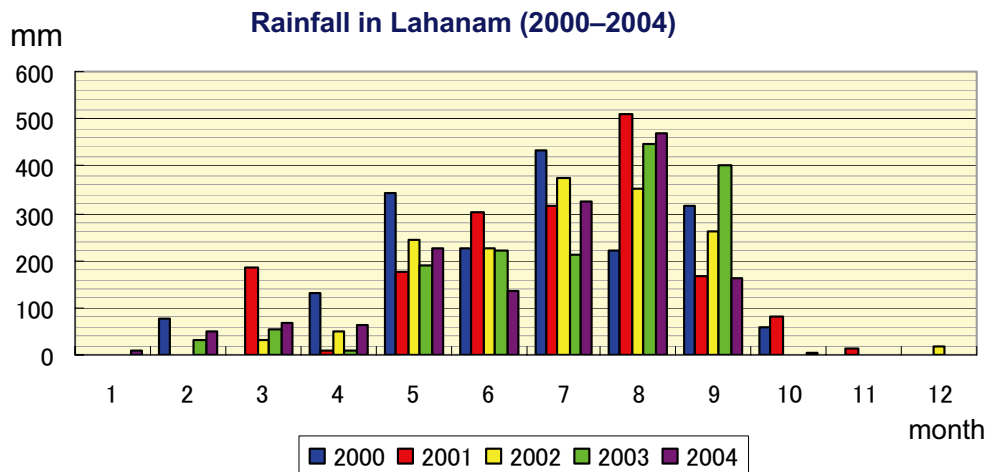
Out of the 2,950 ha of the zone, 1,550 ha are the farming area, 440 ha are the fallow land, 275 ha are for forest. Lahanam thong covers the largest of 1,540 ha, and Dongbang the smallest of 220 ha. While the smallest, Dongbang has the largest forest area of 148 ha.



1.2. Climate

The highest temperature is recorded in May, and December is the coldest season. The temperature ranges from 14 to 32° centigrade. Monthly precipitation in millimetres (mm) for five years is given below. The rainy season with high humidity lasts from May to September.

In the past decade, three villages suffered from draught. Lahanam thong experienced it thrice, and Bengkhamlay and Lahanam tha once. The agricultural output of Lahanam thong and Lahanam tha was reduced



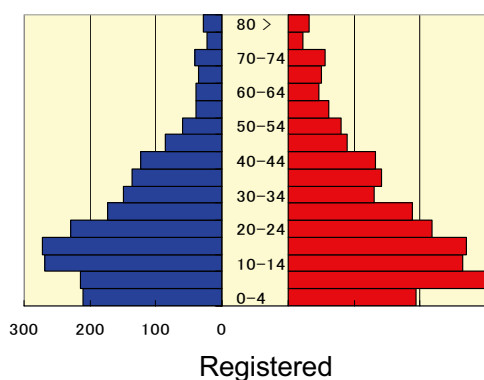
to a half of the average year, and the damage was covered by dry-season crops. In Bengkhamlay the damage caused by draught was covered by wage labour outside of the village, selling out domestic animals, and buying food from other villages.

Floods gave damages to all the villages except Bengkhamlay: Kokphock was affected five times; Lahanam thong, thrice; and the remaining villages, twice. Thakhamlian suffered the worst damages, and the harvest was approximately as low as 20 % of the average year. Lahanam thong, Dongbang, and Kokphock had a harvest of 50 % , and Lahanam tha 80 % . Lahanam tha and Lahanam thong dealt with the damage by subsisting on crops available in the dry season, raw cotton and corn cultivation. Kokphock dealt with the damage by selling domestic animals to overcome its debt and by working in Dongbang.

1.3. Population and Size

The total enrolled population in Lahanam is given in the following table: The total number of households is 713, and the overall population amounts to 4,413 (as of 1st September 2005). Lahanam thong accounts for the largest population size of 1,405, and, by contrast, Dongbang the smallest of 236. The number of houses and the population increased by 1.6 1.7 times in the last decade. It increased by 2.6-2.9 times in the last 20 years. There were approximately 70 family out-migrations from Lahanam to other villages in the last 10 years. Lahanam thong has the highest number of migrant families of 50, while Dongbang has none. There were 20 family in-migration to Bengkhamlay (12 % of all households) and 14 to Dongbang (36 % of all households). According to the villagers, the present size of the village was considered adequate for Bengkhamlay, Lahanam tha, and Thakhamlian, too small for Dongbang and Kokphock, and too large for Lahanam thong.

The main occupation is farming and textile. Agriculture accounts for 96 % of the occupation of the households.



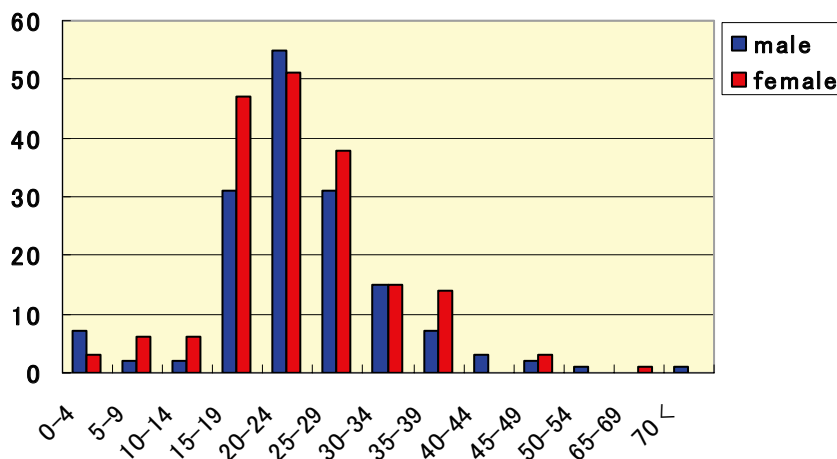
	Number of households	Total population size
Bengkhamlay	159	951
Lahanam thong	222	1405
Lahanam tha	157	1011
Thakhamlian	94	561
Dongbang	39	236
Kokphock	42	249

Most of the agricultural households own their land and, a few landless agrarian labourers exist only in Lahanam thong. Approximately 4 % of the households live on non-agriculture occupation such as medical services, restaurant management, the police force and so on.

The percentage of households whose members seasonally out-migrate from Bengkhamlay, Lahanam tha, Lahanam thong and Thakhamlian is 90 % , 50 % , 30 % and 10 % , respectively. Many young people, mainly in their late teens and twenties, are working in Thailand.

An executive committee exists in each village, and a village chief is elected by all the adults in the village.

Most people believe Theravada Buddhism, and its influence on daily life is strong, while people at the same time believe many kinds of animistic spirits.



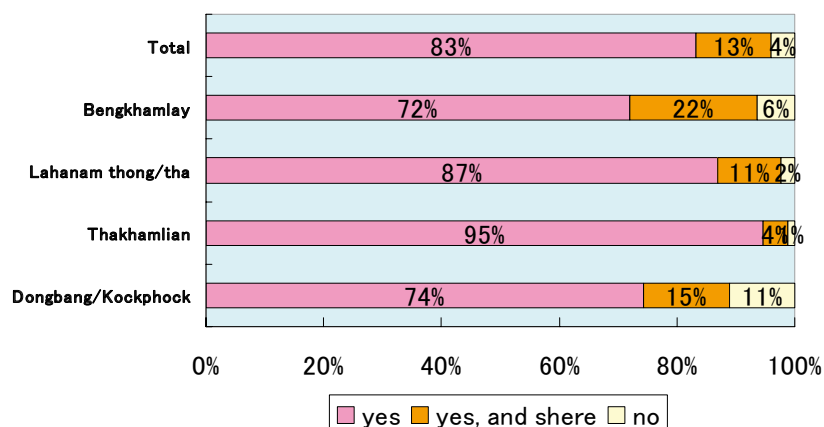
1.4. Life and Environment

Lahanam thong and Lahanam tha were accessible by car since 80 years ago. French army stationed in Lahanam tha during the French colonial period.

Kokphock became accessible by car approximately 10 years ago. Electricity was also introduced in Kokphock approximately 10 years ago. Irrigation construction in 1990s brought a motor-based dynamo system. Nowadays, almost all the houses are using electricity.

Households having a television in Lahanam are 74.5 % . Almost all households in Thakhamlian have a television, while only 30% of households have one in Dongbang. Almost all households own a bicycle. Only 30% own a motorbike and less than 10% own a car. Although there are a few fixed telephones, mobile phones have been popularized remarkably in the last one or two years.

Electricity



There is no official market, but the morning market in Thakhamlian operates on a daily basis. People arrive at around 6:00 am during the off-season and around 5:30 am during the farming season and stay up to around 7:00 am, selling, exchanging, and buying fresh vegetables, fish, insects, fruits and other goods necessary for daily life. There is a permanent market in the district capital, Paksong.

More than 70% of men smoke cigarettes and drink alcohol. beverages Less than 10% of women smoke and 40% drink. During festivals, people indulge in drinking. Although there are few women who smoke and drink on a daily basis; middle-aged and aged women prefer the consumption of the Betel nut, or Kio mark.

The following is an environmental evaluation for each village based on the villagers' impressions.

Bengkhamlay: Air pollution has been deteriorating seriously as compared with the situation 10 years ago. Soil deterioration and deforestation are somewhat problematic and exhibit a deteriorating tendency as compared with the past. Pollution in drinking water has not been detected. The nutritional status of children is not particularly problematic, and no specific disease has been reported. Neither poverty nor unemployment is problematic.

Labanam thong: Soil depletion is a problem in the village. Deforestation is not a problem, There is no problem for air and water pollution. There are no problems with regard to the nutritional status of children. Although acute diarrhoea had been reported in the past, it has now improved. There exist no problems with regard to either poverty or unemployment.

Labanam tha: Soil depletion and deforestation have been deteriorating and thus, pose problems. Air and water pollution also has been deteriorating as compared with the situation 10 years ago, although it is not serious. There exist no problems with regard to the nutritional status of children. Although acute diarrhoea had been observed in the past, it does not pose a serious threat. Poverty and unemployment are unproblematic.

Thakhamlian: Air pollution and soil deterioration have become issues, but water pollution and deforestation are unproblematic. There exist no problems with regard to the nutritional status of children, disease and poverty. Unemployment continues to be a serious problem.

Dongbang: Although water pollution and deforestation are unproblematic, there exists a slight problem with regard to air pollution and soil depletion. The nutritional status of children remains unproblematic. Although acute diarrhoea had been reported in the past, it has now improved. Neither poverty nor unemployment appears to be a problem.

Kokphock: Water pollution and deforestation are unproblematic; however, the deterioration of air pollution and soil has become an issue. Children's nutritional status and disease condition have improved remarkably. Neither poverty nor unemployment appears to be a problem.

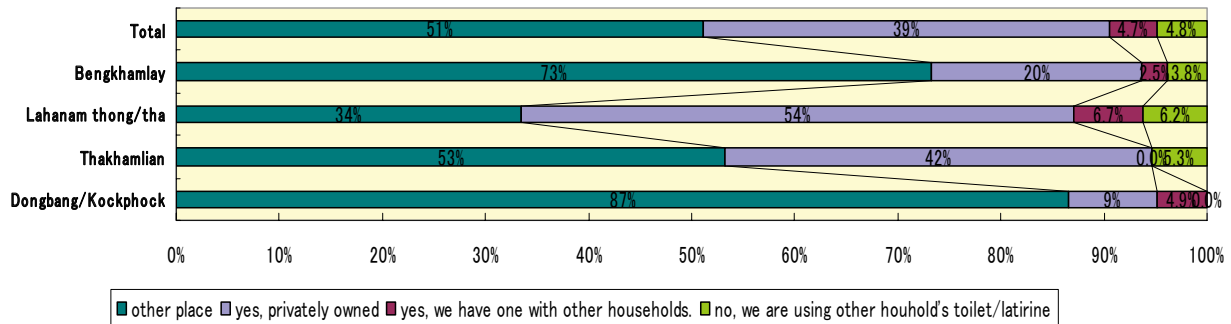
1.5. Textile manufacturing

The Japanese enterprise entered into a contract with some villagers in 2000 for subcontracting machine weaving, and the income from this source is growing. Lahanam is famous for weaving. Cotton is grown and cotton thread is spun and used to weave stoles and traditional rolling skirts, which are called shin. Shin and shirts (Sa dam) of the indigo dye are woven and sold in the markets in Savannakhet and Vientiane. There are

few other non-agricultural sources of cash earnings.

1.6. Toilet Facility

Availability of toilets within Lahanam zone is approximately 50% with relatively large variation among the villages: 30% of Bengkhamlay, 70% of Lahanam thong and 30% of Lahanam tha, 70% of Thakhamlian and 50% of Dongbang and 20% Kokphock had latrines. Water-sealed pit latrines with pour flush (Side of the hole is made of concrete blocks. The bottom is open to earth to escape water) are becoming popular.



2. AGRICULTURE

2.1. Land Ownership

Agriculture is the main income source of almost all the households. Most households own land and engage in agriculture. The households that do not own land borrow it; these account for only 5%. Few landholders, only approximately 1%, lend out their farmlands to other households. The largest landowner had 15 ha of farmland. The price per hectare of marketed farmlands is as follows: irrigated land costs 10,000,000 26,000,000 kip and non-irrigated land costs 2,100,000 12,000,000 kip. There are cooperative banks in Lahanam thong and Lahanam tha, the services of which are available to all the households. Thakhamlian has a government bank that is used by approximately 10% of the population. Wage labour for agriculture is not popular in this area. The irrigation equipment is maintained with the help of the loan from the Japan International Cooperation Agency (JICA).

2.2. Farming methods

In Lahanam, 33.5% of the households use domestic animals mainly buffaloes for cultivation. These domestic animals are bred by households. The remaining 66.5% use tractors. Tractor use is least (8%) in Dongbang. Among the households that use tractors, approximately 70% own one by themselves. Tractors are lent in Thakhamlian at the rate of 500,000 kip per hour. Lending and borrowing often take place under certain conditions. Large trucks are employed to transport the rice crop after harvest to market.

Cultivation is basically executed within the households, and cooperation among relatives is common.

Agricultural labourers, however, are employed occasionally from inside and outside of the village. Their numbers are as follows; Inside the village: 7 men and 50 women in Bengkhamlay, 10 men and 20 women in Lahanam tha, 10 men and 20 women in Thakhamlian and 5 men and 30 women in Kokphock. Outside of the village: 10 men and 60 women in Bengkhamlay, 20 men and 30 women in Dongbang, and none in other villages.

The types of chemical fertilizers used are mainly 16.20.0 and 46.00, and sometimes, 16.88. These chemicals are obtained at the rate of 100 200 per hectare and 3,500 kip per kg. We failed to get information on organic manure use. There is no custom of night soil use.

2.3. Irrigation

All villages have irrigated areas; the gross irrigated area is 262 ha. The irrigation facility was maintained by JICA. The main irrigated areas are at the west of Thakhamlian and the northern part of Lahanam thong. Large-scale canals have been constructed for the purpose of irrigation. The largest irrigated area is Lahanam thong (185 ha), followed by Thakhamlian (28 ha), Dongbang (22 ha), Kokphock (11 ha) and Bengkhamlay (6.2 ha). Half of the households are carrying out cultivation on irrigated land all the households in Lahanam thong, 80% of the households in Lahanam tha and Dongban. In contrast, only 2% of the households in Bengkhamlay and Kokphock have irrigated land. When irrigation is used, it is necessary to pay the rental charges. In Dongbang, the fee is collected by the electricity staff; in Kokphock, by the persons responsible for water management; and by the water users association in the other villages. The charge per hectare in Dongbang is the highest at one million kip, followed by 700,000 kip in Thakhamlian and Kokphock and 300,000 450,000 kip in the other villages. With regard to the use of irrigated water in the last few years, there have been no changes in Bengkhamlay, Lahanam thong and Dongbang. In contrast, the situation has deteriorated in Lahanam tha, Thakhamlian and Kokphock. The reason for this is the poor management of the irrigation facility. As of February 2006, the estimated cost of the electricity bill for irrigation has become a burden, due to which the irrigation facility is not used in Dongbang. The water users association, a village level body in Dongbang is suffering from the situation.

2.4. Agricultural Products (Irrigated Land)

The main farm product cultivated on irrigated land is rice, and almost all the households in all the villages are engaged in rice farming.

Bengkhamlay: Rice farming is conducted from May through November in the rainy season. The expected harvest is 3,000 kg/ha, and a good harvest can reach 4,000 kg/ha and 5,655,000 kg/year. Of the total harvest, 10% is marketed at the rate of 1,000 kip/kg. In this village irrigation is not available for many households (need to be checked).

Lahanam thong: Rice farming is conducted from May through November in the rainy season, and from January through June in the dry season. The expected harvest is 3,000 kg/ha, and a good harvest reaches 4,000 kg/ha and 1,539,000 kg/year. Of the total harvest, 30% is marketed at the rate of 800 kip/kg.

Lahanam tha: The expected harvest is 3,000 kg/ha, and a good harvest reaches 3,500 kg/ha and the village produces 1,665 ton/year. Of the total harvest, 60% is marketed at the rate of 1,000 kip/kg.

Thakhamlian: The expected harvest is 3,000 kg/ha, and a good harvest can reach 3,500 kg/ha and 945 ton /year. Of the total harvest, 20% is marketed at the rate of 1,000 kip/kg.

Dongbang: The expected harvest is 4,000 kg/ha and 4,000 kg/year. Of the total harvest, 20% is marketed at the rate of 1,000 kip/kg.

Kokphock: The expected harvest is 2,000 kg/ha, and a good harvest reaches 25,000kg/ha. The village produces 150 ton/year. Of the total harvest, 10% is marketed at the rate of 1,000 kip/kg.

Rice was not sold in the village 10 years ago. However, when the modern irrigation system established in 1997, double cropping became possible. As a result, the surplus rice could be sold. A reasonable crop

supply can usually be secured in the villages. However, the supply is sometimes inadequate in Dongbang and Kokphock. The harvest has improved in all the villages except in Kokphock because of irrigation and use of chemical fertilizers. Ten years ago, the harvest was approximately 3,500 kg/ha.

2.5. Agricultural Products (Non-irrigated Land)

The main agricultural crops cultivated on non-irrigated land for each village are as follows.

Bengkhamlay. Approximately 10% of the total households in the village grow watermelon from November through January in dried wet-rice field without irrigation. The market price is 5000 kip/kg, and almost everything is grown for the purpose of selling.

Lahanam thong. Cotton is grown in 50% of the households, and November is the season for planting. The expected harvest is 100 kg/ha; a good harvest can reach 120 kg/ha, and a total product of the village is 10,000 kg/year. The market price is 3,200 kip/kg, and 30% of the entire harvest is sold.

Corn is also planted mainly in November by 50% of the households. The price is 1,000 kip/kg and the village produces 50 to 60,000,000 kip/year. Of the total harvest, 90% is sold to market.

Indigo is grown in 50% of the households from November to May. The standard amount of harvest is 1,000 kg/year, and a good harvest may reach 2,000 kg/year. Of the total harvest, 70% is sold at the rate of 25,000 kip/kg. Ten years ago, crops were not bought and sold.

Lahanam tha. Cotton is grown in 10% of the households. The market price of cotton is 1,500 kip/kg and village earns 12 to 20,000,000 kip/year. Almost the entire harvest is sold.

Thakhamlian. Cotton is grown in 60 % of the households from November to February. The standard amount of harvest is generally 1,800 kg, and the market price is 4,000 kip/kg. All harvests are privately consumed. Like cotton, indigo is grown in approximately 30 % of the households from November to February. The amount of harvest is 1,000 kg, and the market price is 15,000 kip/kg. The entire harvest is sold.

Corn is grown in 30% of the households from November to February. All harvests are privately consumed.

Dongbang. Corn is grown in 10% of the total households from November to April. The expected harvest is 1,000 kg/ha and 1,000 kg/year. Of the total harvest, 90% is marketed at the rate of 2,000 kip/kg. Ten years ago, a mere 10 % of the harvest used to be sold. Potato is also grown in 10 % of the households from November to April. The expected harvest is 1,500 kg/ha and 1,500 kg/year. Of the total harvest, 95% is marketed at the rate of 2,000 kip/kg.

Cotton is grown in approximately 10% of the households from November to May. The expected harvest is 200 kg/ha and 180 kg/year. Of the total harvest, 50% is marketed at the rate of 4,000 kip/kg.

Kokphock. There are no farm products cultivated on non-irrigated land.

	Bengkhamlay		Lahanam thong		Lahanam tha		Thakhamlian		Dongbang		Kokphock	
Oxen	300	163	200	502	800	452	500	230	100	59	400	200
Buffaloes	250	105	1,800	306	220	145	250	170	70	40	100	25
Goats	0	32	0	387	0	82	0	58	0	25	0	35
Pigs	200	126	130	217	200	127	150	50	100	10	100	30

(Left: YEAR1995, Right: YEAR2005)

2.6. Livestock (Domestic Animals)

The number of domestic animals bred in each village is listed below in the table. With regard to the sale price of domestic animals, an ox is sold for 1.45 million kip; a buffalo, for 3.65 million kip; a goat, for 315,000 kip; and a pig, for 664,000 kip. The number of buffaloes decreased since tractors took place their use in cultivation. Goats have been bred intensively in last few years since they are easy to rear and grow quickly. Milk is generally not consumed.

3. FISHING

The distribution of the main fish in Lahanam is as follows. Fish abound in swamps, rivers, and streams. Net fishing is the most common method of fishing, followed by hooks and traps. The market price of fish is

No.	N =			Catching place						Catching method				Price kip/kg		
				Buy	Relative	Swamp	Rice field	River	Stream	Others	Buy	Net	Hook		Trap	Others
	30															
		Kaoko	English name /Scientific name													
1*	28	Pa khao	Swamp barb/ <i>Puntius brevis</i>			13	12	15	15	1		25	13	4	5	10000–15000
2	27	Pa duk	Broadhead catfish/ <i>Clarias macrocephalus</i>			20	11	10	15			17	23	6	5	20000–22000
3*	24	Pa xew	<i>Rasbora</i> spp. (<i>Sidestripe rasbora</i>)/ <i>Rasbora</i> spp. (<i>Rasbora paviei</i>)		3	14	8	8	11	1		17	2	12	5	10000
4	24	Pa nai	Common carp/ <i>Cyrius carpio</i>			11	1	20	7			23	3	1		15000
5	22	Pa tong	Featherback/ <i>Notopterus notopterus</i>			18	2	15	10	1		20	12	4	5	10000–15000
6	21	Pa kheng	Climbing perch/ <i>Anabas testudineus</i>			17	7	7	10			17	11	5	6	10000–12000
7	21	Pa koum	<i>Thynnichtys thynnoides</i>			14	6	7	12			13	19	9	2	10000–15000
8*	20	Pa soi	<i>Henicorhynchus</i> spp. (<i>Henicorhynchus siamensis</i>)			5	1	17	6			16	1	4		10000–15000
9	19	Pa pia	<i>Morulus barbatula</i>		2	3		15	1			18	4	2		15000–18000
10	19	Pa bou	(Marbled sleeper)/ <i>Gobies (Oxyeleotris marmorata)</i>	1		15	2	12	9			18	8	3	5	10000–15000

* Fish that carry the risk of infection by *Opisthorchis viverrini*.

approximately 10,000 15,000 kip/kg. Usually, people go fishing in the evening; some go to the river at about 10 pm to set the trap.

People prefer eating raw fish, in the form of *Koi par suk* and *larb pa suk* (fish salad). Raw fish is considered to be more delicious in the dry season than in the rainy season. The habit of eating raw fish is the risk of liver fluke (*Opisthorchis viverrini*), a parasite disease. In Lahanam, approximately 45 % of the primary school children and 80% of the adults were infected with *Opisthorchis viverrini*. Although it is claimed that children are customarily not allowed to eat raw fish, the youngest of the infected children were aged 3 years.

4. COMMUNITY RESOURCE MANAGEMENT

4.1. Forest

The local government manages 27 ha of forest in Lahanam: 3 ha in Bengkhamlay, 6 ha in Lahanam thong, 6 ha in Lahanam tha, and 12 ha in Dongbang. All the forests except that in Dongbang are evaluated to have been maintained in good condition for the past 10 years. The forest is also managed at the village level in Lahanam thong (3 ha). Kokphock and Thakhamlian do not have forests.

The rules for forest use are established and executed by the local government. In Dongbang, villagers are permitted to graze their domestic animals, use dead and dried branches, and use non-timber forest products. However, the use of timber was prohibited five years ago. Lahanam tha also prohibits the use of timber, but even non-residents are permitted to use the fodder. Collecting dead wood these for commercial purposes is prohibited in Lahanam thong.

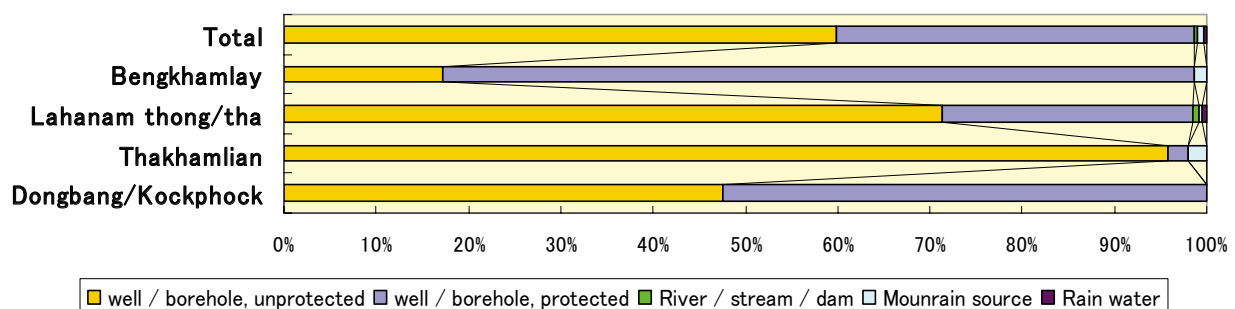
The forest managed at the village level is used as follows. Villagers are permitted to use dead and dried branches in Lahanam thong, but the use of timber is prohibited. In Dongbang, the use of dead and dried branches, non-timber forest products and the grazing of livestock are permitted.

Reforestation or plantation activity has not been introduced in the villages. There are no private forests, and the price of forest resources is not recorded. There is no official organisation responsible for the administration of the forest. A meeting related to agriculture and forestry is held once a year to disseminate the instructions from the district office and the policy of the district.

4.2. Drinking Water

In almost all the villages, drinking water can be accessed within a distance of five minutes. Only in Bengkhamlay, it is necessary to carry water twice a day while once a day is sufficient for the other villages. The water sources are as follows. Most households obtain drinking water by a common hand pump in Bengkhamlay, Thakhamlian, Dongbang and Kokphock, In Lahanam thong, approximately 80 % of the households use disinfected tap water as drinking water. In Lahanam tha 80 % or more obtain water from common wells or boreholes, while the rest use hand pumps.

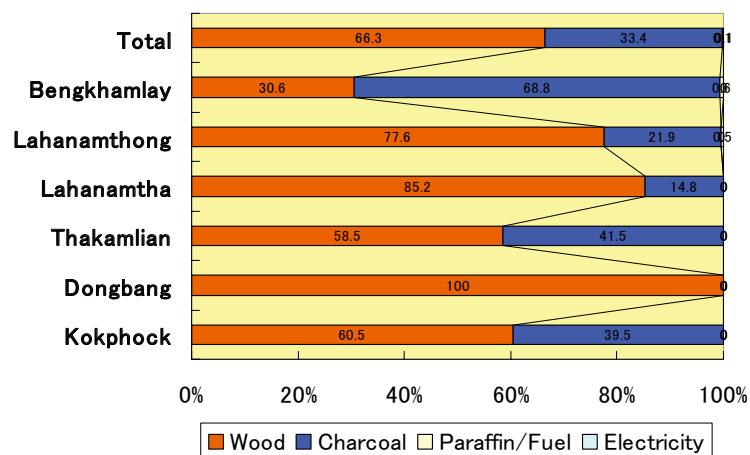
In Lahanam 67 % uses boiled water for drinking; however, in Bengkhamlay, only 10 % of the village population uses boiled water. Drinking water is considered impure only in Lahanam thong. With the exception



of Dongbang where the water quality has improved in the last few years, there was no remarkable change in other villages with regard to water quality. There are no particular restrictions or management on the use of the common water supply. Since 2005, a household began to bottle and sell drinking water to households that did not have water facility.

4.4 Energy Source

The energy used for cooking is mostly fuel wood. Firewood is collected from the common forest, or collected from privately owned trees, or purchased from neighbours or market. Some households use charcoal for cooking. A few households use animal dung for fuel. Kerosene is not used in any village. Villagers spend approximately three hours to gather wood for fuel, and the collected firewood is consumed over 4-5 days. Firewood is not sold in most villages. However, if sold, it is sold at the rate of 50,000 kip for the entire contents of a tractor. Ten years ago, gathering wood for fuel took only 30 minutes.



5. EDUCATION, HYGIENE AND HEALTH

5.1. Education

There are three categories of school levels – primary, secondary and high school. There are five primary schools in Lahanam: at Bengkhamlay (grades 1-5), Lahanam thong (grades 1-3), Lahanam tha (grades 1-5), Dongbang (grades 1-5) and Kokphock (grades 1 and 2). Lahanam thong is a branch of Lahanam tha primary school and Kokphock is a branch of Dongbang primary school. The children living in Thakamlan attend school at Dongbang. The school is located at a distance of approximately 1 km in every village. The primary school of Lahanam tha – the oldest school – was constructed approximately 60 years ago and that of Dongbang was constructed 10 years ago. The school at Bengkhamlay was reconstructed by the Japanese government. There is one secondary school in Lahanam. It is located at the centre of the zone. It is a distance of 5 km from Bengkhamlay and 2 km from the other villages. The secondary school in this area was established approximately 30 years ago.

The average age of entering school is 6.7-8 years (aged 5-8), and there is no gender difference. The enrolment rate exceeds 90%; however, the corresponding figure is approximately 70% in Bengkhamlay. There are 211 high school graduates (104 men and 107 females) and 21 college/university graduates (13 men and 8 females). The literacy rate (reading and writing) is 73% (comprising 80% males and 65% females), and at least 83% of the overall population (comprising 90% males and 75% females) can write their own name.

5.2 Births, Deaths and Family Planning

The total number of children born in 2004 was 82 (45 females). The total fertility rate was 3.1. The number

of children born to a woman has decreased over the last 20 years. According to the villagers, in the case of 10 newborn babies, the number remains constant after 5 years but reduces to 7 after 10 years.

The primary cause of infant death is fever, followed by diarrhoea. For adults, it is old age followed by liver cancer, diabetes and so on. Deaths caused by HIV/AIDS are also reported. The total number of deaths in 2005 was 36.

The contraception prevalence rate is 65 % , with Dongbang accounting for the highest (90 %) and the remaining villages showing 50 70 % . The major methods of contraception are injection (50 %), followed by oral contraceptives (30%) and intrauterine contraception (7.4%). The injection is available at Lahanam health centre. The age of marriage is mainly 20 years for males and approximately 17 years for females.

5.3 Health Service

None of the villages have a health committee. A vaccination service is executed in all the villages. A malaria control program was executed in all the villages five years ago. There is one health centre in Lahanam. There are private pharmacies in Lahanam thong, Lahanam tha, Thakhamlian, and Bengkhamlay.

Village health volunteers (VHVs) exist in all the villages, and his or her main function is providing assistance during a health programme, data collection and health education, for instance, the use of mosquito nets and so on.

The nearest medical facility in Bengkhamlay is the district hospital, and the cost amounts to 100,000 kip per visit, including medication charges. In the case of other villages, the health centre in Lahanam tha is the nearest medical facility, and it is located at a walking distance of approximately 5 30 minutes. The cost amounts to 6,000 7,000 kip per visit. The management expense is covered by the budget of the government and the villagers.

People mainly rely on treatment by modern medicine. The use of traditional healers is approximately 30% . The use of these healers is the most prevalent in Bengkhamlay (50%) and the least prevalent in Dongbang (2%). The use of herbal medicine is also common.

CONCLUSION

We believe that the construction of a DSS is essential for observing and analysing the human ecological transition prospectively in this area. There is a limit on the historical records which can be used for the retrospective study. To see the human ecological transition prospectively, collection of the basic data for the period of one and two decades is necessary. Our present research in this project is only a starting point.

Lastly, we express our condolence to late Mr. Phousone, the former director of Songkhone District Health Department, the representative of our project in the district, and good friend of us who died of liver cancer in December 2005, only two months after being diagnosed. We all pray that his soul rest in peace.