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The Social and Economic Situation of Small-Scale Fisheries in Tambol Pakklong, Chumporn Province, Thailand: Analysis for the Establishment of Sustainable Resource Management

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ABSTRACT

This description will identify the social and economic situation of small-scale fisheries in Tambol Pakklong, Chumporn Province, Thailand. The small-scale fisheries have faced the decrease of catch and the depletion of coastal resources. The Department of Fisheries (DOF) in Thailand and the Southeast Asian Fisheries Development Center (SEAFDEC) have collaborated to conduct a locally based coastal fisheries management (LBCRM) project in the Tambol. Socio-economic surveys were conducted in order to create a foundation of deeper analysis on resource utilization and stakeholder interest. Small-scale fisheries dominate production and distribution. They employ multiple types of fishing gears. Diversification of fishing effort is the most striking tendency, while fisheries households increase dependency upon squid and anchovy resources, contributing largely to the local economy. As well as full-time fishers, part-time fishers increasingly affect resource exploitation, whose volume of catch is by no means negligible. The LBCRM project purposes to establish a sustainable management framework of coastal fisheries, which will be fitted into the local reality of Tambol Pakklong.

INTRODUCTION

"Locally Based Coastal Resource Management in Pathew District, Chumporn Province"(LBCRM-PD) has been conducted under a collaborative scheme between the Department of Fisheries in Thailand (DOF) and the Southeast Asian Fisheries Development Center/Training Department (SEAFDEC/TD). The LBCRM-PD is modeled on the concept of community-based fisheries management (CBFM) and co-management (CM), which intends to achieve the sustainable use of coastal resources through the greater participation of people in coastal resource management. At least four results are expected from the implementation of this project : 1) locally based coastal resource management (LBCRM) in Pakklong works, 2) people's production and living conditions improve, 3) local people and organizations enhance their capability in community development, 4) practices are converted into DOF policies for coastal resource management (Yamao and Suanrattanachai, 2002).

The Sub-district of Pakklong (Tambol Pakklong) in Pathew district is the target project site of LBCRM-PD. In Pakklong, a local administrative unit,"Aongkan Borihan Tambol"(Ao.Bo.To), increases its role and function in local governance. The Thai government is in the process of decentralization programs that empower people and local autonomous administration units like Ao. Bo. To. The central

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authority delegates selected issues of community development and welfare matters to local level. The Pakklong Ao. Bo. To gradually grows in maturity to put together its own development plans and implement demand-led public works. It is expected that local resource users and their institutions will hold greater responsibility for coastal resource and fisheries management, together with the Ao. Bo. To. The LBCRM-PD is modeled on the concept of CBFM and CM, but more specifically on how to establish networks of primary management units at sub-district levels (Tambols).

This report intends to describe the rough outlines of fisheries resource utilization, fisheries related business and people's life in Tambol Pakklong. Socio-economic surroundings will be clarified to illustrate the situation and trend of coastal fisheries there. The report consists of four parts.

The first part concerns geographic and demographic conditions of the Tambol. The second part focuses on social and economic indicators, clarifying the level of development, cohesion of people and communities and the quality of life for the people. Major occupational and income sources will be described, referring to how greatly local people and society depends upon fisheries and related businesses.

In the third part of the report, the fisheries business will be analyzed in depth by showing figures and tables of fisheries households, boats, gears and so on. The economic structure of small-scale fisheries in the Tambol is a major topic. Multi spices and multi gear fisheries dominate, while the amount of concentration on particular target spices rises sharply. Both tendencies are incorporated into fisheries economy. Marketing systems for fish and fisheries products are the last topic. Transactions between sellers and buyers are interlocked with a somewhat patron-client relationship, characterizing exclusive and paternalistic natures. Such a marketing system, of course, evolves into a competitive and business-like one along with the appearance of new marketable products.

The discussion hereafter provides merely the outlines of fisheries business in the Tambol, but becomes a foundation of deeper socio-economic analysis on resource utilization and stakeholder interests. Therefore, the concluding part constitutes recommendations and suggestions for a future plan for LBCRM activities.

SEAFDEC/TD and DOF have already published a number of research reports focusing on socio-economics, oceanographic data, fishing activities and biological surveys in the LBCRM-PD site. This report relies on the successful outcome of these surveys. In particular, figures and data of the household survey that was conducted in June and July 2002 by the socio-economic team of the base line survey, help to figure out the social surroundings of fishing villages in Tambol Pakklong.

Ⅰ. GEOGRAPHIC AND DEMOGRAPHIC CONDITIONS OF TAMBOL PAKKLONG

Geographic Conditions

Tambol Pakklong has boundaries with Prachuab Khirikan Province, being in the northern most part of Chumporn Province (see Map 1). It is located 7 km far from the center of Pathew District where the district offices are concentrated; the Tambol sub-district office (Ao.Bo.To) is located much further on. The

Tambol's coverage area is 117 square km. The population amounted to 4,152 and the number of households was 882 in 2001.

There are seven villages in Tambol Pakklong. A village is called a "Moobaan" in Thai and is a primary local administrative unit. The seven Moobaans are widely scattered over the Tambol, as shown in the Map 2. Boundaries between Moobaans are officially delineated, however geographic, cultural and economic demarcations between them are apparent. Table 1 shows the official names of the Moobaans and the customary names of sub-divided areas (see Table 1). In Moobaans Nos.2, 3 and 7 consists of agricultural and coastal zones. The coastal zones might have historically separated from agricultural ones, but political unity and cohesion among the people have steadily increased in recent years.

Moobaan No.5, Ban Numpoo, is very complex with respect to political unity and the local intimacy of the people. It actually consists of two groups of residents, those with household registrations in Tambol Pakklong, Pathew District, Chunporn Province, and those domiciled in Ban Bang Bird, Bang Saphan Noi District, Prachuabkirikhan Provicne. The latter group lives and hold residences within the territory of Ban Numpoo, in Chumporn Province. Preliminarily, an unclear jurisdictional mandate of provincial administration leads to such confusion of residential registration. Ban Numpoo is located in the far distance from the center of Pathew District, even from the center of Pakklong. Those people having household residential registrations in this district have long become troublesome in the official procedures required by district offices, like registration, certification, taxation, access to subsidies, welfare, and so on. In the past before transportation was developed, they had to spend much time and cost to communicate with the centers of Tambol and District. Therefore, the residents greatly preferred to have household registration in Prachuab Khiri Kan rather than Chumporn. Their economic and social lives are firmly built into the society of Ban Sapan Noi Districts.[1]

Map1 Location of Chumporn Province

Map2 Tambol Pakklong & 7 Moobaans

Table1 Names of Moobaans in Tambol Pakklong

	Name	Sub−divided area's name	Geographic conditions
Moobaan No.1	Ban Thungmaha		Political and economic center of the Tambol.
Moobaan No.2	Ban Bosamrong	BanTha−matras (agricultural zone) Ban Bosamrong (coastal zone)	Coastal zone is narrow. Farming is the major income source.
Moobaan No.3	Ban Thumthong	Ban Nhongtoh (agricultural zone) Ban Thumthong (coastal zone)	Fishing households are scattered. Sand dunes are widespread. Living conditions near the beach are bad.
Moobaan No.4	Ban Bangwean		No fishing households.
Moobaan No.5	Ban Numpoo	Ban Nampoo (Chumporn Province) Ban Bangbird (Prachuap Kirikan Province)	Boundary and household registration are complicated. Both are one economic unit, linked to Ban Sapan Noi District, Prachuap Khirikan.
Moobaan No.6	Ban Bonrai		Adjacent to Moobaan No.1 and the neighboring Tambol. Fishers have intimacy with those in Moobaan No.1
Moobaan No.7	Ban Tha−ad	Ban Thaat (agricultural zone) Ban Koh Teab (coastal zone)	Fisheries households are separated from others. They will establish another Moobaan soon.

Those who specialize in fisheries are likely to live in coastal zones, with some holding land property in the agricultural zone and are partly involved in farming. Residents who live in agricultural zones also involve in fisheries and related businesses. Both agriculture and fisheries are main occupations, providing the greatest portion of people's income. As regards the degree of economic dependence on fisheries, there is great difference between Moobaans, and even in sub-divided areas in a Moobaan.

Distribution of Population and Households

The figures of Table 2 indicate the distribution of households throughout seven Moobaans. The total number of households increased from 759 in 1998 to 882 in 2001. Annual growth rate is approximately 5.4 % (see Table 2). The LBCRM-PD research team counted 831 households in all Moobaans in June and July 2002.[2] Non-registered households and those with extended families were included.[3] The numbers of households and population constantly change on a yearly and even on a monthly basis. It is assumed that both the agriculture and fisheries sectors flexibly absorb and discharge unemployed family members and hired workers in the Tambol. As a whole, the size of the population in the Tambol shows a gradual increase, although there is a small gap between the figures in 2001 and those in 2002.

Moobaan Nos. 1, 2, 4 and 6 put together have 563 households and account for 67.7 % of all households in Tambol Pakklong. These Moobaans are at the core of the Tambol, with a higher density of population and local business. Densely built-up areas concentrate on the coastal zones of Moobaan No.1 and 6, in which a large number of fisheries households are situated. Agricultural households are scattered over a far wider area along the main roads and branch lines, not concentrating on spots. The main agricultural zones and farmer's house lots are adjacent to the coastal zones in Moobaan Nos.1, 2, and 6. Moobaan Nos.3 and 7 are located a little further from the center of the Tambol, with 11.6 % and 12.4 % of the total households, respectively.

As mentioned before, official non-registered households in Moobaan No.5 amount to 61. These are registered in Tambol Saithong, Ban Sapan Noi District, but their houses are located within the Tambol Pakklong territory. Adding this figure to the registered households, the total number of households in this Moobaan increases to 130. As a result, all households in Tambol Pakklong are 892 in real numbers.

Table2 Number of Households in Tambol Pakklong

Moobaan	Kor.Chor.Chor. 2 Kor 1998			Kor.Chor.Chor. 2 Kor 2000			Chor.Por. Thor.2001	July, 2002	
	Engage〉1 occupation	Engage only in fisheries	Total	Engage〉1 occupation	Engage only in fisheries	Total		Total	%
No.1	120	14	183	153	16	176	176	190	22.9%
No.2	20	35	105	65	40	112	112	110	13.2%
No.3	40	18	90	73	24	97	97	96	11.6%
No.4	106	0	106	122	0	122	122	119	14.3%
No.5	71	0	71	105	0	105	105	69	8.3%
No.6	100	10	113	152	12	164	164	144	17.3%
No.7	91	0	91	106	0	106	106	103	12.4%
Total	548	77	759	776	92	882	882	831	100%

Table3 Outlines of Moobaans

Moobaan	No.1		No.2		No.3		No.4		No.5		No.6		No.7		Total	
Household	176		112		97		122		164		105		106		882	
Population (persons)	725		542		413		650		541		483		522		3,876	
Male	360		277		230		326		265		229		267		1,954	
Femal	365		265		183		324		276		254		255		1,922	
-5	35	4.8%	43	7.9%	48	11.6%	46	7.1%	22	4.1%	43	8.9%	45	8.6%	282	7.3%
6-11	73	10.1%	46	8.5%	44	10.7%	49	7.5%	39	7.2%	49	10.1%	78	14.9%	379	9.8%
12-14	24	3.3%	11	2.0%	33	8.0%	34	5.2%	34	6.3%	31	6.4%	21	4.0%	188	4.9%
15-17	29	4.0%	33	6.1%	31	7.5%	56	8.6%	26	4.8%	22	4.6%	24	4.6%	221	5.7%
18-49	431	59.4%	224	41.3%	202	48.9%	279	42.9%	312	57.7%	206	42.7%	173	33.1%	1,830	47.2%
50-59	66	9.1%	122	22.5%	29	7.0%	118	18.2%	35	6.5%	73	15.1%	27	5.2%	471	12.1%
> 60	67	9.2%	53	9.8%	26	6.3%	68	10.5%	73	13.5%	59	12.2%	54	10.3%	401	10.3%
Income (Baht)																
per household	61,337		70,921		30,171		57,174		24,058		70,431		76,749		46,908	
per capita	14,890		13,825		7,086		10,731		7,293		15,311		15,585		10,674	
More than 20,000 households1)	73		36		20		67		62		90		83		431	
% of Total	41.9%		33.3%		36.4%		59.3%		41.3%		94.7%		78.3%		53.8%	
Joining membership of groups (households)	174		108		55		113		150		95		106		801	

Note 1) Those households whose annual income is more than 20,000 Baht.
Source : Cho. Por. Tho. People's Life Improvement Development Committee, Ministry of Interior

The composition of age groups and gender is shown by the figures of Table 3 (see Table 3). The working age group ranges from 15 to 59 years old, accounting for 65.3 % of the total population. As regards percentages of this group, there are great differences among the Moobaans. Moobaan No.1 shows the highest ratio of 72.5%. Moobaan No.7 is the lowest with 42.9%, whereas the age group of less than 12 years shows 23.5%. This Moobaan is regarded as a new frontier in nature in which younger generations and migratory workers have settled down in relatively recent years. The Kho Teab area features younger fishers families.

Ⅱ. SOCIAL AND ECONOMIC DEVELOPMENT WITH THE GROWTH OF FISHERIES BUSINESSES

Levels of Social and Economic Development

According to a regular survey on community development conducted by the Ministry of Interior (MI),[4] Tambol Pakklong seems to hold a relatively higher level of social and economic conditions. Its development reaches "Level 3". [5] This does not mean that the local people in the Tambol are not subject to any program of poverty and social insecurity. Four Moobaans are categorized as "poor", so that government provides a subsidy of 280,000 Baht to each of the four (see Table 4)[6]. These Moobaans should be at least under such conditions as 1) household income per year is less than 15,000 Baht; 2) there are households whose family members earn less than 15,000 Baht per year; 3) those households at the level of absolute poverty account for over 30 % of the total (Ruangsivakul and Yamao, 2002)

Table4 Level of Development in Communities

	No.of Grade1	No.of Grade2	No.of Grade3	Level of Development
Moobaan No.1	1	12	14	3
Moobaan No.2	6	12	10	2
Moobaan No.3	8	10	11	2
Moobaan No.4	3	8	19	3
Moobaan No.5	6	10	14	2
Moobaan No.6	1	11	15	3
Moobaan No.7	7	10	12	2

(Note) 1 The number of items is thirty one. Each item is scored from 1 to 3. Grade 1 is the lowest development, and Grade 3 is the highest.
2 Numbers in Grade 1 will determine the Level of Development.
3 The level of development is as follows :
Level 1 Grade 11-31 Less developed
Level 2 Grade 6-10 Middle
Level 3 Grade 0-5 Developed
4 Moobaan No.5 does not cover Moobaan Banbird.
(Source)"Kan Jat Keb Kho Mun Phun Tan Radab Moobaan, Kho.Cho.Cho. Son. Kho" 2541 (1998)

In 2000 in Tambol Pakklong, the people earned an annual average income of 10,674 Baht per person. 48.9 % of households were over the level of 20,000 Baht. This was the lowest figure among six Tambols in Pathew District; where the average income of the District was 14,272 Baht. [7] The people in Pakklong still suffer a relatively lower economic and social standard than those in other parts of the District, where the majority of households were ranked at a level of over 20,000 Baht.

A large disparity of income appears among the people, and among the Moobaans. The average income per person in Moobaan No.3 is the lowest, being 7,086 Baht, while Moobaan No.7 is the highest, at 15,585 Baht.[8] Figures indicating average income in Moobaans No.1, 4, and 6 are lower than those of Moobaans No.5 and 7, but the social and economic surroundings of the former group are much better than the others. This means that a larger income disparity exists in Moobaan Nos. 3 and 7.

Several interacting factors cause economic disparity. Agricultural development and land ownership greatly affect economic stability and income increase. Out of seven Moobaans, six are engaged in both fisheries and agriculture. Moobaan Nos.1, 2, 4 and 6 are an agro-based society, where the majority of households are involved in plantations of coconuts, rubber and palm. They are less dependent on the fisheries economy, except for Moobaan No.1. They developed earlier than the others. Farmers are more likely to hold full titles of land ownership and *No.So. 3*.[9] This is distinct from other Moobaans in which farmers cultivate and plant the national forestry zones without any land title.[10]

Occupation and Main Income Sources

Shown by the figures of Table 2, 82% of all households in the Tambol have plural occupations. Those households whose occupation is fisheries amount to 92 only (in 2000). In 2002, the households engaged in fisheries accounted for 41.2 % of the total, while the majority of households involved in non-fisheries business. The agriculture sector provides major occupations and income sources. A large proportion of households situated in coastal zones has plural income sources coming mainly from agricultural and fisheries economics.

The results of the household survey, conducted in June and July 2002 by the socio-economic team of the base line survey, reveal accurate profiles of household economies (see Table 5 and Figure 1). Including the households that are situated in Moobaan No.5 (Ban Nampoo) without registration, 72.2 % of all households are engaged in the non-fisheries sectors like agriculture, trade and wage labor. Those households specializing in agriculture account for 31.4 %; agricultural households with other occupations show 44.7 % of the total. Wage labor is another important source of income.

Fisheries households, consisting of both full and part-time ones, account for 27.8 %. The combination of agriculture and fisheries seems relatively low in percentage terms. Fisheries business may evolve into a profession and specialization. This point will be an argument over whether small-scale fisheries in Pakklong have become cost-intensive and highly commercialized in nature. This does not mean that the local people are less likely to catch and utilize fish and mollusks on a daily basis. They may catch for household consumption and occasionally market a small amount of catch.

Wage labor is the third ranked source of occupation. Both agriculture and fisheries provide a wide variety of employment opportunities inside the Tambol. Part of the household members are normally hired in these fields on a seasonal and temporary basis, while they cultivate or fish by themselves.

Different Level of Dependence on the Fisheries Economy

The extent of economic dependence on fisheries differs from area to area. Moobaan No.4 does not have any fisheries households as they specialize in agriculture. In Moobaan Nos. 1, 3 5 (Nampoo &

Banbird) and 7, the fisheries sector ranges from 35 to 45 % in the weight of occupations. In Moobaan No.1, the households engaged in fisheries on a full-time basis are 26.3 %, and the total of any category of fisheries households is 43.7 %. In spite of a higher ratio, many of the fishing households involve in other occupations like agriculture and wage labor. On the other hand, members of agricultural households tend to seasonally engage in processing squid and anchovy products. The economy of Moobaan No.7 depends heavily on the fisheries sector. Although there are about 1,000 rai of cultivatable land, many fishing households suffer from a meager scale of land property. In Moobaan Nos. 2 and 6, agriculture is a primary economic activity rather than fisheries. The household economy is more attuned to plantations of rubber, coconut and palm.

Some farmers still suffer from low productivity and a lack of land property, and use forest areas to transplant rubber, coconut and palm without any possession of land property title. These farmers are grouped into a poverty class.[11] Nevertheless, compared with small-scale fisheries, agricultural households have a more sustainable economy. Runagsivakhul and Yamao point out that agricultural development and land ownership affect stable economic development and income increase, even if the level of Moobaan development defined by the MI is lower than that of coastal zone areas (Ruangsivakhul & Yamao, 2002). This is chiefly because of a large disparity of income between the people in coastal areas. Small-scale fisheries and wage labor households are ranked at a low level of income. Large-scale and highly commercialized fisheries represent a higher income group, which raises the level of average income per household in the Moobaans. Suffice it to say that more dependence on the fisheries economy leads to social and economic disparity between people.

Political Leadership and Social Unity

Tambol Pakklong consists of seven Moobaans, which are primary units in local administration. Local people usually access government-sponsored services including community development, welfare and education through these units. Like any other part of Thailand, the Tambol has still hold a conventional local administrative line, constituting Phuyai Baans (village heads) and Kamnan (Tambol head). This line has some selected functions including supervising, building political unity, and assisting residents under the authority of the District office. However, in the on-going process of decentralization, sub-district local administrative organizations (Ao.Bo.To) have steadily expanded the territories of Tambol administration, budget allocation, plan and implementation of project activities for community development and public construction. It takes over part of the Kamnan and Phuyai Baan system. Local leadership has gradually transferred from the conventional system to the newly established one that makes council members hold full responsibility for making decisions and implementing projected activities together with several administrative staff.

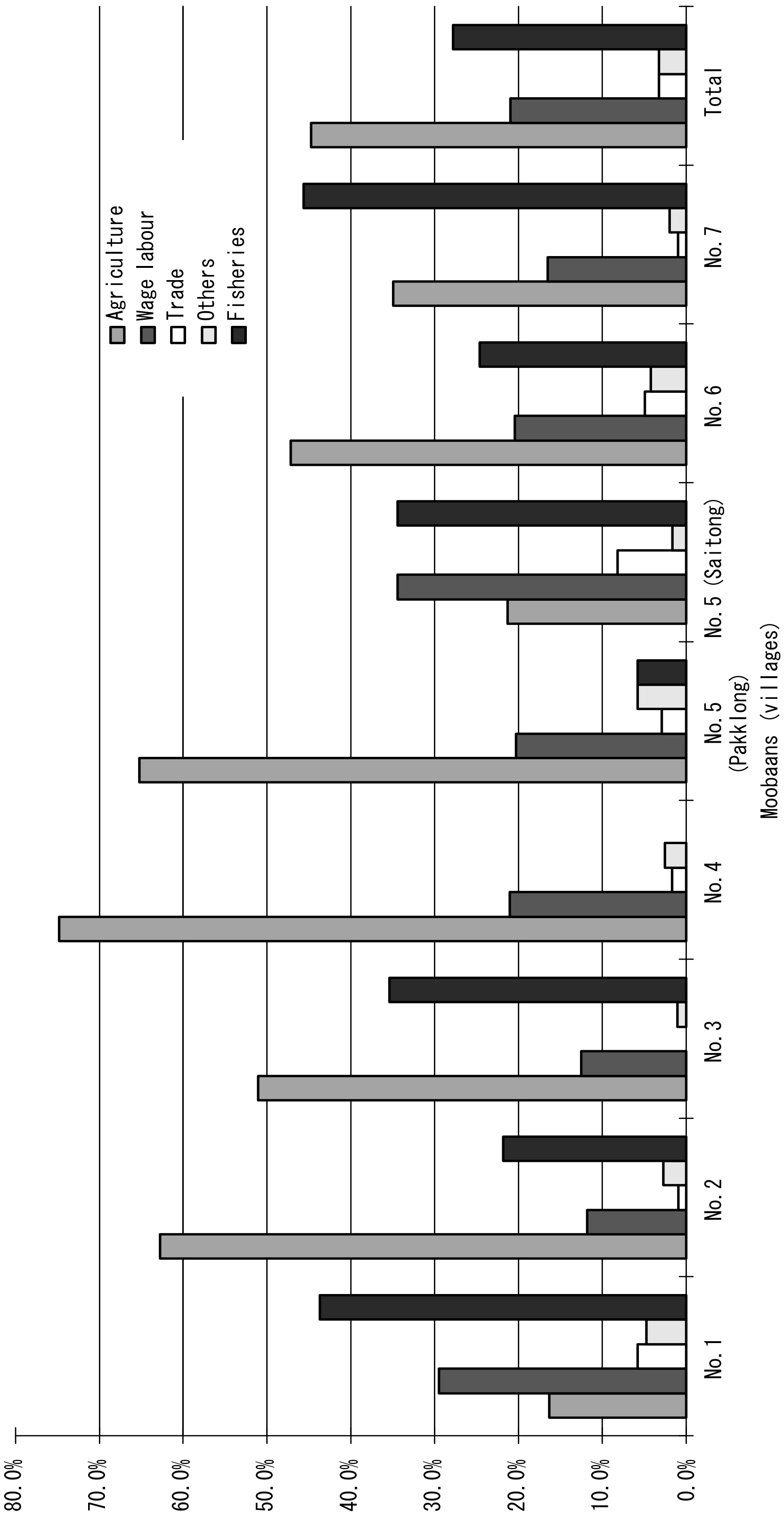
Table5 Major Occupations of Households, Distinguished between Fisheries and Non-Fisheries

Unit : No.

Moobaan	Non-Fisheries								Fisheries						
	Sub-total	Agriculture only	Agriculture + Wage labour	Agriculture + Trade	Wagelabour +	Wagelabour + Trade	Trade	Others	Sub-total	Fisheries only	Fisheries + Agriculture	Fisheries + WageLabbours	Fisheries + Trade	Fisheries + Others	Grand Total
No.1	107	16	8	7	47	9	11	9	83	50	4	16	7	6	190
No.2	86	59	9	1	8	5	1	3	24	8	12		1	3	110
No.3	62	33	16		11	1		1	34	17	11	3	3		96
No.4	119	58	21	10	25		2	3	0	0	0	0	0	0	119
No.5 (Pakklong)	65	33	8	4	12	2	2	4	4	2	0	2	0	0	69
No.5 (Saitong)	40	8	4	1	16	5	5	1	21	11	5	4	1	0	61
No.6	109	48	17	2	24	5	7	6	35	21	3	4	5	2	142
No.7	56	25	9	2	16	1	1	2	47	17	15	11	1	3	103
Total	644	280	92	27	159	28	29	29	248	126	50	40	18	14	892

(Note) 1. These figures are based on the interviews on major income sources of household.
2. This survey intended to get an accurate picutre of fisheries, but not to get the whole picutre of all households.
Rough category and grouping were adopted, not like the Household & Population Census conducted by the National Statistics Office.
(Source) Socio-economic Survey on Households, in 2002.

Figure1 Percentage of Major Occupations of Households



There seem to be some conflict as regards political unity between the old-fashioned line and the newly established Ao.Bo.To system. Pakklong Ao.Bo.To becomes the center of the Tambol at which people will build democratic mechanisms and join the decision-making process of planning for any development work. At this moment, two duplicated administrative lines are still in confusion, in that the Ao.Bo.To system itself depends primarily on conventional decision-making processes in Moobaans that the old types of local leaders initiate. Several government-sponsored projects for community development have been implemented by old leaders in the Moobaans under the guidance of the district administration.

Cohesion and uniformity among local people appear strong. They have established a number of people's groups and community-based arrangements. The figures of Table 6 reveal how widely people participate in the membership and activity of the groups, and how heavily they depend upon government-sponsored schemes, especially a micro credit scheme. Residents access to any meaningful service in accordance with project-oriented and voluntary-based purposes. They rarely have a keen awareness of distinguishing either at Moobaan level, few recognize which administrative line their participating organization belongs to.

Membership and activity of people's groups and community-based arrangements are less likely to extend over the territories of a Moobaan. This is not only because of the characteristics of government-sponsored schemes they rely upon, but also because of geographical and economic conditions as has been already described. These institutions mostly confine their membership and purpose within Moobaan territory. Based upon intimacy among residents, groups and financial arrangements are very supportive of those who suffer from a shortage of a modern banking system. Savings groups have grown up sufficiently to conduct various economic activities like fish processing and marketing. The people gradually foster self-help and self-concerned economic attitudes, relying upon the funds accumulated by the Moobaan-based groups. Women enthusiastically join supportive and self-help groups.

Moobaan Nos.2 and 6 effectively manage and allocate funds provided by government to the people on an equal basis. Old-type leaders, mainly Phuyai Baans, pay great attention to how to deliver financial services to as many people as possible. Rotating the access to a micro credit source helps them to continue livelihood longer. Moobaan administration often has a more vital role in managing cooperative financing. People's groups are almost equal to the extended activity of Moobaan administration.

Although many of groups and arrangements are confined within a Moobaan, people are also encouraged to join Tambol-based institutions. The Ao.Bo.To expands its contribution to public work, education, welfare and development. The people's concern at Tambol level has greatly increased. The Tambol territory gradually, but steadily becomes one primary unit of local unity and uniformity especially in economic activities. In addition, fishers and fisheries related groups will be discussed later.

Table6 Lists of People's Groups and Community-based Arrangements

	Name of Groups	Government-based or NGO
Moobaan No.1	1 Village Funds	G
	2 Agricltural Integrated Group, Pakklong	G (AED, MAC)
	3 Women's Groups for Fisheries	G (CDD, MI)
	4 Mangrove Resource Conservation Group	N
Moobaan No.2	1 Alleviation Poverty Group	G (LAD, MI)
	2 Village Funds	G
	3 Agriculturists Group	G (AED, MAC)
	4 Coastal Aquaculture Group	G (DOF, MAC)
	5 Women's Group	G(CDD,MI)
Moobaan No.3	1 Village Funds	G
	2 Farmers Integrated Group for Development	G (AED, MAC)
	3 Coastal Fisheries Group	G (DOF, MAC)
	4 Women's Group	G (CDD, MI)
	5 Alleviation Poverty Group	G (LAD, MI)
	6 Fisheries Relation Group	N
Moobaan No.5	1 Village Funds	G
	2 Alleviation Proverty Group	G (LAD, MI)
	3 Women's Group	G (CDD, MI)
Moobaan No.6	1 Village Funds	G
	2 Saving Group	G (CDD, MI)
	3 Coastal Fisheries Group	G (DOF, MAC)
	4 Fruit & Tree Agriculture Group	G (AED, MAC)
	5 Traditional and Prapenie Conservation Group	N
	6 Environmental Conservation Group	N
Moobaan No.7	1 Village Funds	G
	2 Alleviation Poverty Group	G (LAD, MI)
	3 Fishing Gear Promotion Group	G (DOF, MAC)
	4 Women's Group	G(DOF)
Tambol Level (District Level)	1 Clients Groups of BAAC	BAAC
	2 Pathew Agriculture Cooperative	G(CPD, MAC)

Abbiation : AED=Agriculture Extension Department, BAAC=Bank for Agriculture & Agricultural Cooperatives, CDD=Community Development Department, DOF=Department of Fisheries, LAD=Local Administration Department, MI=Ministry of Interior, MAC=Ministry of Agriculture and Cooperative, G=Government-based, N=Non Govrenmental Organization

Ⅲ. FISHERIES BUSINESS AS A MAJOR LIVELIHOOD

Outlines of Fisheries Households

According to the 1995 Marine Fishery Census, 257 fisheries households existed in Tambol Pakklong (not including non-registered households in Moobaan No.5). Those households engaged in capture fisheries only amounted to 233, while those in aquaculture are 23. There is a little difference as regards the total number of fisheries households between these figures and the results of the household survey in 2002, as seen in Figure 2. A decrease in the number of capture fisheries households is obvious, falling from 233 in 1995 to 188 in 2002. Aquaculture shows a slight increase from 24 to 35 in number, including both full and part-time households.

Figure2 No.of Fisheries Households, in 1995 and 2002

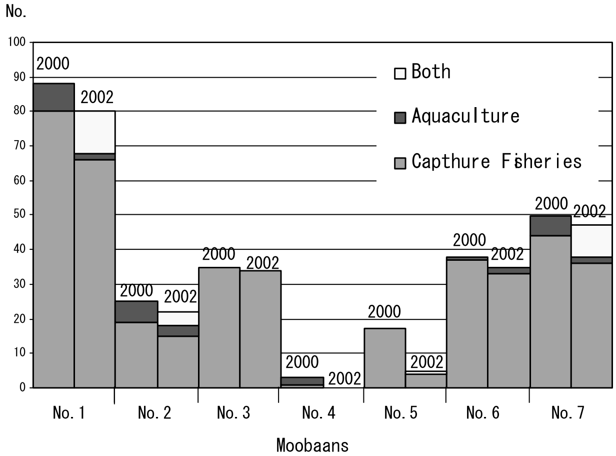
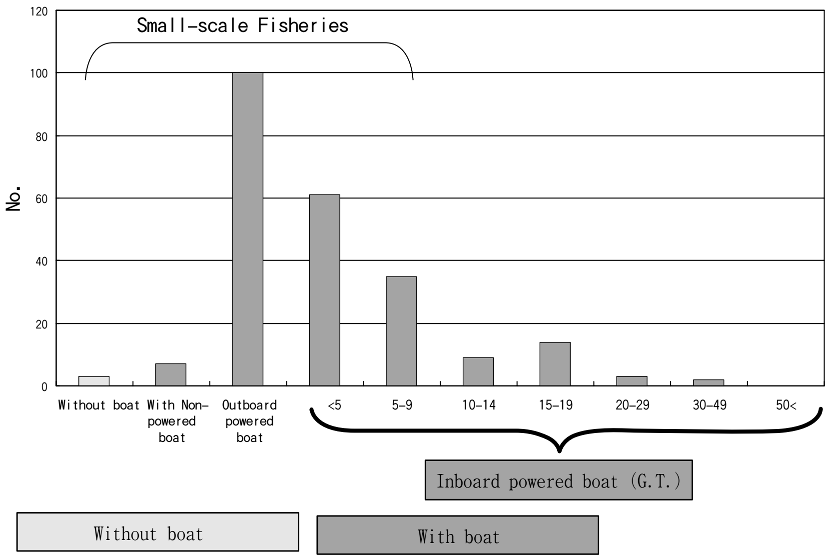


Figure3 Classification of Capture Fisheries Establishments, shown by Size of Fishing Boat



The National Statistics Office (NSO) and DOF define small-scale fishery as follows; 1) an establishment with a non-powered boat, 2) with an outboard powered boat, and 3) with an inboard powered boat (of less than 10 G.T.). A commercial fishery establishment is one that possesses an inboard powered boat of more than 10 gross tons. Such definitions may not accurately reflect the economic characteristics of fisheries establishments, as the size of the boat is not always relative to volume of capital investment. Some fishers own more than one small sized boat, but they are grouped into the category of small-scale fisheries. They might be characterized into capital-intensive fisheries in economic terms. The definition of small-scale and commercial fisheries hereafter is an expedient way to give a rough classification.

Small-scale fisheries account for 83.8 % of the total number of establishments in Tambol Pakklong (see Figure 3 and Table 7). The establishments owning out-board powered boats amounts to 100, being 42.7 % of the total. Few establishments own non-powered boats. Inboard powered boats of less than 10 gross tons amount to 96, being 41.1 %. These groups constitute small-scale fisheries. As will be later discussed in depth, there is great difference as regards percentage of outboard powered boats between Moobaans No.1 and No.7. The former indicates 30 % only, while the latter shows 50 %. In Moobaan No.1, the establishments possess inboard powered boats accounting for 65 % of the total. A large gap can be seen as regards capital investment between both areas. Additionally, compared with Pathew District, the establishments with outboard powered boats are about 10% higher, although commercial fishery is almost at the same level.

Table7 Number of Marine Capture Fisheries Establishment by Size of Management

Unit : No.,%

	TOTAL	Without boat	With boat											
			Sub-total	With Non-powered boat	Outboard powered boat	Inboard powered boat (G.T.)								
						Sub-total	〈5	5-9	10-14	15-19	20-29	30-49	50〈
All Moobaans	234	3	231	7	100	124	61	35	9	14	3	2	—
Percentag	100.0%	1.3%	98.7%	3.0%	42.7%	53.0%	26.1%	15.0%	3.8%	6.0%	1.3%	0.9%	—

(Source) NSO The 2000 Intercensal Survey of Marine Fishery, Changwat Chumporn

As a whole, fisheries in Tambol Pakklong are characterized by the class of fisheries households engaged in marine capture fishing using out-board powered boats. As far as statistical data is concerned, aquaculture is not widespread over the Tambol. The decrease in the number of establishments is the most striking tendency in recent years.

Referring to the Household Survey in 2002

Including Ban Bird (Moobaan No.5, Tambol Saitong), the total number of households engaged in capture fisheries only amounts to 209 (see Table 7). Those households operating both capture and aquaculture is 26. Aquaculture has developed mainly in Moobaans Nos. 1 and 7. These two are located in the proximity of fish and shell farming grounds around Ko Lang Island. Fishers have enthusiastically expanded into aquaculture business, both on an individual and group basis. The present number of households involved may be more than the figures tabulated.[12]

Moobaan No.1 (Thung Maha) is the largest cluster of fisheries households in Tambol Pakklong. The number of fisheries households is 80, being 32.8 % of the total (244 households). The number of households engaged in capture fisheries only decreased from 80 in 2000 to 66 in 2002, while aquaculture increased from 8 to 14. The coastal area of Moobaan No.6 (Bonrai) that adjoins Thung Maha also consists of the center of fisheries businesses in the Tambol. Capture fisheries and aquaculture amount to 33 and 2, respectively.

In the crowded fisheries center of the Tambol, 115 fisheries households are concentrated along small lanes, between the beach and the plantation area of the hinterland. An enormous amount of social and public capital to develop fisheries is invested in the center. There is a concrete pier, 240 m long that was constructed by the DOF. Government subsidy schemes have tended to target mainly fishers and their family members in two Moobaans, to develop fisheries production and quality of life. The DOF and local government provided a source of micro-credit to two fishers groups. A women's group is encouraged to promote fish processing activities in line with the "One-Tambol, one-Product" scheme. Several large-scale traders have extended collection of fisheries products from inside and outside Thung Maha, and marketed them through local and nation-wide networks (but not covering fisheries in the Ban Bird and Saitong areas).

In Moobaan No.2 (Bosamrong), fisheries households amount to 22, out of which 7 households are engaged in aquaculture (3 are involved in aquaculture only). This Moobaan adheres to the agriculture plantation economy, like Moobaan No.4 (Bangwean). It has a very small cluster of fisheries households. Fisheries are a minor business activity. Full-time fishers are not many in number. In Moobaans Nos. 3 and 7 (Koh Teab), fisheries households are stable in number. Small-scale aquaculture has become prosperous, and several households have changed their occupations from capture to this. The coastal zone of Moobaan No.7, called Koh Taeb, is the second largest cluster of fisheries households in the Tambol. Most of households are devoted to fishery and related business. This cluster is isolated and located far from the main road, and living conditions appear worse than other areas. Moobaan No.5 (Nampoo) shows a rapid decrease of fisheries households, from 17 in 1995 to 5 in 2002. However, it is not certain at this moment whether this figure is correct, as household registration is complicated in this area.

Table8 Details of Fisheries Households, Showing Major Fisheries Incomes

Unit: No.

Moobaan	Capture Fisheries	Aquaculture	Both, mainly from capture fisheries	Both, mainly from aquaculture	Total	No.of full-time fisheries households
No.1	66	2	6	6	80	50
No.2	15	3	4	0	22	8
No.3	34	0	0	0	34	17
No.4	0	0	0	0	0	0
No.5	4	0	0	1	5	2
No.6	33	2	0	0	35	21
No.7	36	2	9	0	47	17
Total 1)	188	9	19	7	223	115
No.5 (Saitong)	21	0	0	0	21	11
Total 2)	209	9	19	7	244	126

(Note) 1. This is the total number of households registered in Tambol Pakklong
2. Households with residentail registration in Saitong are included.
(Source) Socio-economic Survey on Households, in 2002.

Table9 Possession of Fishing Boats by Fisheries Households

Unit : No.

	Without boat	One boat	> One boat	No.of households
No.1	0	67	13	80
No.2	2	18	2	22
No.3	1	30	3	34
No.5[1)]	0	28	0	28
No.6	1	25	9	35
No.7	2	37	8	47
Total	6	205	35	246

Note :1) This includes those households registered in Tambol Saitong.
(Source) Socio-economic Survey on Households, in 2002

Possession of Fishing Boats and Their Types

The great majority of fisheries households are classified into the small-scale fisheries group. In 2002, out of 246 fisheries households interviewed, those owning one boat amounted to 205, which is 83.3 % of the total. 35 households owning more than one boat, which is 14.2 %. Moobaans Nos. 1 and 7 show a higher percentage in this category with 16.3 and 17.0 %, respectively. This assumes that a number of households develop commercial production and accumulate enough capital to invest in small-scale boats. Some of these households might not be categorized into small-scale fisheries; they probably belong to commercial fisheries in the management aspect. The number of households with no boat is negligible.

The volume of investment in the possession of fishing boats has increased during recent years. The number of boats rising from 249 in 1995 to 270 in 2002 (not including Moobaan Saitong). A number of small-sized boats have been newly put into operation. Outboard powered boats account for 60.1 % of all boats, while inboard powered boats are 38.5 %.

In Moobaans Nos. 1 and 3, fishers tend to prefer inboard powered boats. A large number of their boats are classified into the inboard type. The average length is more than 9 m, which is longer than the outboard powered type of 7 m on average (see Table 11). In great contrast, fishers in Moobaans Nos. 2, 5 and 7 are characterized as that of small-scale fisheries. 85 % of households possess outboard powered boats (see Table 10). Thus, fisheries differentiate the possession of fishing boats among Moobaans. Obviously, the type and size of fishing boats are not always appropriate criteria to make a distinction between small-scale and commercial-scale fisheries. More adequate criteria should be explored and adapted to the coastal fisheries presently existing in the Tambol.

Table10 Number of Fishing Boats

Unit : No.,%

	Outboard	Inbaord	Others	Total	
Moobaan No.1	38	54	3	95	32.6%
	40.0%	56.8%	3.2%	100%	
No.2	21	1	1	23	7.9%
	91.3%	4.3%	4.3%	100%	
No.3	12	26	0	38	13.1%
	31.6%	68.4%	0.0%	100%	
No.5	25	1	0	26	8.9%
	96.2%	3.8%	0.0%	100%	
No.6	21	20	0	41	14.1%
	51.2%	48.8%	0.0%	100%	
No.7	58	10	0	68	23.4%
	85.3%	14.7%	0.0%	100%	
Total	175	112	4	291	100.0%
	60.1%	38.5%	1.4%	100%	

(Source) Socio-economic Survey on Households, in July 2002.

Table11 Average Length of Fishing Boats

Unit : m

	Outboard	Inbaord	Others	average
Moobaan No.1	7.45	9.56	3.17	6.73
No.2	7.43	7.00	5.50	6.64
No.3	7.13	9.02		8.08
No.5 (Pakklong) 1)	7.68	0		7.68
No.5 (Santhong) 1)	6.66	8.00		7.33
No.6	7.90	8.73		8.32
No.7	7.23	7.60		7.42

Note : 1) Figures for Moobaan No.5 are separated from each other.
(Source) Socio-economic Survey on Households, in 2002.

A Wide Variety of Fishing Gear

More than 20 basic types of fishing gear are identified in Tambol Pakklong, neglecting minor variations and modifications. Table 12 shows the major types of fishing gear employed by both small-scale and commercial fisheries. Almost of all types of fishing gear are mobile in nature. There used to be small-scale stationary fishing devices like bamboo stake traps in the Thung Maha Bay, but no household is involved in this fishery.[13]

The fishing gear employed are roughly grouped into six types, i.e., 1) purse seine (anchovy purse seine), 2) falling gear (cast net), 3) gill nets, 4) scoop nets, 5) hooks and line, and 6) traps. The type of falling net consists of anchovy stick-held box nets and squid cast nets, which are the most important in economic terms. Besides anchovy purse seines, this gear needs a considerable amount of capital, compared with other types of gear. Gill nets are the most popular, targeting a variety of species including shrimp, Indo-Pacific mackerel, mullet, crab, and so on. The gill nets are adopted mainly by small-scale and outboard powered engine boats (Arinupapboon and Laongmanee, 2003).

Another important group of fishing gear are traps catching squid, juvenile grouper, and crabs. Few fishers employ any kind of fish trap. A conventional type of squid trap made of rattan, which is widespread along Thai coastlines, has widely expanded throughout the Tambol, with little difference in the sizes of traps. The collapsible crab trap is a preferred gear that small-scale fishers invest in. It is more popular than the gill net. The crab trap is of two different types (small and medium sizes). It is believed that the increasing numbers of crab trap impact on the crab stocks near seashore. This becomes a critical issue among fishers engaged in crab gill net fisheries. Grouper trap fishing has started to become popular, along with the recent new development of fish cage culture in front of Ian Island, in the Thung Maha Bay.

According to a questionnaire on fishing gear that the fishers use frequently, the squid cast net (scn) is ranked first, followed by the Indo-Pacific gill net (ig). Crab gill net (cgt), mullet gill net (mg) and crab trap (ct) ranging from the third to the fifth place. The gear listed is not the same as the gear that fishers consider as economically important. Squid cast net (scn) represents 30% of the total. Mullet gill net (mg) is second with 8.4%, followed by the Indo-Pacific mackerel gill net with 7.6 %. Crab gill net (cgt) and crab trap (ct) are ranked at the forth (6.9 %) and fifth (6.1 %), respectively. Squid cast net fishery may generate the biggest income source, and provide plentiful job opportunities to members of fisheries households. Anchovy cast net (acn) accounts for 5.0 %. Fishers often operate this together with squid cast nets. The actual percentage of anchovy cast net is far greater than the figure tabulated.[14] Fishing gear for targeting shrimp, like the sand gill net and shrimp trammel net, are very popular, but they are employed mainly during the monsoon season. Seasonal changes in utilization of fishing gear are examined and described by the survey team on fishing activities, as will be discussed later.

Table12 Abbreviation of Fishing Gears

Abbreviation	Name of Gear	Abbreviation	Name of Gear
ig	Indo Pacific gill net	ct	crab trap
mg	mullet gill net	jgt	juvenile grouper trap
sgt	sand gill net	st	squid trap
sdgn	sadine gill net	aps	anchovy purse seine
stn	shrimp trammel net	shl	squid hand line
cgt	crab gill net	hl	hand line
pn	push net	scn	squid cast net
kpn	krill push net	light	luring light for squid
acn	anchovy cast net	cp	crab pot
gt	grouper trap		

Note : 1) English name of fishing gear sources from the DOF's statistics.
2) Prior to the survey, all identified gears were investigaged and given unified Thai nams.

Table13 Fishing Gears Mostly Often Used, Shown by Households

Moobaans	No. of fishing gear type	No. of households	Rank 2)					
				1st	2nd	3rd	4th	5th
No.1	18	80	Often used	scn	ig	light	mg	aps, shl
			Important	scn	ig	light	mg	aps
No.2	8	22	Often used	cgt	scn	cp		
			Important	cgt	scn	mg	cp	
No.3	11	34	Often used	scn	st	aps	cgt, can	
			Important	st	aps, scn		can	cgt
No.5 1)	9	26	Often used	ig	cgt, st, scn			
			Important	mg, scn		ig, stn		cgt
No.6	14	35	Often used	scn	ig	shl, hl, light		
			Important	scn	ig, light		shl	hl
No.7	16	47	Often used	ct	cgt	mg	sgt	scn
			Important	ct	sgt	mg	cgt	scn, light
Tambol		244	Often used	scn	ig	cgt	mg	ct
			Important	scn	mg	ig	cgt	ct

Note : 1) The figures include both areas from Saitong and Pakklong.
2) Fishers listed up the only one gear that they used most often.
(Source) The Socio-economic Survey on Household in 2002

In Moobaans No.1 and 6, the squid cast net occupies the first rank among the economically important gear. This gear is most frequently used by fishers, too. The Indo-Pacific gill net (ig) is placed in the second position from both aspects. Fishers in these two Moobaans may be similar in economic nature of fisheries, although the scale of fisheries establishment in Moobaan No.6 seems smaller than that in Moobaan No.1. Considering the fact that anchovy cast nets and falling nets are probably found in squid cast net boats, fisheries households in the Moobaans depend heavily on squid and anchovy resources.

Moobaan No.2 tends to concentrate on the operation of squid fishery (and anchovy fishery). Squid cast nets and squid traps are often used. They are the most important gear, too. It seems that the economic nature of this village is a little different from Moobaans No.1 and 6 where fishers diversify the adoption of fishing gear.

Fishers in Moobaan No.5 prefer to use types of gill net like the Indo-Pacific mackerel gill net and crab gill net. Economically important types of gear are mullet gill nets, squid cast nets and shrimp gill nets. In Moobaan No.7, a wide variety of fishing gear are found, among which the crab trap is ranked as the first in frequent utilization and economic terms. Sardine gill net fishery gives abundant amounts of income to fisheries households, as the fishing grounds of shrimp are adjacent to the Moobaan. Mullet gill net is attractive, too. Thus, most of the fishing gears are typically those of small-scale fishing.

Employment of Single or Multiple Gear

The employment of multiple fishing gear is a remarkable point in Tambol Pakklong. Those fisheries households using multiple fishing gear are 77.0 % of the total. 23 % of the fisheries households use a single gear. There may be several factors causing such a diversification of gear utilization, but the most decisive is the seasonal changes of available fisheries resources in the Thung Maha Bay and adjacent fishing grounds. The Pre-survey Report roughly describes the seasonal changes of fishing activities and gear employed (Suanrattanachai *et. al* 2002 (a)). Some fishing gear can be used throughout the year, like Indo-Pacific mackerel gill net, sardine gill net, and collapsible crab trap. Shrimp trammel nets, squid traps, crab and other types of gill net are utilized for a shorter period, so that the fisheries households engaged in the operation of these use more than one type of gear.

Besides the fisheries resource environment, the amount of capital and family labor affect the diversification of fishing operations in Tambol Pakklong.

There are great differences as regards the kinds of fishing gear adopted between outboard and inboard powered boats. Outboard powered boats using multiple fishing gear account for 80.6 % of the total of this type. Inboard powered boats show 74.1 % only. Though there is not much difference between both parties, the inboard powered boats tend to specialize in one particular fishery.

From the figures of Table 14, it is realized that inboard powered boats are specialized into the first ranked gear (squid cast net), with a 34.8 % of the frequency rate. The aggregated ratio of squid cast net and anchovy cast net is 43.0 %. The contribution made by the top five types of gear is 68.3 %. On the other hand, outboard powered boats use various types of gear. Indo-Pacific mackerel gill net is the first ranked, with a share of 19.2 %. Mullet gill net occupies the second rank with 10.6 %, followed by crab gill net (9.8%) and shrimp trammel net (9.8%). The top five types of gear occupy 57.5 % of all frequencies, and their concentration is more extensive than those for inboard powered boats. Obviously, fisheries households possessing outboard powered boats are more likely to spread their effort over a wide variety of fishing activities.

Table14 Frequency of Fishing Gears, Show by Boats

(1) Outboard Powered Boats — Unit : No., %

	1st	2nd	3rd	4th	5th	Sub-total up to 5th	6th	7th	Sub-total up to 7th	others	Total
Frequency	ig	mg	cgt	stn	shl		scn	light			
	78	43	40	40	33	234	30	27	291	116	407
% of total	19.2%	10.6%	9.8%	9.8%	8.1%	57.5%	7.4%	6.6%	71.5%	28.5%	100%

(2) Inboard Powered Boats — Unit : No., %

	1st	2nd	3rd	4th	5th	Sub-total up to 5th	6th	7th	Sub-total up to 7th	others	Total
Frequency %	scn	can	ig	aps	shl,stn 1)		shl, stn	light			
	80	28	18	16	15	157	15	10	182	48	230
of total 1)	34.8%	12.2%	7.8%	7.0%	6.5%	68.3%	6.5%	4.3%	79.1%	20.9%	100%

Note : 1) This figure show only one gear.
(Source) The Socio-economic Survey on Household in 2002

Table15 Households with Employing Multi or Single Gears

Unit: No.,%

Moobaans	Tambol Total				Type of Households							
					With one boat				With more than one		Non boat	
	Multi	%	Single	%	Multi	%	Single	%	Multi	Single	Multi	Single
No.1	61	68.5%	28	31.5%	56	69.1%	25	30.9%	3	2	0	1 2)
No.2	16	76.2%	5	23.8%	16	76.2%	5	23.8%	0	0	0	0
No.3	30	85.7%	5	14.3%	29	85.3%	5	14.7%	1	0	0	0
No.5 1)	25	96.2%	1	3.8%	25	96.2%	1	3.8%	0	0	0	0
No.6	26	72.2%	10	27.8%	23	69.7%	10	30.3%	3	0	0	0
No.7	41	80.4%	10	19.6%	40	81.6%	9	19.4%	1	1	0	0
Tambol	197	77.0%	59	23.0%	189	77.5%	55	22.5%	8	3	0	0

Note: 1) The figures include both areas from Saitong and Pakklong.
2) This household operates krill hand push net.
(Source) The Socio-economic Survey on Household in 2002

Different Patterns in the Moobaans

The use of multiple gear is different between Moobaans. As described before, Moobaan No.1 is characterized by a higher level of commercial fisheries because of the development of squid and anchovy fisheries. Fisheries households involved in one single gear operation represent 31.5 % of the total. Moobaan No.6 follows this with 27.8 %. Generally, inboard powered boats with longer length concentrate on a single gear.

In extreme contrast, 96.2 % of all fisheries households in Moobaan No.5 use multiple gear. Moobaans No.3 and 7 also have a higher percentage, being 85.7 % and 80.4 %, respectively. In Moobaan No.2, not much incentive is given for fishers to diversify fishing gear, as their fisheries production is regarded as smaller-scale and self-consumption in nature.

A series of figures indicate what gear a fisheries household possesses (a question asks to list three major types). They may not always correspond to the gear that is often used and/or is economically important. As far as the collected figures are concerned, the possession of fishing gear in each Moobaan can be concluded as follows :

1) Moobaan No.1 : fishing gears catching squid and anchovy account for a large portion, while the kinds of gill net have a lesser proportion. Distinction between two groups of fishing gear is remarkable, as both correspond to small-scale and commercial fisheries, respectively.
2) Moobaan No.2 : gill nets are the major types of gear that fisheries households employ. Mullet and crab gill nets account for 34.1 % and 29.5 %, respectively. Squid cast net holds a smaller proportion of the total. Small-scale fisheries feature the characteristics of fishing operation in this Moobaan.
3) Moobaan No.3 : the possession of fishing gear is very similar to Moobaan No.1. Squid cast net and anchovy falling net are the major types. Small-scale gear like gill nets remains at a low percentage.
4) Moobaan No.5 : Indo-Pacific mackerel and shrimp trammel nets are widely accepted. Their ratio is more than 40 % of the total. Squid and anchovy fishing gear share a minor proportion.

5) Moobaan No.6 : the pattern of possession is almost the same as Moobaan No.5, although this village is in the proximity of Moobaan No.1.
6) Moobaan No.7 : squid cast net is ranked first, followed by luring light for squid. This village seems to have a similar pattern to Moobaan No.1. However, there are not so many types of gear as in Moobaan No.1. Hand line accounts for 11.3 %. Fishing gear for crab is also important.

Lucrative Combinations : Anchovy Falling Net and Squid Cast Net

Anchovy falling net and squid cast net directly affect the economic status of fishers and fisheries households. The combination of both gears is the most lucrative. This combination is regarded as being rather capital-intensive in nature, more than any other type except for anchovy purse seines. Those fishers involved in the two fisheries are classified into the upper economic classes of small-scale fisheries. Inboard and outboard powered boats are equipped with both. Of course, the inboard powered boats are likely to develop such an attractive combination.

A socio-economic research on cast net and anchovy falling net fisheries will analytically describe how fishers are attracted to both and/or either of them. They develop many patterns of fishing operations by combining small-scale fishing gear with the lucrative ones. At least four types exist, i.e., 1) small-scale fishing gear ＋ cast net, 2) cast net ＋ falling net ＋ small-scale gear, 3) cast net ＋ falling net, and 4) cast net only (Suanrattanachai et al. 2003). Fishers usually try to maximize their benefit even from one fishing trip. After sampling a target species, anchovy or squid, they will decide without hesitation which gear should be employed at any given spot. When lunar cycle is around full moon, some prefer to operate small-scale fishing gear as both anchovy and squid cannot be readily caught. Some who do not have enough funds concentrate on squid cast operation. In this case, squid cast net and anchovy falling net are indispensable units

The fishing gear survey that was conducted during the six months from March to August 2002 describes that the types of fishing gear found amount to 24, most of them are used in the coastal zone because of the size of the fishing boats (Arnupapboon & Laongmanee, 2003). Fishing operations seasonally change according to the resource and fishing ground environments, climate, and restriction rules on particular types of fisheries during the period from February to April. In conventional small-scale fisheries, Indo-Pacific mackerel, hand line, crab trap, sand-whiting gill net are operated almost throughout the year. Fishers choose selective gear seasonally while employing these substantial types. As a result, they involve in different types of fisheries on a regular basis. An attempt is made to appropriately allocate their labor force to fishing operations.

Characteristics of Fishing Operations

A series of surveys on fishing gear and fishing grounds are still needed to get a real picture of fishing operations around the seas in front of Tambol Pakklong. By dividing 12 fishing grounds areas, the survey specifies the seasonal changes in fishing grounds according to types of fishing gear, and then provides necessary data to estimate the efficient operation of fishing activities. Observation on fishing activities during the period from March to August in 2002, confirms a high density of small-scale fishing boats of not more than 8 m long in Thung Maha Bay and Tam Tong Bay. Almost 40 % of the fishing boats are in operation along the Bays areas.

As the figures of Table 11 show, fishers do not have middle and large scale fishing boats, even if the operation of commercial-scale fishing gear near the seashore remains highly productive and profitable. This does not mean that commercial-sized boats rarely enter into the Thung Maha and Tam Tong Bays. Anchovy purse seine boats usually operate in 5-10 meters depth outside the Ko Lang Island or in the Bays. They are mostly middle scale, coming from outside the Tambol. According to the survey report by Arnupapboon & Laongmanee, the fishing grounds are so narrow that the density of fishing gear is relatively high. In particular, the operation of anchovy fishery in near the seashore becomes controversial among small-scale fishers in Tmabol Pakklong. They often complain that this fishery heavily exploits anchovy-like juvenile species including the Indo-Pacific mackerel. Although a stock assessment is still in process, such a rapid expansion of anchovy fishery may have damaged fish stocks in the coastal zones. Push net fishery may not be popular in the zones, but there are still a few operators along the bay areas.

Severe conflict between crab gill net and crab collapsible trap is another controversy. The trap efficiently catches a larger amount of crab (mainly Blue swimming crab) than gill net, while the latter catches bigger sizes (Petchkamnerd, *et al* : 2003). Gill net fisheries are conducted in both shallow and deep sea waters, while crab traps are set in the shallows. An increasing number of fine mesh sized traps have caused conflict with those fishers employing gill nets in the shallow waters. Fishers living in Moobaan No.1 often criticize the fishing behavior as being destructive to crab resources by the fishers in Moobaan No.7 who increase catch effort through the expansion of fine mesh sized traps. Thus, coordination and adjustment should be implemented even among small-scale fishers.

IV PROCESSING AND MARKETING SYSTEMS OF FISHERIES PRODUCTS

Grouping of Traders

Referring to the marketing survey conducted in 2002, 10 fish traders are concerned with the collection of fisheries products and extend their own marketing channels. Table 16 indicates the outlines of these ten fish traders. They are diversifying business activities with family members, but female members play a decisive role in any trading business. There are several types and sizes of fish traders: some extend their business interests over the whole range of fisheries business on a large scale, while some focus mainly on the wholesale business and processing within the narrow locality of Moobaans.

Table16 Outlines of Fish Traders

Moobaan	Moobaan No.1 and No.6						No.3		No.7	
Trader	No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8	No.9	No.10
Sex	Female	Female	Female	Female	Female	Female	Female	Female	Female	Female
Age (years)	55	63	45	38	50	30	48	40	55	42
Experience (years)	>30	>40	4	10	6	5	23	10	15	5
Income sources										
1) Agriculture	//	//			/		/	/		
2) Wholesale business										
-Dried squid and anchovy	/	//								
-Fresh										
1 squid	//						/	/	/	
2 fish			/				/	/	/	
3 shrimp			/				/	/	/	
3) Fish processing										
-Dried squid	//		/				/	/		
-Dried anchovy	/						/	/		
-Dried-salted fish			/	/		/				
4) Fishing	/					//	/	/		
5) Gasolin and ice trade	/	//					/	/	/	/
6) Retailing										
-Dried										
1 Dried squid	//		/				/	/		
2 Dried anchovy	/						/	/		
3 Dried-salted fish			/	/		/				
-Fresh										
1 squid						/				
2 fish			/		/	/				
3 shrimp			/		/	/				
Total investment (Baht)	3,989,500	1,818,000	38,700	12,900	441,100	424,250	1,736,000	1,828,000	22,500	10,000

(Source) Laowapong and Yamao 2002; Marketing and Utilization of Fish Products in Tambol Pakklong, Pathew District, Chumporn Province

With respect to the marketing function, six traders (Nos. 1, 2, 3, 7, 8, and 9) are regarded as those who function by wholesaling fresh and processed fish over a wider area. Among themselves, two wholesalers are locally called "Phe Pla" (No.1 and 2), standing at the apex position of the marketing channels in Tambol Pakklong. They have established a horizontal integrating link with other small traders, exerting strong influence on the formation of benchmark prices that traders afford to offer. These big wholesalers are the financial traders that provide investment and operational funds with particular client fishers. Investment funds are directed toward the purchasing of fishing boats, engines, and devices. The provision of operating funds on a daily basis consists of fuel, ice and small fishing gear.

Exclusive Nature of the Transactions

Wholesale traders, more or less, exclusively transact business with their particular clients, by providing financial services. The clients are obliged to sell their catch and processed goods to the traders. They will deduct a certain amount of repayment from a client's daily turnover, considering his/her catch and remaining amount of credit.

Such a relationship is regarded as a somewhat like patron-client relationship between fish traders and fishers, which still perpetuates the marketing systems in the Tmabol. This may be exclusive and paternalistic in economic nature, thereby making the fishers often to become vulnerable against their patron. Fish trader No.1 has more than 20 “Luuk Rua” (client boats) under her control. Trader No.2 has established a patron-client relationship with about 30 fishing boats. The number of “Luuk Rua” from which a small trader collects fish ranges from 5 to 10 boats. Both big wholesalers and small traders transact their business in almost the same pattern with particular fishers. The more fishers need capital investment, the more they rely upon monetary advances from the traders.

Wholesale traders diversify economic functions. Gas stations and ice storage are indispensable facilities for their trading business. The biggest trader in Moobaan No.1 deals in a large volume of gasoline (diesel fuel and gasoline) and owns a big refrigerator. She provides fuel and ice to client fishing boats. A considerable part of the business profit derives from such a supply business. This is the foundation of her lucrative marketing activity. Fuel and ice are the most essential materials for daily fishing operations, so that they represent an advance payment. As long as fishers want to continuously receive such services, they regularly sell their catch to a financial trader. Wholesale traders still tend to supply daily production materials, which allows them to easily collect fisheries products.

Fish trader No.1 had constructed a wooden pier by herself before the DOF built a new concrete pier 240 m in length. Yet another trader possessed a long wooden pier in Moobaan No.3, at which a number of purse seine and squid cast net boats unload their catch. These two traders seem to be old-fashioned types. The piers are a physical foundation of a lucrative marketing business, in which they control the flow of fisheries products by standing at the apex position between client fishers and specific buyers.

Changing the Marketing System

The oligopoly of fish marketing often allows a fisher to access to several financial sources from more than one fish trader. In Moobaan No.7, two fish traders demarcate a territory of marketing, species by species. The one collects mainly crab and crab meat, by delivering collapsible crab traps as credit-in-kind to fishers. Another trader purchases fresh fish and squid, who also give production materials as a form of advance payment. Most fishers in this village are involved in multiple fishing operations including crap trap fisheries, so that they rely on several traders at one and the same time.

An increasing number of fishers do not depend on any financial service given by a particular trader. They freely market their fisheries products. Smaller-scale and part-time fishers are less likely to be dependent on guaranteed transactions. Small traders from inside and outside the Tambol offer a higher price to fishers than financial traders, and catch particular species of fresh fish and crustaceans. Their appearance stimulates a competitive situation in fish marketing.

Wholesale (financial) traders often suffer from a shortage of business operating funds, which are directed to a source of advance payment and credit. They have to take fishing and marketing risks instead of client fishers, although they benefit. Available fish stocks around the Thung Maha Bay and Ko Lang Island has decreased, and the catch per unit effort (CPUE) is on a downward trend. In cases where the market price plunges and demand decreases, financial traders face the problems of increasing un-collectible credits. They do not always want to intensify exclusive marketing links with client fishers.

During the monsoon season from December to February, a considerable number of fishing boats migrate from adjacent areas like Prachuab Khiri Kan Province to the Thung Maha Bay. Moobaan No.7 (Moobaan Ta-et) is a major landing site for shrimp. Several collectors of shrimp move there from outside Tambol Pakklong, but they purchase mainly from the fishing boats coming from outside with whom they keep exclusive contracts. There appears to be completely different channels of shrimp marketing.

Processing of Squid as an Important Income Source

In Tambol Pakklong, a large number of households are engaged in wage labor. Not only fisheries but also farming households get additional income from fish processing. Females provide an abundant source of cheaper labor in unloading, cutting and gutting, boiling, drying and grading. Processing work enable fishers and traders to sell value added fisheries products through local and nationwide distribution channels. Almost all processing and marketing activities are based upon intensive labor.

Female workers normally earn 150-200 Baht a day during the peak seasons of squid fisheries. Unloaded squid is immediately cut and gutted and then dried for several hours. Wages change according to the size and amount of squid, being 2 Baht/kg for large sizes, 3 Baht/kg for middle, and 5 Baht/kg for small sizes. The smaller the size, the higher wages a worker requires.[15] There are several types of squid fisheries including cast net, trap, and hand line. The cast net is the major fishing gear for squid. The fishing season extends over almost 10 months from February to November. Squid fishery provides an important income source to local people over a long period.

The processing of squid starts in the morning after the fishing boats return from fishing at around 6 o'clock. Housewives and hired female workers are busy in processing and drying until they have completed the catch. They spend almost half day in the peak season. Several hours after sunlight drying, dried squid being graded according to size. Grading creates another income source of 1.5 Baht/kg for the local people. In Moobaan Nos. 1 and 6, fishers' family members (mostly women) grade dried squid and transport it to the fish traders, who often hire wage laborers if necessary.

Only two fish traders (Nos. 1 and 6) deal in dried squid. They transport it mainly to Bangkok and partially to local markets. They do not purchase a great amount of fresh squid. Traders in Moobaan Nos. 3 and 7 purchase raw materials and process them. They prepare and arrange for processing work by themselves. As a result, the added value belongs to the traders, but not to the fishers. There may be several factors to cause such a difference between both areas, but the background and reasons for it will be further investigated.

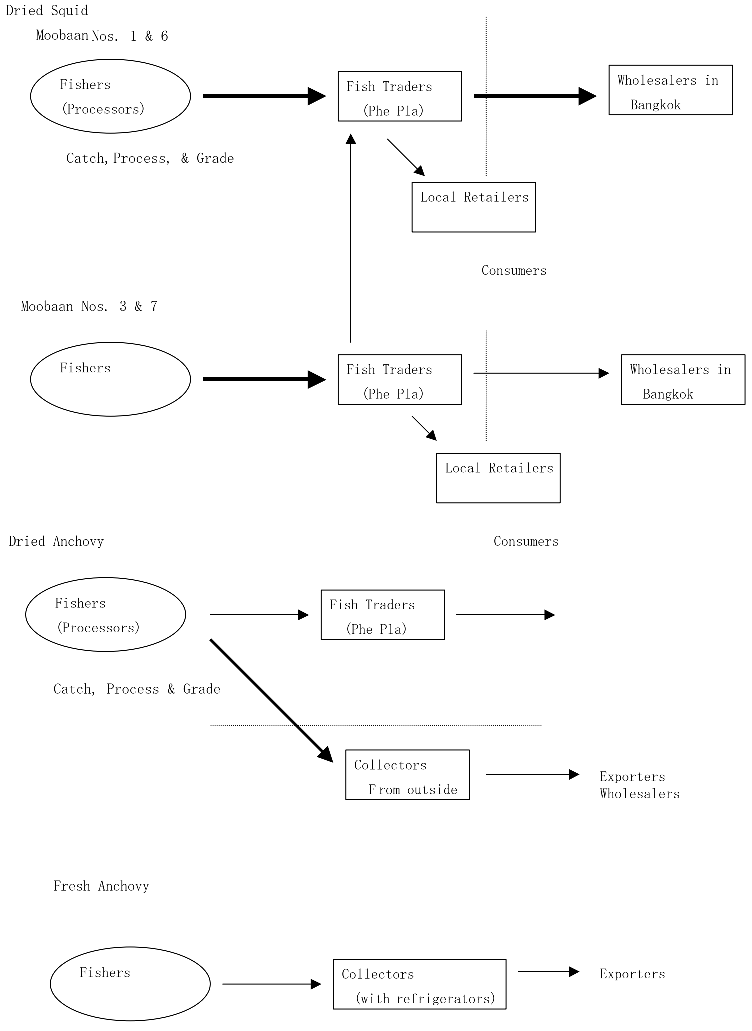
It is roughly estimated that the rate of added value is 31 % from the price of fresh squid (Lawapong and Yamao, 2002). Squid fisheries present a ripple effect to the local economy like anchovy fisheries. There are several marketing channels of fresh squid with sizes of over 9 inches; 90 % of the squid is eventually transported to cold storage factories for export. A minor portion of the fresh squid is sent to Chumporn local markets and processing plants in Prachuab Khiri Kang.

Anchovy Processing and Marketing

Anchovy fishery and processing businesses have become a greater source of income since five or six years ago. Incentive for the expansion of the anchovy business comes from export-oriented demand for dried and frozen fresh anchovy. Anchovy is unloaded in Moobaan Nos. 1 and 3, where both purse seine and falling net are the major fishing gear employed. Fresh anchovy, called 'Pla Saimai' in Thai, is sold to a single small factory located in Moobaan No.3, immediately after unloading. Large sized anchovy is boiled in salty water for a few minutes, and is then spread on a tray for drying (Lawapong and Yamao, 2002). Dried anchovy is precisely graded into five sizes. Processing and grading is labor intensive work, which requires skill and speed to maintain the quality of the processed anchovy. Like drying and grading squid, these processes generate a large income source within the Tambol. However, women tend to prefer squid processing rather than anchovy because of shorter working hours.

Only two fish traders in Tambol Pakklong deal in graded dried anchovy, and sell to collectors coming from outside. There are many outside-traders who collect directly from fishers. Their transactions flourish during the peak season of anchovy fishery. As a result, marketing channels of dried anchovy change greatly. This becomes a strong incentive to increase fishers' investment in anchovy fishery. Anchovy and its processing represent newly growing commodities that are not always under exclusive business links between fishers and a conventional type of trader. They are not a parallel with dried

FIgure4 Patterns of Marketing Channels for Dried Squid and Anchovy and Dried Squid



squid. Generally speaking, anchovy fishery has grown rapidly along Thai coast lines, causing the appearance of new marketing channels accompanied by new types of fish trader. Tambol Pakklong is not an exceptional case (see Figure 4).

Extended Networks of Traders

Wholesale traders in Tambol Pakklong still keep a particular relationship with client fishers. Based upon exclusiveness and half-competitiveness of transactions at collection level, the main stream of fisheries products at wholesale level is made up of kinship relations. Big wholesalers extend vertical integration in collaboration with relatives. These variables affect the whole process of marketing transactions in the Tambol. However, the exclusive marketing systems may be weakened and softened. Because of a rapid increase of fishing boats and gear, a conventional type of fish trader finds it hard to provide client fishers with financial services. Part-time fishers who invest in small fishing equipment have increased. Fishers have more access to formal micro credit than before. New types of fish traders appear to collect profitable products only like the dried anchovy. As a result, fishers tend to reduce their dependence on the conventional type of trader.

Geographically, extended networks of traders are confined within the areas of Moobaan Nos.1 and 6, and in their proximity. The networks do not cover Moobaan No.5 (Ban Bangwean and Ban Numpoo). Fishers there are included into the marketing territories of Ban Sapan Noi and Ban Sapan Districts. Fish traders in these two districts come to collect various species of fish and crustaceans, and types of processed products. As described before, many shrimp traders move on to Moobaan No.7 accompanying fishing boats equipped with shrimp trammel nets during the monsoon season. Some fish traders occasionally purchase dried squid and other species of fish, and then transport them through their own marketing networks. Dried anchovy is another target species. The marketing networks originated from the two adjacent districts affect, directly or indirectly, the formulation of local prices, even if there is distinction between inside and outside traders.

Not surprisingly, fish traders in Tambol Pakklong are not involved in the collection and marketing of cultured shrimp (Black tiger shrimp). This business is very lucrative, but needs a large amount of working capital. Conventional types of trader neither can accumulate enough working capital, nor are they capable of managing a nationwide network of culture shrimp or searching for a number of harvesting and grading workers. Capital-intensive and large-scale shrimp culture does not belong to the business territory of local people. Local fish traders hardly become concerned with cultured shrimp marketing.

Outside the Extended Network of Traders

There are many kinds of fisheries processed products apart from dried squid and anchovy, including dried-and-salted fish, crackers, paste, and various kinds of cooked and tasty products. These are mostly the traditional types that are produced on a small scale for sale in local markets as well as for household consumption. The local markets are inside the Tambol, in the adjacent Moobaans outside the Tambol, and in the Amphur Muang District of Chumporn. Housewives of fishing households and female retailers sell the products at the local markets to gain additional income. Conventional traders do not usually deal in traditional processed products.

Since the LBCRM-PD started with promotion of fish processing, two or three womens' groups have expanded the scale of experimental production. The groups' members join in collective work and marketing. They actively explore new marketing channels and destinations. Supported by provincial and district governments, their products are often transported far beyond Chumporn Province.[16] Newly explored products are outside the marketing systems currently prevailing, even if fish traders are joining the groups' activities.

IV CONCLUSIONS

Small-scale Fisheries Dominate

Tambol Pakklong is a typical coastal community in the upper part of the South, facing the Gulf of Thailand. Small-scale fisheries dominate production and distribution. The majority of small-scale fishers employ multiple types of fishing gear, and change target species season by season and day by day. Diversification of fishing effort is the most striking tendency in small-scale fisheries. Outboard powered boats of less than 8 m long are the main type of fishing boat. The fishers tend to catch around Thung Maha Bay, Tam Tong Bay and behind Ko Lang Island. Gill net and trap are the most popular devices. Fishers do not own sizable boats that are equipped with commercial-scale fishing gear like trawl nets, bottom gill nets, push nets and so on (Arnupapboon and Laongmanee, 2002). Fishing grounds near the seashore are fertile, so that a number of commercial fishing boats are attracted to come from outside. As a result, the fishing grounds become congested.

The number of fishing boats, particularly outboard powered boats, has continued to increase. Included in small-scale fisheries, a number of boats are equipped with squid cast nets and anchovy falling nets. Fisheries households increase dependency upon squid and anchovy resources. They contribute largely to booming and depressing the local economies. Concentration of capital and labor on squid and anchovy has been a notable trend in recent years.

Diversifying Marketing Systems of Fisheries Products

Fish traders deal in almost all species of fish except fresh anchovy and cultured shrimp, but the food system of fresh and dried squid has long been determinant in the whole system of fish marketing in Tambol Pakklong. Gradually but steadily, this static system has proceeded into a new one giving a foretaste of dynamic change. The prevailing system is divided into several parts, as described before. The growing anchovy business is a decisive factor that pushes traders and fishers forward exploring new marketing channels. The appearance of new comer-traders gives a great impact to flexibility.

In accordance with growing demand for new products in the diversified marketing system, fishers modify and develop fishing technologies and equipments. The combination of squid cast net and anchovy falling net is a remarkable case. Small-scale boats have adopted it effectively. Lucrative anchovy fishing urges a number of fishers to invest in it. However, the majority of them cannot afford to invest in anchovy purse seine fishery that requires large sums of capital and numbers of crew. Thus a marketing incentive often brings a structural change of distribution channel and the renovation of fishing technology adaptable to small-scale fishing operations. This often causes a rapid deterioration of a new target resource. Small-scale anchovy fishery might seriously damage other coastal resources by the by-catch of juvenile other species. A positive effect on fisheries and local economy, in turn, increases an opposite, negative effect on coastal resource surroundings.

The development of the crab collapsible trap fishing is accelerated by several small traders who concentrate on crab trading. A strong market incentive pushes forward the rapid expansion of fine mesh traps, which expel bigger sized traps and crab gill nets. A particular marketing channel often deplores a new technology and enhances efforts to catch target fish. The technology is mostly modified from conventional gear. Such a market-oriented technology puts strong pressure on the renew-ability of a target resource.

Uncertain Factors to Explore Fisheries Resources

In Tambol Pakklong, fisheries are a very important income source as well as agriculture. People involve in both economic activities at one and the same time. Part-time fishers increasingly affect resource exploitation. They freely invest in small-sized boats to earn daily income. Because of the ownership of land property, they often stand in a far better position than full-time fishers. Farmer-fishers do not always increase the amount of capital and labor, but their whole volume of catch effort is by no means negligible. Women in households prefer to use primitive gear in shallow waters in front of their houses, like ski-board and spear. Small cast net is commonly used to catch black tiger shrimps released from shrimp culture ponds, too. These primitive fisheries, being less costly, preserve the additional household income as well as dishes on the plate. They are very cost-effective. There are several distribution channels to carry such small catches to local markets.

Local people freely enter into fisheries and go out just as easily. Naturally, their movement becomes uncertain factors to increase or decrease the fisheries resources.

Further Study from the Viewpoint of the Food System

A further study on the food system of fisheries products is needed to predict future trends of production and marketing. Wholesalers stand on the apex positions between the production side and the local distribution process. Therefore, market trends do not always affect the production side immediately. Fishers' production behavior has a time lag with the fluctuation of market prices. Whereas market prices change every day and every minute, fishers' selling prices normally remain at a different level for several days (and weeks). The part of market price rise is largely absorbed into the distribution process. If market prices fall, fishers have to accept an immediate drop in the selling price that traders offer. Transactions between patron trader and client fisher characterize oligopoly with information asymmetry. Low accumulation of capital prevails in the management of household-based fisheries, so that fishers should still rely on financial-traders in various ways.

Fishers increasingly focus on lucrative fisheries resources like squid, anchovy, crab and shrimp, despite resource diversity. They are more likely to be affected by market trends. Of course, they keep a diversified pattern of fishing operations to reduce market risks. As a parameter, however, the resource environment of such economic species influences social and economic indicators of fisheries households and local people. The correlation between resources targeted and the indicators will be discussed in depth in the near future through a series of base line surveys. Practical and adaptable methods of resource management will be proposed by resource users and stakeholders, based upon analytical reports to be restored by the LBCRM-PD.

(NOTE)

[1] There was much discussion and dispute about how the LBCRM-PD would approach and target the group of non-residents in Tambol Pakklong. Very few officially based projects and programs have satisfied their economic and social interests beyond the provincial territory, with the exception of primary education. A series of training and educational activities of the LBCRM-PD are targeted at both residents and non-registered residents, since many of the fishers in Ban Bang Bird utilize coastal resources in the sea in front of Tambol Pakklong.

[2] This survey also intended to illustrate a map of the Tambol, to create a community-resource map of the Tambol, to create a community-resource map and bring accurate geographic information to the people.

[3] Suanratanachai defines these households into three categories as follows ;

1) non-registered households that are not certified by the district office.
2) registered households that are certified by the district office as a unit.
3) registered households that are certified by the district office as a unit, but consist of more than one family and constructs other houses nearby the main house in the same lot.

There may arise dispute over such simple definitions. However, the LBCRM-PD prioritizes getting the real number of households considered as an economic unit, not giving any specification in sociological aspects.

[4] The MI gives a report with the title “Raigan Khong Khana Kamakan Phattana Heang Chart”.

[5] This assessment consists of 37 items that cover four fields, 1) infrastructure, 2) income, production and employment, 3) water resources, 4) level of development. Each item is given low, middle, or high, and then scored one to three. 0 to 5 have a score of 1 out of 37 items, which is “Level 3”. 6 to 10 have a score of 1, which is “Level 2”. 11 to 37 have a score of 1, which is ”Level 1”.

[6] This scheme is named ”Krong Kan Khe Khai Phanha Kwam Yakjon” (Poverty Alleviation Project). This scheme started with Phase I in 1993, covering 11,608 Moobaans. The duration of the Phase II was from 1998 to 2001, targeting 28,038 communities. The number of Moobaans that applied for this scheme was 7,026.

[7] These figures are based upon “Raigan Phon Kan Samuruaj Kho Mun Jo.Po.To. lea Pon Kan Thiap Keat Phamai 2544”. This report includes 39 items being related to basic human needs. The Local Administration Department (LAD) publishes it every year.

[8] These figures indicate an average, so that these figures may not have real accuracy to the situation of fishing household economy.

[9] *No.So.3* is a type of land title that secures exclusive utilization. Although this title does not allow for land ownership like *Chanort*, land users can sell the title as if they are landowners. The *No.So.3* becomes a mortgage for loans obtained from formal financial institutions like the BAAC and agricultural cooperatives.

[10] Those farmers who pay a land tax that is subject to the land they cultivate. The receipt of the tax is called “Pho.Bo.Tho. 6”.

[11] Under the Poverty Alleviation Project (PAP) scheme under the Ministry of Interior, four Moobaans are categorized into the poverty group by following three standards : 1) household income per year being less than 15,000 baht, 2) there are households whose family member obtain less than 15,000 Baht per year, and/or 3) those households at the level of absolute poverty account for over 30 % of the total number.

[12] In September when the LBCRM-PD proposed to set up a zoning plan for fish and shellfish farming, more than 60 people joined the meetings to discuss problems and procedures of zoning.

[13]A few households occasionally build a framework of stake traps in front of Aueng Island.

[14]The Socio-economic survey team describes that anchovy falling net is frequently found on large cast net fishing boats (unpublished).

[15]Wages differ from village to village; there are only two sizes, large and small. Small is 4-5 Baht, while large is 2 Baht.

[16]The groups' products are sold in festivals and ceremonies that government agencies arrange for such purposes as promoting the "One-Tambol, One-Product" scheme. They are held all over the country.

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チュンポン県パクロン地区の零細漁業の社会経済的状況
―持続的な資源管理の確立をめざした分析―

山尾　政博・久賀みず保

本論文は、チュンポン県パクロン地区の社会経済的な状況を明らかにするのを目的にしている。タイの沿岸零細漁業は漁獲量の減少と資源の枯渇に直面している。過剰人口を抱え、漁業以外に就業機会が限られている漁村では、水産資源に対する漁獲圧力が高まり、持続的に資源を利用するのが難しくなっている。資源の減少と貧困という二重の悪循環に陥っている地域が多い。水産局と東南アジア漁業開発センター（SEAFDEC）は、資源の持続的な利用と地域経済振興を組み合わせた、住民参加型のパイロットプロジェクトをパクロン地区で計画・実施している。このプロジェクトは "Locally Based Coastal Resource Management (LBCRM)" と呼ばれている。本報告は、 LBCRM の今後の活動方向を検討するために、漁家の存在形態、資源利用の実態、および資源利用をめぐる利害関係等について分析している。パクロン地区では、零細漁業が生産と流通を担っている。多種多様な漁具・漁法が用いられて、数多くの魚種が水揚げされている。イカとカタクチイワシが漁家はもとより地域経済にとって特に重要である。専業漁民の他に、農業者を中心に多くの住民が前浜で漁獲行為をしている。１人当たりの漁獲量はわずかだが、地域全体としてみると漁獲努力量はかなり大きくなる。パクロン地区での沿岸資源管理は、漁民はもとより一般住民をも巻き込んだ参加型方式が相応しいと考えられている。