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in

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Committee for Coordination of Investigations
of the Lower Mekong Basin

(Khmer Republic, Laos, Thailand and Republic of Viet - Nam)

SOCIO - ECONOMIC ASPECTS OF FISHERY OPERATIONS

IN

THE NAM PONG RESERVOIR

1970 - 1971

Report by the Secretariat

(This study has been made by the Mekong Secretariat with
financial contributions from the US Agency for International
Development through the Regional Economic Development
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SOCIO-ECONOMIC ASPECTS OF FISHERY OPERATIONS

IN

THE NAM PONG RESERVOIR

1. INTRODUCTION

The Nam Pong reservoir, which represents one of several water resource development projects in North-east Thailand, is at present the largest fresh water lake in the whole country. At the maximum storage elevation of 182 m. above mean sea level, it has a surface area of about 410 square km. with an average depth of about 16 m.; and at its minimum elevation of 167 m., its surface area is down to 160 square km. with an average depth of about 12 m. The lake bottom was, prior to inundation, mostly paddy fields interspersed with shrubs and scrub. These physical characteristics, together with a tropical monsoon climate, make Nam Pong a very fertile ground for fish propagation. During the first few years after the reservoir impoundment in 1965, the abundance of fish together with the small number of fishermen resulted in a high income per fisherman. Since the Government has put no restriction on entry to the reservoir margin where land is publicly owned, new opportunities provided by inland fishing were soon exploited to the utmost. Attracted by high income from fishing at Nam Pong, the North-east farmers, especially those whose land was poorer and whose income was below average, were beginning to move into the reservoir for fishing on a permanent basis. This process was made easy by the fact that migration has been part of the North-east culture and that most of the farmers have had experience in fishing with one kind of gear or another. This, which we might call the second phase of fishery development, naturally brought about a decrease in fish catch per unit of effort and per individual fisherman, more or less in proportion to an increase in the number of fishermen themselves. When this study was conducted in 1971, average income from fishing had gone down

/so much,

so much, from over Baht 10,000 per family per year to about Baht 4,000, that only a few farmers found it still attractive. By then, the number of fishermen in Nam Pong has grown from an estimated 200-300 families in 1966 to about 1100 families five years later. Ironically, the increase in the number of fishermen has enhanced the earnings not of the fishermen themselves, but of the middlemen who receive the biggest gain from fishing.

Equally interesting are the social changes brought about by the emergence of large and small fishing communities around the lake. For every family that moves in, a new house has to be built, new school accommodation to be found, and a new social and political organization has to be created so that law and order will be maintained and the entire communities can make a living peacefully.

This study attempts to examine all these changes as a consequence of the creation of a man-made lake. In so far as the Thai Department of Fishery has been engaged mainly in limnobiological research and experiment in Nam Pong and has not yet done very much in the field of reservoir management for fishery purposes, the Nam Pong Reservoir has been an ideal place to study the socioeconomic changes associated with the natural development of inland fishery. Of special interest is the question of optimum ratio between the number of fishermen per given water surface area where the yield of fish in monetary terms to be realized by fishermen will be maximized individually and collectively on a perpetual basis. The determination of this ratio will be possible only after a series of studies have been carried out in most or all reservoirs in the basin. This particular study attempts to provide information for such a ratio on the basis of the Nam Pong experience. It is hoped that more such information will become available so that the collective results of these studies can be relied upon in planning for the greater realization of potential fishery benefits from other water resource development projects within and outside the Lower Mekong Basin.

2. METHODOLOGY

This study employs both observation and statistical survey methods with emphasis on the latter. Of special interest to those who are in the field of rural socio-economic research is the fact that, unlike the farmers who normally grow but one or two crops per year, a fisherman grows, theoretically, 365 "crops" of fish per year. With a population of more than one thousand fishermen, about whom absolutely no previous records or information were available, living in large and small communities around the reservoir, constantly moving from one place to another, the task of statistical data collection was rather difficult. In view of this, it was decided that the collection of data pertaining to the sociological and economic aspects of fishery operations, viz. the business of catching fish, would be done together with the census of the fishermen's population in the period of medium fishing season. Thus a complete enumeration survey and fisherman population census was carried out during November and December 1970. Since this survey had to be completed within a reasonably short time in order to maintain the instantaneous quality, only a limited number of questions could be asked. This survey was therefore followed by another more detailed survey on the basis of a 25 per cent stratified systematic sampling to obtain information related to the social aspects of life in the fishing villages. This was done between January and March 1971.

As regards the other part of the data collection which pertains to the marketing of fish, a 3-man enumerator team was organized to collect information on quantities and prices of about 18 species of fish that were brought to the central fish market at Tha Rua on the lakeshore. One set of questionnaires was used with the fishmongers whose dealings were between fishermen and the wholesalers. All the fishmongers which averaged about 40 per day were covered with respect to the quantities, buying and selling prices. For the fishmongers alone, between one and two thousand items of statistical information had to be recorded for each survey

/day

day depending on the number of fishmongers and of the species of fish that were caught. Another set of questionnaires was used with those who bought fish from the fishmongers at Tha Rua. They consisted of 5 principal wholesalers, 2 fermented fish makers and 2 fish smokers. And lastly, still another set of questionnaires was used to obtain information on retail prices of fish at Khon Kaen and Udorn, the two most important markets. These surveys were conducted simultaneously on the 10th, 20th and 30th of each month (except February which is the 28th) throughout the 12-month period under study; the total number of survey days was 36, representing time-wise about 10 per cent of the total statistical population.

It might be added here that the reason why the statistics on quantities and prices of all species of fish have to be carefully covered in all stages of the transactions is partly because there are so many species, some of which command a price which may differ from other species by as much as 5 times. Thus to evaluate the fishery benefit on the basis of a simple average price can yield a very different result from that derived by using a weighted average price. In addition, such calculation of the average price of any fish will have to take into account the seasonal fluctuations. Therefore, in comparing the fishery benefits on one year with those of another, it is necessary, if a high degree of reliability is to be maintained, to evaluate the quantity of each species of fish on the basis of its annual average price and then combine the individual values to arrive at the total benefit. With the information which is available as a result of this study, it is possible to make such a calculation of the fishery benefit for any year on the basis of 1971 prices as long as statistics on the quantities and fish species are available.

In presenting the statistical tables throughout this report, reference will be given in each case as regards the source and nature of the survey from which statistics were derived. Tables which are not directly related to the discussion are given at the end as appendices.

3. FISHERMEN'S SOCIO-ECONOMIC BACKGROUND

3.1 Previous Occupational Background

In a tropical monsoon country like Thailand where fish abound in rivers and streams, fish catching is part of a subsistence life of most of the rural inhabitants. Almost without exception, every adult farmer regardless of sex knows by life-time experience how to use at least one of several fishing gears. Fish and fishery products have been, and still are, the cheapest source of animal protein which is vital to the people whose wealth and income are among the lowest in the country. Although fish is plentiful everywhere, its abundance in terms of quantity of fish per given area, and its geographical distribution pattern are not favourable enough to create full-time employment opportunities in inland fishing. As a matter of fact, until recently, it was regarded as a marginal source of income of the average farm family, and is even today practised only by some members of the family whenever there is nothing else to do. In Thailand, the fishing season for the rice farmers more or less coincides with the rainy season, beginning in May or June and ending in December or January when the paddy fields, swamps, and most other natural sources of water are beginning to dry up. Fish are caught not so much for sale as for personal consumption since preserved and fermented fish are to the North-eastern farmers what butter and mayonnaise are to Westerners.

When the Nam Pong Reservoir was impounded in 1965, the farmers living in the villages nearby found new opportunities, viz. full-time fishing in the reservoir. First to be interested were perhaps those who had lost their land by the inundation of the reservoir areas but had hung around on whatever land was left or sometimes with relatives instead of moving elsewhere. The unusual abundance of fish during the first few years coupled with the relatively lower number of fishermen resulted in an exceptionally good catch per person. These people were soon followed by others, mostly rice

/farmers,

farmers, who were attracted by the better prospects associated with fishing instead of rice farming. The survey around Nam Pong Reservoir reveals that 88.4 per cent of all the fishermen have been previously engaged in rice farming, 1.6 per cent upland (mostly kenaf) farming, 6.1 per cent wage labour and only 1.8 per cent had been fishing for a living before moving to the lakeshore. Surprisingly, most of the farmers who changed their occupation to fishing were not landless as can be seen from the table below. Quite a number had owned a moderate size of farm before changing occupation to fishing. It was not so much a lack of land as a desire to earn more income that seemed to be the most important motivating factor. As explained in the next paragraph, the trend of per capita income in North-east Thailand during the past few decades is definitely not on the increase despite the deliberate attempt on the part of the Thai Government to improve it.

TABLE I
FISHERMEN CLASSIFIED BY CULTIVATED LAND PREVIOUSLY OWNED

<u>Area (rai)</u>	<u>Fishermen moving in from elsewhere</u>	<u>Fishermen already residing before dam construction</u>
0	68	45
1-10	161	113
11-20	193	102
21-30	104	84
31-40	45	44
41-50	26	25
51-60	14	4
61-70	8	3
71-80	6	2
81-90	1	1
91-100	8	0
Over 100	<u>3</u>	<u>0</u>
Total	<u><u>637</u></u>	<u><u>423</u></u>
<u>Average (rai)</u>	19.2	18.2

3.2 Previous Dwelling-Place

Nam Pong Reservoir was created in the middle part of the North-east Region which is the poorest of all the four regions of Thailand. Poor soil, wide fluctuations of rainfall, absence of known mineral reserves of commercial significance, and a long period of comparative neglect on the part of the Government are the main reasons responsible for this Region having the lowest farm productivity and income. Average per capita income in certain areas where rural surveys have been conducted was between Bt. 500 and Bt. 1,000 (US\$25-50) which is much below the national average. During the past thirty years or so, while the population has been rapidly expanding, farm productivity in North-east Thailand in terms of income earned from a given land area has changed very little. Rural socio-economic investigations which have been carried out even in areas immediately adjacent to the Government's experimental and demonstration farm have brought to light the fact that subsistence farmers in North-east Thailand have adopted only a few of the agricultural innovations which the Government has tried to introduce despite a great deal of effort and resources spent. With the possible exception of a few ostentatious objects such as the farmers' possession and display of transistor radios, wrist watches or even motorcycles, the rural way of life and farming techniques remain much the same today as they have been during the last few decades.

The tranquility of the North-east village is therefore rather deceptive because it conceals underneath a turbulence resulting from the ever increasing population pressure on the one hand and the inability to release this pressure to economically productive uses on the other. For every newly born baby, a new job has to be found. In the likely event that urban jobs cannot be provided in any large number, new land will have to be brought under cultivation. With most of the land-holdings divided and subdivided

/over the years

over the years to what are today small plots of about 5 to 30 rai, the majority of the new generation of farmers has little alternative but to become squatters of the jungle. Because of the rapid increase of population, illegal encroachments into public land or forest reserves has during the past 20 years or so become the rule rather than the exception. In fact, it is so rampant that the Government has not dared to take drastic action against the encroachers.

New opportunities in fishing brought about by the Nam Pong Reservoir construction served well to release part of the population pressure in much the same manner as the forest encroachment. Here was a new land which could be temporarily occupied at no cost and with no formality. The authority which is responsible for the maintenance of the lake did not bother to regulate the number of families who were to resettle along the lakeshore. The villagers who had been living in or around the reservoir were naturally the most easily attracted. The survey results showed that 53 per cent of all the fishermen families have lived in the same vicinities continuously since before the reservoir was formed, and only 42 per cent have moved in from elsewhere. About half of the latter were in fact from other parts of Udorn and Khon Kaen, the provinces at the border of which the lake was located, while another one-third were from other provinces in North-east Thailand. Those moving in from the other parts of the country were few in number. The provinces in the North-east from which the new settlers came are Maha Sarakam, Chaiyapoom, Roi Et, Korat, Buriram, Kalasin, Nong Khai and Ubon.

3.3 Migration

There is nothing phenomenal about the farmers migrating from their previous houses to Nam Pong Reservoir because migration is a part of their lives. It is a reflection of the fact that the North-east has been poorer economically than the other regions of Thailand. Even before the modernization and improvement of the

/overland

overland transportation system, when travelling to and from the North-east was difficult, costly and time wasting, a large part of its surplus labour flocked to Bangkok in search of employment. The migration to Nam Pong was in fact made easy for these people because of this similarity in language and customs and, more important still, the availability of water all the year round.

Since the reservoir impoundment in 1965, there has been a considerable migration into, out of, and around Nam Pong but unfortunately no record has been kept of it. During the 12-month-period under this study, four censuses of fishermen were carried out at regular intervals to obtain information on, among other things, the migration movement among the fishermen. The result of these counts shows that a total of 1511 fishermen families have, for varying lengths of time, been engaged in fishing for income in Nam Pong. Only 60 per cent of this number have lived there continuously throughout the 12-month-period while the rest have not. The statistical details can be seen from the following table:

TABLE II
DURATION OF FISHERMEN'S RESIDENCE ON THE LAKESHORE
November 1970 - December 1971

<u>Duration</u>	<u>Number of fishermen residing</u>	
	<u>Continuously</u>	<u>Not continuously</u>
3 months	85	4
6 months	208	10
9 months	234	61
12 months	359	0
Total	1436	75
	====	==

/With respect to

With respect to the migration into and out of the reservoir, the record which this survey team has kept of all the movements, presented below, shows a constant in- and out-migration throughout the year. It is not clear whether this is attributable to the fluctuations in fishing income, or rather to the inherent cultural behaviour of the North-eastern peasants in general.

TABLE III
IN- AND OUT-MIGRATION
(1971)

	<u>Jan-Feb</u>	<u>May-June</u>	<u>Sept-Oct</u>	<u>Total</u>
	(No.of families)	(No.of families)	(No.of families)	(No.of families)
In-migration	97	69	69	235
Out-migration	53	147	33	233

Foot-Note : The total numbers of fishermen during the 4 census periods are as follows:

Nov-Dec, 1970	1060	fishermen	families
Mar-Apr, 1971	1244	"	"
Jul-Aug, 1971	1139	"	"
Nov-Dec, 1971	1196	"	"

In addition to the in- and out-migration, there were also short distance movements from one village to another within the perimeter of the lake. Most of these movements were associated with the search for better sites for fishing. In some areas, fishing was adversely affected when the draw-down of the reservoir was below a certain level whereas in others, the water hyacinth which was abundant obstructed access from the water to the village, thereby creating considerable inconvenience. The way in which this type of migration was recorded was by checking the individual fishermen residing in each village or location. If a new fisherman

/was found

was found to have come from another village within the reservoir, he would be recorded as such. On the other hand, if a fisherman who had been living there was missing and was reported by his relatives or neighbours to have moved to another location within the reservoir, he would be recorded as such. Thus, the in- and out-migrants at any time are not necessarily equal. The difference represents those who could be accounted for in the survey. The findings of the survey are as follows:

TABLE IV
INTERNAL MIGRATION OF THE NAM PONG FISHERMEN
(1971)

	<u>Jan-Feb</u> (No.of families)	<u>May-June</u> (No.of families)	<u>Sept-Oct</u> (No.of families)	<u>Total</u> (No.of families)
In-migration	1	3	10	14
Out-migration	11	14	31	56

To complete the migration picture, the last type should also be mentioned. This consists mostly of rice farmers living in nearby as well as far away villages who wanted to spend their off-season time fishing on a more or less temporary basis or without the original intention to change the occupation. It may or may not involve changes in the physical location of the houses depending on how near each person is living from the lake. As can be seen from the following table, this type of migration was confined to the period between the harvest and the beginning of the rainy season during which many farmers were free of the farm-work.

/TABLE V

TABLE V
SEASONAL MIGRATION OF NAM PONG FISHERMEN
(1971)

	<u>Jan-Feb</u>	<u>May-June</u>	<u>Sept-Oct</u>	<u>Total</u>
	(No.of families)	(No.of families)	(No.of families)	(No.of families)
In-migration	215	43	-	258
Out-migration	-	129	-	129

Foot-note : The difference between the total number of the in- and out-migrants indicates that there were many who, despite their original intention to stay fishing temporarily remained there throughout the following year.

3.4 Kinship

A typical family in North-east Thailand is characterized both by the inclusion of the relatives and the in-laws and by the emphasis placed on the inheritance of property by the female members of the family. It is customary for the groom to desert his home upon marriage to live with the bride under the roof of his father-in-law's house. If his wife is neither the only nor the youngest, the time will come when he and his wife are expected by the father or mother-in-law to settle elsewhere to begin a new life of their own. If the wife's parents possessed more than one piece of land, they might give one to their daughter, in which case the young couple may still stay in the same village or wherever that piece of land is located. The youngest or the only daughter is the exception for she and her spouse are expected to stay with the bride's parents and inherit the house as well as other properties, especially land, which are left over after the marriages of all the bride's sisters. As the population keeps increasing at a faster rate than the arable land, the chances of a new family receiving an out-right

gift of land from the parents are less and less as the years go by. If they do not have much money, they may encroach upon the public land or even the forest reserve, or they may migrate to town to seek urban employment. Whatever they decide to do, it is clear that more and more people are forced both by the rural economic poverty and by their own culture to migrate somewhere.

The Nam Pong Reservoir is obviously an ideal place for the resettlement of these new families. The survey of all the fishermen families showed that the average family size here is 6 persons, which is markedly smaller than that found in the farm villages of the same and adjacent provinces (where it is about 8 persons). This is an indication that there was a larger number of young families which had for some time past deserted the greater family to start a new life in the manner which has just been described. Together with the information which has been given that by far the majority of the fishermen had owned some cultivable land before migrating to Nam Pong, it can be assumed that the land which they had been cultivating was marginal land and that as a result they did not do well, or at least felt that they did not do so well as they would by fishing for a living. Thus started the process of migration into the Nam Pong Reservoir.

3.5 Education

As is well known, rural education in Thailand is characterized by a large percentage of literate, but poorly educated adults. This situation is brought about mainly by a combination of two somewhat contradictory factors, viz. the long existence of a compulsory education up to 4 years (now changed to 7 years), and the difficulty for the Government to cope with the rapidly increasing demand for higher and better education. The result is the existence of a high percentage, 70-80 per cent in most areas, of population with only 4 years of schooling which was adequate to enable them to read and write, but not more.

/With the

With the farming background of most of the Nam Pong fishermen, the education picture is not much different from that described in the preceding paragraph except for one aspect. Since the fishing communities are sparsely located over a long shoreline, school attendance has become a problem especially for children living with parents in isolated, mostly newly established villages. After a sample survey of 280 families, it was found that only 224 out of the total of 539 children aged between 5 and 14 attended school. This was attributed both to the weakness in the law enforcement in general which resulted in the postponement of school attendance, and to the inconvenience encountered by many parents who had no means of transport to bring their children to and from school. (In the Nam Pong Reservoir, regular boat service is non-existent except between Tha Rua and Non Sang).

There were at the time of the survey, 25 primary schools located in 25 villages around Nam Pong. All of them were visited by the survey team which has made the following comments:

- (i) With the exception of a few schools located in larger and older villages, most of the school buildings were of wooden structure, in some cases without walls. School furniture and teaching equipment such as desks, chairs and blackboards were rather inadequate. Toilet facilities were practically non-existent. The situation could be annoying to both students and teachers during the rainy season when the wind and rain might sweep across the poorly sheltered class-rooms.
- (ii) Most of the students were in fairly good physical condition. Quite a number appeared to have suffered from under-nutrition due to poor living conditions, but there was no sign of the prevalence of any potentially dangerous disease. The area around the lake was considered to be malaria-free.

/(iii)

- (iii) Because of the scattered nature of the student population around the lakeshore, it was difficult to make a suitable arrangement of the classes. For example, in one village school there were 45 students attending 4 grades (and 4 corresponding classes). It was difficult for the authority to hire 4 teachers due to a small number of students per class. In this particular school, there were only two teachers each teaching two classes more or less simultaneously. This situation existed, with a varying ratio of the number of classes per teacher but almost always more than one to one, in 16 out of the total of 25 schools surveyed.
- (iv) In spite of the law enforcing compulsory education up to the grade 7, most of the schools could not accept students beyond grade 4. Out of the 25 schools, there was only one school each which taught up to grade 5 and grade 7, with the rest only up to grade 4.

3.6 Government

The administrative machinery at the local level in Thailand consists of a governor appointed from Bangkok for each province who supervises a number of district officers (Nai Ampur) also appointed from Bangkok. In each district (Ampur), the district officer governs through village chiefs (Kamnan) and, at the next level, the village headmen (Puyaiban) who are elected by the people of each particular locality. The most important duty of the Kamnans and Puyaibans is to maintain law and order. Usually a meeting is held once a month with the Nai Ampur in each district at which they are informed of new rules and regulations, receive new orders, etc., and in return can report on the situation in each village to the Nai Ampur.

/In the areas

In the areas around and adjacent to the Nam Pong Reservoir, the administrative machinery works in all the old villages or communities in the manner described in the previous paragraph. The exceptions are the new fishing communities of sites varying from a few houses up to a hundred. As mentioned before, these communities are scattered all round the lake, thereby complicating the task of the Puyaiban to supervise properly. Although legally speaking everybody who changes residence is supposed to report or register such a change with the district office, only about half the number of the in-migrants have actually done so. As a result, many of the scattered fishermen families which happened to resettle some distance away from old-established villages would not appear in the official registration of the Puyaiban. Thus the enforcement of law has been considerably weakened. Throughout the survey, many complaints have been heard from the fishermen of the widespread stealing of the gill nets and this has demoralized the poor fishermen appreciably.

There does not seem to be an easy solution to this problem as long as the underpaid puyaibans are still relied upon to stretch law and order from their village to cover the scattered fishing communities, and as long as the fishermen keep moving in and out of the reservoir in sizeable numbers. It would not be easy also because, EGAT, the authority charged with the responsibility of maintaining the reservoir may not be interested in policing some 200 kilometres of shore-line. If there is going to be any change for the better, the initiative will presumably have to come from the Ministry of Agriculture whose interest is the reservoir management for fishing purposes.

3.7 Living Condition

3.7.1 Housing and Village Condition There exists some difference between the housing and village condition found in older villages and that found in the scattered fishing camps. The first visible difference is in the physical layout of the village. Older villages would usually have space provided for a thoroughfare, on either side of which there would be houses built of materials such as timber or bamboo. The fishing camps are usually disorderly in appearance and the houses, built mostly of bamboo and walled with either bamboo panel or leaves, are obviously make-shift. In fact, only the availability of a wide open space along the lakeshore prevents some of these communities from becoming filthy. As elsewhere, most families keep a small garden plot on which they grow a variety of crops other than rice for their own consumption. In this way, they are able to sustain a livelihood even at a low cash income.

A sample survey of 280 houses around Nam Pong produced the following statistical results:

TABLE VI
DWELLING PLACES CLASSIFIED BY SIZES AND CONSTRUCTION
MATERIALS

	Structural Material				Roofing Material				Size			Total
	Wood	Bamboo	Others	Total	Galvanized Sheets	Leaves	Others	Total	Larger than 64 m ²	36-64 m ²	Smaller than 36 m ²	
Number	239	41	0	280	123	151	1	280	23	70	187	280
Percentage	85.4	14.6	0.0	100.0	45.7	53.9	0.4	100.0	8.2	25.0	66.8	100.0

/As can be seen

As can be seen from the above table, the largest number of the fishermen's houses are of small sizes of less than 36 square metres in which the average family of six persons have to sleep, rest, cook, eat, etc. Another interesting feature which distinguishes these houses from those found in most lowland villages is the high percentage of the houses roofed with a kind of leaves plucked from the trees. In the rural North-east, one can fairly accurately tell the economic and social standing of a family in a village from the kinds of roofing materials, cement tile and galvanized steel sheet indicating higher standing, thatch and leaf the opposite. Houses which were built of bamboo for structural materials (such as the pillars, beams, etc.) were the most rickety of all, indicating that the families who owned them were completely migrant and would be prepared to move anywhere at any time.

3.7.2 General Living Standard If the general living standard of an individual or a family can be assessed accurately and consistently in quantitative terms, it would be much better than to use the monetary income statistics as an indicator of the economic well-being. As the reader will find out in the next chapter, the average daily income of the Nam Pong fishermen is somewhere between Bt. 10.70 and Bt. 12.88 per family of six persons. To those who are totally unfamiliar with life in a subsistence, underdeveloped economy, it would sound impossible for such a family to survive, but they do. To give the money income statistics without concurrently giving at least a rough description of the general living standard, although qualitative essentially, could therefore be quite misleading.

The first impression which one gets of a fisherman's life in Nam Pong is that the amenities of an urban living are absent (except for one or two items); no chairs, no beds, no electricity, no toilet facilities, a bare minimum of kitchenware and crockery. The one or two exceptions, both apparently associated with the desire for conspicuous consumption, are the portable radio and wrist-watch.

/In attempting to

In attempting to give some quantitative touch to the description of the fishermen's living standard, five items of personal belonging were selected for enumeration. The first two items, i.e. the blanket and the mosquito net, are considered necessary by local standard. The third i.e. the mattress can be considered only half necessary by the same local standard, whereas the last two, i.e. the radio set and the watch are luxury items. The survey of the 280 sample households produced the following results:

TABLE VII
HOUSEHOLDS CLASSIFIED BY THE POSSESSION OF CERTAIN ARTICLES

<u>No</u>	<u>Article</u>	<u>Available to all members</u>	<u>Number of households</u>		<u>Total</u>
			<u>Available to some member only</u>	<u>not available at all</u>	
1	Blanket	148	124	8	280
2	Misquito net	149	84	47	280
3	Mattress	93	111	76	280
4	Radio set	-	119	161	280
5	Watch	-	15	265	280

On the basis of these statistics, it can be concluded that the living standard as demonstrated by the dwelling place and the household utensil is lower than that commonly found in most lowland farming communities in the neighbourhood of Khon Kaen and Udorn.

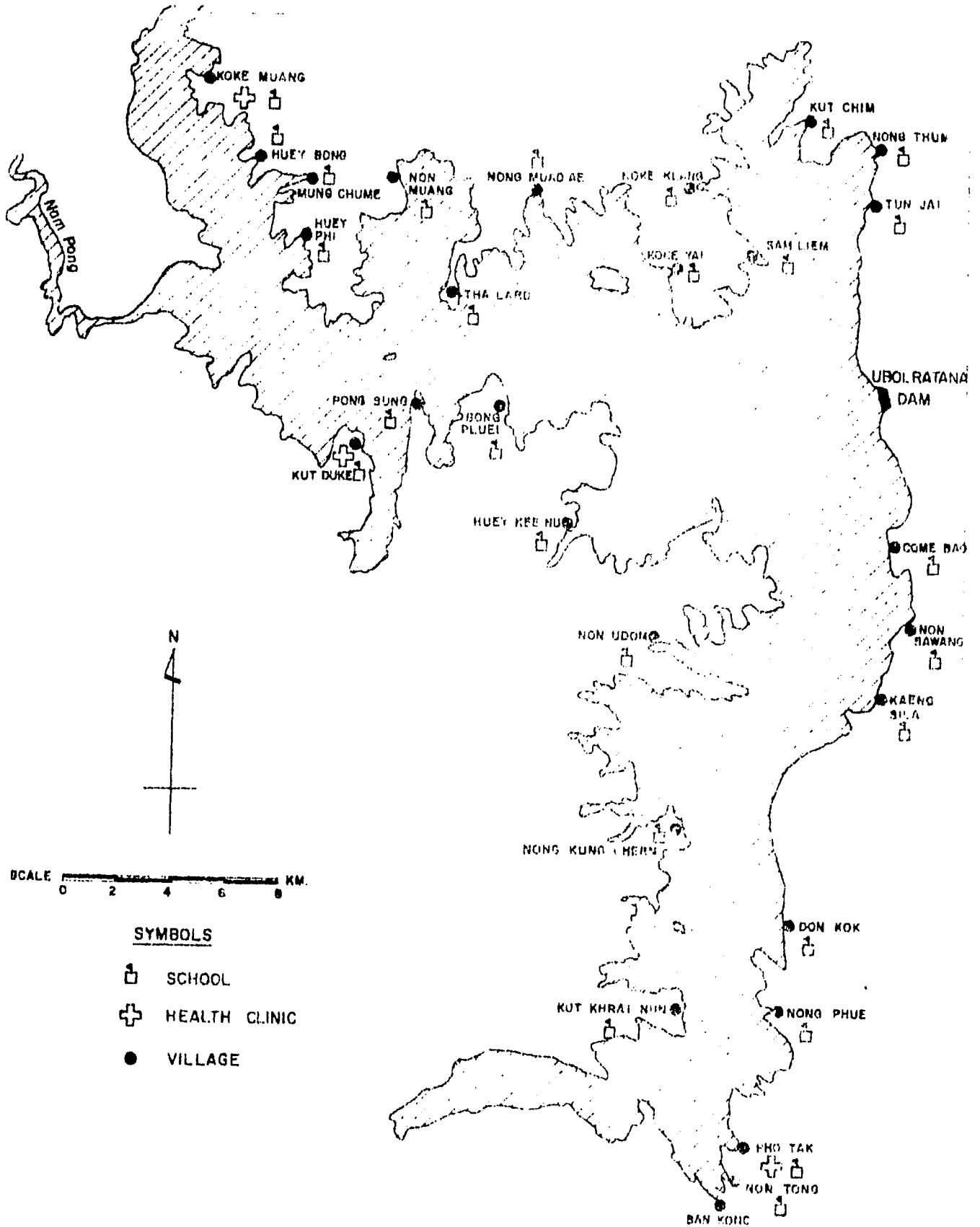
/Another

Another important point in connection with the living standard is that concerning diet. Due to the specialized nature of this subject, no detailed study has been made. However, a general observation of the dietary situation made during the course of this survey reveals the following points:

- (a) Fishermen and members of their families had more fish and more vegetables to eat than the farmers in a typical lowland farming village. Fish was of course more readily available in larger quantity, in fresh or preserved form. Vegetables were also more readily available as most fishing families had easy access to the draw-down areas which were ideal for growing vegetables. On the other hand, beef and pork were not always available in several of fishing camps. Even if they were, not many would buy them because of their low purchasing power. Like elsewhere in the North-east, most fishermen raised a few head of chickens for their own occasional consumption.
- (b) In spite of the self-supply of fish and vegetable, a typical diet of a fishing family is not much different from that of a farming family. There was always too much cereal, in the form of glutinous rice, and too little animal protein.

Unhealthy diet is perhaps one of the most important factors which, together with the unsanitary living environment, was responsible for frequent sickness among the fishermen. During the field survey, the enumerators were struck by the number of fishermen who gave poor health as an excuse for not going out fishing during the past few days or so. When sickness occurs to someone, the nearest place where he can consult the doctor is Khon Kaen which is a distance of about 50 km. from Tha Rua, the fishing port, plus whatever distance he has to travel by boat from his home to Tha Rua. Time-wise,

/it would take



SYMBOLS

- ☐ SCHOOL
- ⊕ HEALTH CLINIC
- VILLAGE

MEKONG COMMITTEE
 LOCATION OF SCHOOLS AND CLINICS
 FIG. 1
 DATE May 1972

it would take on average three hours to travel one way during day-light. Since the hospital in Khon Kaen has always been overcrowded, it was not possible for a person from a fishing village to come to Khon Kaen for medical treatment and return within the same day. This, together with the travelling expenses involved and the fear of the formalities, has deterred most of sick persons from seeking the doctor's treatment. However, around the lake there are three health clinics each of which was attended by a trained nurse. They have been rendering a very valuable service to the Nam Pong residents especially in the treatment of minor sickness and childbirth. For the majority of people, the most common method of treatment is to prescribe and buy for himself the patented medicines which are available for sale everywhere. The survey showed that as many as 251 out of the total of 280 fishing families interviewed have treated sickness in this manner as against only 45 families which have used the hospital facilities.

4. THE ECONOMIC ASPECT OF FISHERY OPERATIONS

4.1 The Place of Fishery in a Household's Life

Unlike rice farming, fishery as practised in Nam Pong today involves only one or, at the most, two persons in each family. The operation is simple: they just go out into the lake and stretch the gill net across like a fence under the water, leave it overnight, and then draw it back with the fish catch in the following morning. Other methods of fishing involving the use of other types of fishing gears such as the fishing spear, trap, hook, thrust and lift net, were also employed but the significance in terms of the number of persons involved or of the quantity of the fish caught by these methods was far less than the fixed gill net. The data collection effort, especially in matters relating to the fishery efficiency was therefore principally directed towards the use of gill nets since to try to cover all the rest would spread the efforts of the survey team too thin.

The overall situation from the point of view of the fishing equipment can be viewed statistically from the following table:-

TABLE VIII

HOUSEHOLDS CLASSIFIED BY NO. OF BOATS AND FISHING GEAR

<u>Types of fishing gear</u>	<u>Number of Boat/Gear</u>						<u>Total</u>
	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>4</u>	
Motor-driven boat	977	81	2	0	0	0	1,060
Paddle boat	118	845	79	16	2	0	1,060
Gill net */	167	640	185	52	14	2	1,060
Swing (thrust) net	889	149	20	2	0	0	1,060
Chinese lift net	1,007	39	13	1	0	0	1,060

Foot Note */ For gill nets, the numbers for the horizontal reading represent units of 10 nets, e.g. 1 = 10 nets, 2 = 20 nets, etc.

4.2 Capital Investment in Fishery

Since the fishing gear used in Nam Pong was simple, only a small capital outlay was needed. Statistical information concerning the amount invested in fishing gear including the boat is given below:

TABLE IX

HOUSEHOLDS CLASSIFIED BY THE AMOUNT OF
CAPITAL INVESTED IN FISHING GEAR

<u>Amount</u> (Baht)	<u>No. of</u> <u>Households</u>	<u>Percentage</u>
1-300	466	44.0
301-600	355	33.5
601-900	89	8.4
901-1,200	28	2.6
1,201-1,500	23	2.2
1,501-1,800	14	1.3
1,801-2,100	13	1.2
2,101-2,400	14	1.3
2,401-2,700	14	1.3
2,701-3,000	9	0.8
3,001-3,300	5	0.5
3,301-3,600	6	0.6
3,601-3,900	7	0.7
Over 3,900	<u>17</u>	<u>1.6</u>
	1,060	100.0
	=====	=====

Foot-Note: Average per household = Baht 594.56

/Although

Although the average amount of capital investment was rather small, there were still some fishermen who did not have enough cash to invest. An average fisherman invested Baht 392.03 in cash for the purchase of the gear, Baht 44.48 in pure credit, and Baht 158.03 in a mixture of cash and credit. As long as the fisherman could afford to pay in cash, he tended to do so in order not to have any obligation to sell fish to any particular merchant. If he did not have enough money, he might be forced to pay partly in cash, leaving the balance to be paid by instalments. In the worst situation in which he had no money at all, e.g. when his nets had been stolen, he had to rely entirely on credit in which case he would normally be obliged to sell his fish only to his creditor, sometimes at a price slightly lower than that prevailing.

4.3 Fish Catch Per Unit of Effort

An attempt to collect these statistics was made during the early period of survey when the fishermen census was taken for the first time. It was not repeated due to the size of the population, the geographical distribution pattern, and the problems of accessibility of some areas. In collecting the statistics of fish catch per unit of effort based on actual, as distinct from a research type of operation, it was found necessary to reject a few of those fishermen who used more than one type of fishing gear because the catch results could not be classified according to the type of the fishing gear used.

During the first round of fishermen's census, information was collected regarding the daily fish catch during the previous seven days and the number of each type of fishing gear in possession. After discarding those who used more than one type of fishing gear, the results were tabulated to show the weight of fish caught per unit of effort for different types of fishing gear, as follows:

/TABLE X

TABLE X

FISH CATCH PER GILL NET/DAY

<u>Zone</u>	<u>Number of fisher- men surveyed</u>	<u>Number of Nets</u>	<u>Catch per net/day (kg)</u>
1	165	1,374	0.35
2	127	1,474	0.45
3	102	1,348	0.34
4	11	62	0.76
5	76	822	0.43
6	91	1,117	0.32
		<u>Average</u>	<u>0.38</u>

- Foot-Notes: (1) A day for the gill net is approximately 15 hours beginning at about 15.00 p.m. and ending 06.00 am of the following morning.
- (2) A gill net is about 0.75 metres wide and 50 metres long.

TABLE XI

FISH CATCH PER LIFT NET/DAY

<u>Number of fishermen</u>	<u>Number of nets</u>	<u>Average catch per net/day (kg)</u>
34	45	10.12

- Foot-Notes: (1) All lift nets were found in zone 4 only
- (2) A Chinese lift net is roughly 8 metres square
- (3) A day for the Chinese lift net is approximately 10 hours beginning at about 7 am. and ending 5 pm. of the same day.

/TABLE XII

TABLE XII

FISH CATCH PER THRUST (SWING) NET/DAY

<u>Number of fishermen</u>	<u>Number of nets</u>	<u>Number of net/days observed</u>	<u>Average catch per net/day (kg)</u>
7	10	54	2.72

TABLE XIII

FISH CATCH BY HOOK PER MAN/DAY

<u>Number of fishermen</u>	<u>Number of hooks</u>	<u>Number of man/days observed</u>	<u>Average catch per hook/day (kg)</u>
49	8,865	300	0.034

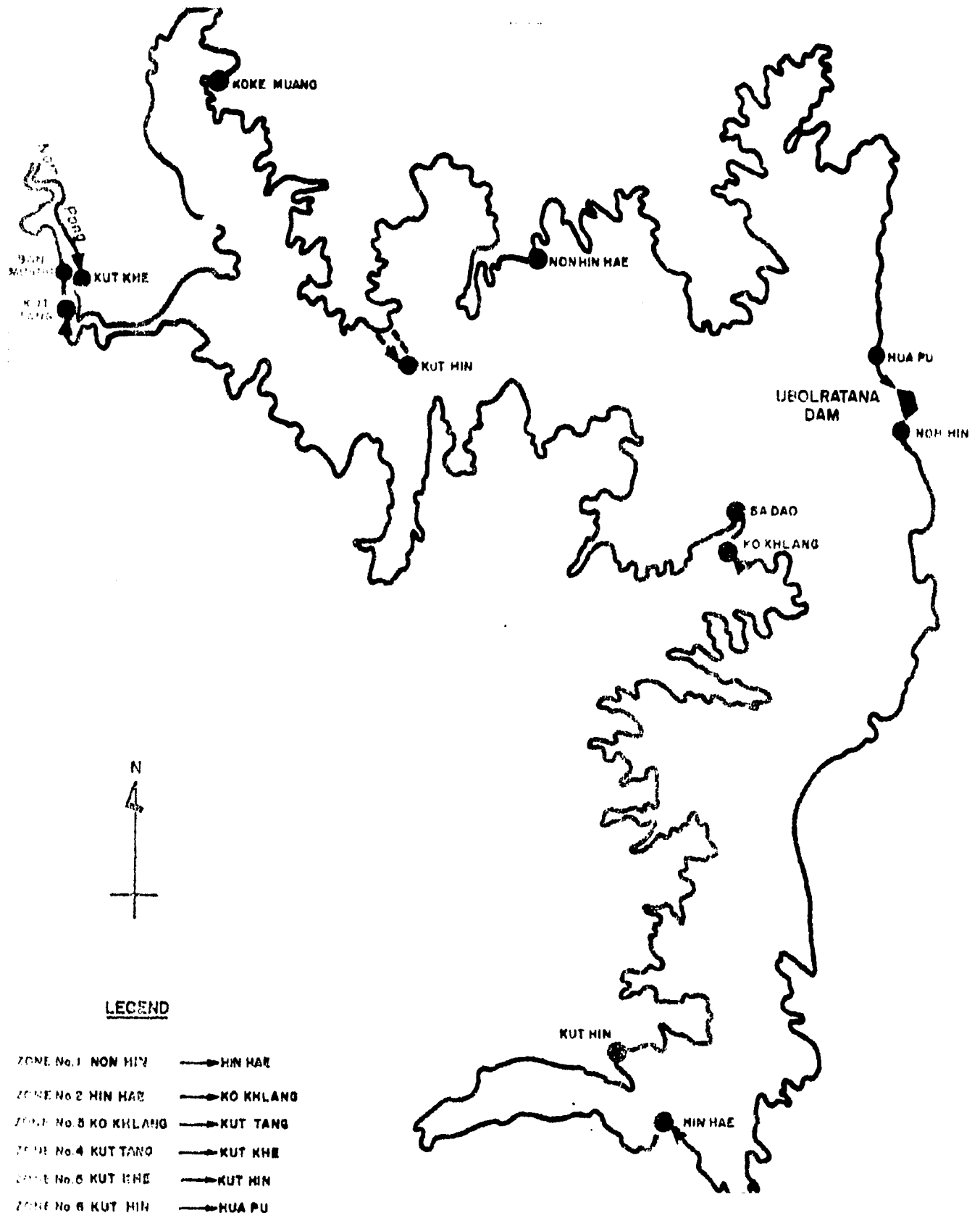
TABLE XIV

FISH CATCH PER HARPOON/DAY

<u>Number of fishermen</u>	<u>Number of harpoons</u>	<u>Number of harpoon/days observed</u>	<u>Average catch per harpoon/day (kg)</u>
14	20	109	3.03

From the point of view of the number of fishermen involved, the gill net is by far the most popular fishing gear because it is simple to operate and does not require much effort or skill. The difference in the catch per unit of effort (expressed as one net/day) between any two geographical areas of the reservoir (see map) is very small except for zone 4 which is located around the estuary of the Nam Pong River. The findings indicate that there might be a concentration of fish in that area due to its spawning migration upstream of the river.

/Next



LEGEND

- ZONE No. 1 NON HIN → HIN HAE
- ZONE No. 2 HIN HAE → KO KHLANG
- ZONE No. 3 KO KHLANG → KUT TANG
- ZONE No. 4 KUT TANG → KUT KHE
- ZONE No. 5 KUT KHE → KUT HIN
- ZONE No. 6 KUT HIN → HUA PU

SCALE 0 2 4 6 8 KM.

MEKONG COMMITTEE	
NAM PONG RESERVOIR ZONE DISTRIBUTION	
FIG. 2	DATE May 1972

Next in importance is the lift net which was found to be in use mostly in the riverine section of the reservoir and for only about three to four months beginning in October. It was observed during the survey that practically every one of these fishermen was trying to increase his catch by blocking the river with the fishing net (see picture). This practice severely obstructed the fish migration for spawning and is harmful to fishery in the reservoir. It is to be hoped that the officials of the Fishery Department at Nam Pong will be able in future extend their jurisdiction to cover this riverine section also.

All these statistics pertaining to the catch per unit of effort were collected during November and December and are therefore subject to seasonal fluctuations. For more details on the latter, please consult tables on the monthly break-down of total catch which are appended to this report.

4.4 Time Spent on Fishery

One interesting phenomenon which distinguishes the Nam Pong fishery from most rural occupations is the perennial nature of the operations. Whereas in rice farming the activities involved are highly seasonal, in fishery it is the opposite. It may be partly due to a rather big change in the working habit from farming to fishing that the fishermen took periodic rests throughout the year. Only 51 per cent of all the fishermen interviewed were reported to have worked everyday during the previous week, and as many as 16 per cent have not fished at all. The distribution of 995 fishermen who were interviewed during November and December 1970 on basis of the time spent on fishing can be seen from the table shown below:

TABLE XV
FISHERMEN CLASSIFIED BY NUMBER OF FISHING DAYS
DURING THE WEEK BEFORE INTERVIEW

No. of fishing days	0	1	2	3	4	5	6	7	Total
No. of fishermen	162	18	37	38	45	73	111	511	995
Percentage	16.3	1.8	3.7	3.8	4.5	7.3	11.2	51.4	100.0

Foot Note: Average per week = 5.0 days

/4.5

4.5 Fishery Income

(a) Fishermen's Daily and Annual Income

With minor exceptions, fishery income is the only cash income of the Nam Pong fishermen. The fact that fishermen families were on average younger in age and smaller in size tends to discourage them from engaging in any other activity in a serious manner. Their locations together with a lack of regular efficient and cheap means of transport, are also an obstacle to the mobility which is essential for urban employment. As a result, many have spent their spare time growing crops in the draw-down areas for their own consumption. Comparing this situation with that in a typical farm village in North-east Thailand, the Nam Pong fishermen are worse off economically on account of their inability to earn extra income like the rice farmers do from off-farm employment.

As regards the information on income from fishery, the data could not be obtained directly from the fishermen in the form which was considered sufficiently reliable because of several operational problems. We were therefore compelled to approach this question indirectly by making estimates on the basis of more reliable information which have been collected. Two approaches were followed in this case to provide an internal check with each other.

The first approach is on the basis of statistics of an individual fisherman's fish catch. The estimates are given step-by-step as follows:

./TABLE XVI

TABLE XVI

AVERAGE DAILY INCOME EARNED BY FISHERMEN

Average daily fish catch per fisherman (Nov.-Dec. 1970)	= 2.3 kg.
The above average, seasonally adjusted with the index from Appendix III.	= 3.8 kg.
Weighted average price paid to fishermen (9% sample)	= $\frac{\text{Total earnings}}{\text{Total weight}}$
	= $\frac{402,305}{118,545}$
	= $\text{P} 3.39/\text{kg.}$
Daily average income per fisherman	= 3.8 x 3.39
	= $\text{P} 12.88$
Annual average cash income per fisherman	= 12.88 x 365
	= $\text{P} 4,701$
	=====

The second approach is on the basis of a total money income earned by all fishermen during the 36 sample days of data collection at Tha Rua. (The tonnage of fish landed at Tha Rua is approximately 90 per cent of the total for the whole reservoir. The data collected therefore represents 10 per cent of the 90 per cent, or 9 per cent of the total). The step-by-step estimates are as follows:

/TABLE XVII

TABLE XVII

AVERAGE DAILY INCOME EARNED BY FISHERMEN

Cash income of all fishermen during 36 days	=	₱ 447,006
Cash income of all fishermen per day	=	₱ 12,417
Cash income per fisherman per day	=	<u>12,417</u> 1,160
	=	₱ 10.70
Annual average cash income per fisherman	=	10.70 x 365
	=	₱ 3,906
		=====

The discrepancy between the two results is roughly 20 per cent of the lower amount which could be due to a number of errors involved in making estimates of this nature including the sampling error. By way of providing another check with these estimates, a third approach was adopted whereby each individual fisherman's income was estimated on the basis of the type and number of fishing gear which he had. This method makes liberal use of the statistics of fish catch per unit of fishing gear which have already been presented from table X to table XIV. In addition to providing an additional estimate of the average income, it also gives us at least a crude picture of the distribution of fishermen according to income. The amount of annual income for each fisherman was calculated by, first, multiplying the rate of fish catching per unit/day of each type of fishing gear with its number. Second, the result which is the quantity of fish caught per man/day is converted to annual figures. Third, the result is then multiplied by the average price received by fishermen. The statistics which are presented on the following table are based on the assumption that all fishermen except lift-net operators were engaged in fishing throughout the year. This, of course, is not true because, as has already been described under the heading of migration, we know that there has been a constant migration of fishermen into and out of the reservoir all the time. However, it was not possible to keep track of each individual

/fisherman

fisherman throughout the whole period with the result that an accurate picture of the distribution of all fishermen on the basis of income cannot be presented. Another unrealistic element which has to be borne in mind is that the income figures were derived from the number of fishing gear which they had at the time of survey. Since this number and type of fishing gear changed over the year, so did the catch and the income. This was not taken into account for lack of data. As a result of this deficiency, a fisherman who had, say, 30 nets at the time of survey but who had them all stolen shortly thereafter and not replaced, would appear in the statistics as if he had 30 nets to operate for the whole year. On the contrary, one who had no fishing gear whatsoever at the time of survey would come out in this estimate as a man who had no income.

These shortcomings no doubt reduce the meaning of the estimates which are given below. Due to a lack of better information on the income distribution, however, we have no alternative but to use them in presenting a complete picture of the socio-economic situation in the reservoir areas.

TABLE XVIII

DISTRIBUTION OF FISHERMEN ACCORDING TO
ANNUAL INCOME FROM FISHERY

<u>No. of Fishermen</u>	<u>Annual Income</u> (Baht)
10	0
270	1- 2,000
388	2,001- 4,000
121	4,001- 6,000
130	6,001- 8,000
51	8,001-10,000
57	10,001-12,000
8	12,001-14,000
14	14,001-16,000
5	16,001-18,000
4	18,001-20,000
2	over 20,000
<u>1,060</u>	
<u>Average</u>	Bt. 4,294.83

/(b)

(b) Seasonal Fluctuation of Fishermen's income

As is expected, income from fishing varies from season to season and from month to month. Presented below are the statistics of the average daily income per fisherman, computed on basis of a 9 per cent sample of the fishermen's money income, for each of the 12 months under survey.

TABLE XIX

FLUCTUATION OF FISHERMEN'S INCOME

<u>Month</u> (Dec.1970-Nov.1971)	<u>Average daily</u> <u>cash income</u> (Baht)	<u>Average monthly</u> <u>cash income</u> (Baht)
Dec.	4.80	148.80
Jan.	4.50	139.50
Feb.	7.90	221.20
Mar.	6.30	195.30
Apr.	7.20	216.00
May	11.10	344.10
June	15.60	468.00
July	12.80	396.80
Aug.	17.70	548.70
Sept.	18.60	558.00
Oct.	12.20	378.20
Nov.	9.20	276.00
<u>Average for the</u> <u>whole year</u>	10.70	324.20

(c) Fishery Benefit

In this section we shall attempt to calculate the annual benefit derived from fishing in Nam Pong in monetary terms. This was done by adding three sets of figures together. They are:

/(a)

- (a) weight of processed fish (fermented, salted, and smoked) converted into fresh fish equivalents;
- (b) weight of fresh fish consumed by fishermen and their families;
- (c) weight of fresh fish bought and sold at Tha Rua and elsewhere in the reservoir.

The added sum, which represents quantities of fish caught in all the reservoir, is then multiplied by the average retail price. The result is the retail market value of fishery benefit for the year under survey. Details of the calculation are presented in the following table:

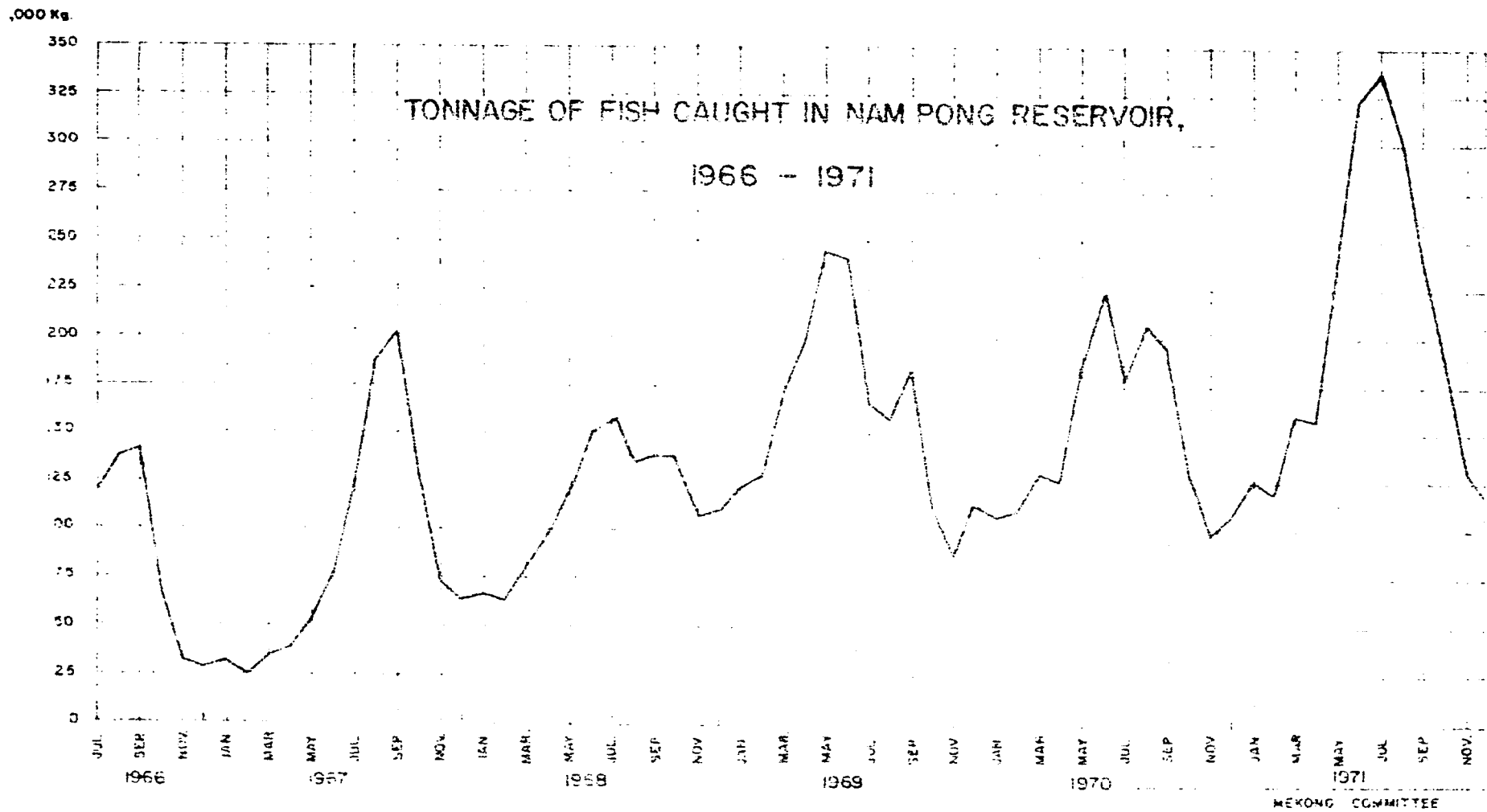
TABLE XX
ANNUAL FISHERY BENEFIT OF NAM PONG RESERVOIR
Dec. 1970 - Nov. 1971

<u>Month</u> (1971)	<u>Processed</u> <u>fish in</u> <u>fresh fish</u> <u>equivalent</u>	<u>Fresh</u> <u>fish</u>	<u>Fish con-</u> <u>sumed by</u> <u>fisher-</u> <u>men</u>	<u>Total</u> <u>weight</u>	<u>Retail</u> <u>price</u>	<u>Value</u>
	(kg)	(kg)	(kg)	(kg)	(฿/kg)	(฿)
Dec. (70)	5,106.4	82,738.0	19,716.0	107,506.4	7.21	775,121.14
Jan.	7,306.0	97,459.9	21,427.2	126,193.1	7.00	883,351.70
Feb.	4,368.8	96,155.3	19,353.6	119,877.7	7.39	885,896.20
Mar.	1,867.0	132,730.0	23,138.4	157,735.4	7.27	1,146,736.36
Apr.	2,959.6	131,879.0	22,392.0	157,230.6	7.35	1,155,644.91
May	4,100.8	218,130.5	22,161.9	244,393.2	8.02	1,960,033.46
Jun.	6,114.4	294,836.2	21,447.0	322,397.6	7.85	2,530,821.16
Jul.	9,054.0	307,788.0	21,185.4	338,027.4	7.99	2,700,838.93
Aug.	18,496.0	261,721.3	21,185.4	301,402.7	7.44	2,242,436.09
Sept.	6,332.0	214,153.7	21,015.0	241,500.7	7.93	1,915,100.55
Oct.	4,196.0	161,525.5	21,715.5	187,437.0	7.89	1,478,877.93
Nov.	4,436.0	105,656.6	21,528.0	131,620.6	7.72	1,016,111.03
Total	74,337.0	2,104,774.0	256,265.4	2,435,376.4		18,690,969.46

Foot Note: Fish consumed by fishermen and their families was conservatively estimated at 0.1 kg. per person per day.

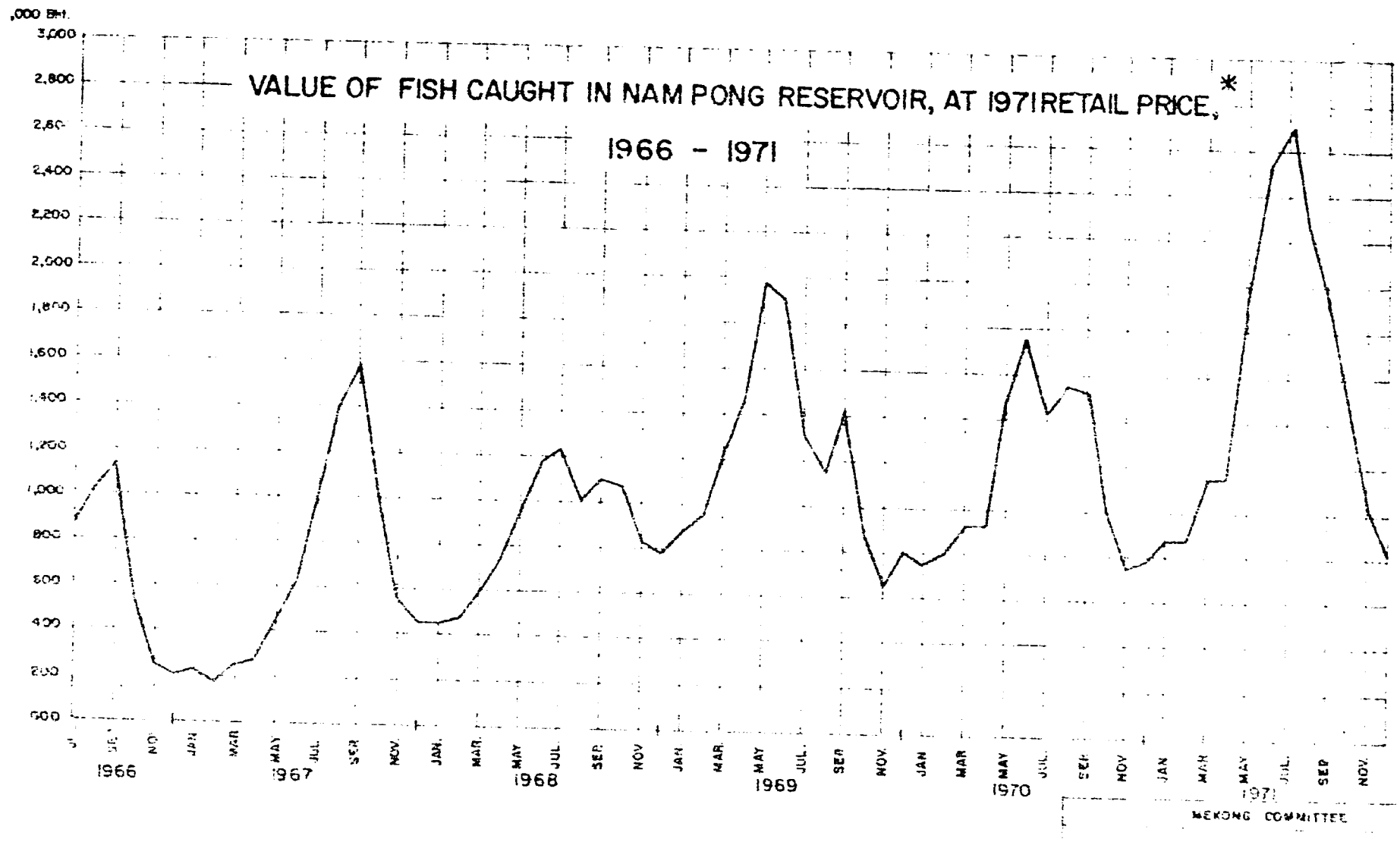
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The fishermen's income reaches high levels during the six-month period from May to October, thus corresponding more or less with the rainy season. Interesting enough, the fluctuation of the cash income follows closely that of the quantities of fish brought to the market. The implication of this relationship is that the prices of fish have remained much the same throughout the period despite the supply fluctuations. This in turn suggests a possibility either that the price mechanism for fish might not have functioned as freely as it should have, or that the Nam Pong fish supply constituted too small a proportion of the overall fish market.



TONNAGE OF FISH CAUGHT IN
NAM PONG RESERVOIR,
1966 - 1971

DATE May 1972



* Each monthly quantity was multiplied by average price of that particular month

VALUE OF FISH CAUGHT IN
NAM PONG RESERVOIR,
AT 1971 RETAIL PRICE, 1966 - 1971

DATE May 1972

5. THE MARKETING OF FISH

5.1 The Demand Picture

Having the population of about one third of the country but endowed with a far less proportionate water resource especially in terms of natural sources of water where fish can be raised, North-east Thailand has been invariably a fish deficit region. Large quantities of both seas and fresh water fish are annually imported from other regions of Thailand, especially the Central Plain, following the rapidly increasing numbers of urban residents in provinces such as Ubon, Udorn, Khon Kaen, Korat, and several other smaller towns. To a large extent, the market for sea and fresh water fish in general is divided. Fresh sea-food including fish is imported mostly from or via Bangkok and is rather expensive because of the necessity to transport it by refrigerated trucks to the North-east. Consequently, its consumption is rather confined to medium and high income consumers most of whom are urban residents. Hotels and restaurants usually buy daily large quantities of various kinds of sea-fish to cater to their customers. Fresh water fish in general is lower in price than sea fish and is therefore consumed by the rich and the poor alike. The sources of supply of fresh water fish are also equally wide, ranging from the petty farmer cum fishermen who spends a few extra days or nights catching fish in the paddy fields to professional fish farmers who raise fish in ponds commercially. A high percentage of fresh water fish sold in the urban markets in the North-east comes from the fish farms in Nakorn Sawan, Ang Tong, Singburi and Chinat in the Central Plain where natural conditions are especially conducive to fish raising.

Before Nam Pong Reservoir was built, the demand for fresh water fish in the urban markets were satisfied mostly by imports from the Central Plain as the local supply from the farmers cum fishermen was irregular as well as limited in quantity.

/The emergence

The emergence of Nam Pong Reservoir as a major source of fish supply has changed that picture. At Khon Kaen, for example, the quantities of fish brought for daily sale from Nam Pong far exceeded those imported from outside. At Udorn where the population is much larger than at Khon Kaen, the fish supply from Nam Pong, although not enough to meet local demand, has considerably reduced the quantity of imports from both the Central Plain and from Nong Khai where fish caught from the Mekong River is landed for sale in Thailand.

It is not the intention of this study to analyse in detail the fish market in and around Khon Kaen and Udorn, although all the markets where the Nam Pong fish was sold have been observed by the survey team with respect to the quantities of fish supplied from each major source, the price structure, and above all, the relationship in terms of the quantities and prices of fish with the original source of supply -- the fishermen in Nam Pong. The focus of this section of the study is on the marketing operations from the moment when fish was caught to the moment when it was sold to the housewife at the retail market.

5.2 Destinations of Fish

At present, the fishing port which is considered to be most centrally located and best served by roads leading to Udorn and Khon Kaen is Tha Rua which is located on the eastern side of the reservoir and close to the dam. According to the Department of Fisheries, about 90 per cent of all the catch is brought to Tha Rua for distribution to the various markets, the other 10 per cent being distributed between two small villages called Ban Kong (about 7 per cent) and Ban Fa Leum (about 3 per cent) located at the southern end of the lake. The use of the latter places was seasonal depending mostly on the condition of the road connecting them with the main Khon Kaen-Chumpae Highway. When this survey was started, these two places were found to have been temporarily

/abandoned due

abandoned due to their inaccessibility by road. It was learned that fish transactions at these two places were not so well organized as at Tha Rua. This, and the fact that the volume of fish transacted there was small, and that they could not be easily reached during the rainy season, was the main reason for omission of these two places from the survey. There are one or two other places from where fresh fish was sometimes reported to have been sold, but the quantities involved were too insignificant to be covered. The data collection effort with respect to the marketing aspect of this study is therefore concentrated on the transactions taking place and the parties involved at Tha Rua. As has already been mentioned at the beginning of this report, every fishmonger who brought his fish from the lake for sale at Tha Rua was interviewed at regular intervals of 10 days. The dates of interview were set on the 10th, 20th and 30th (except February, of course). Also interviewed were the wholesalers who bought fish and resold it to the retailers in Khon Kaen, Udorn etc. At the retail markets where the Nam Pong fish became mixed with fish from other sources of supply, the data collection was reduced to only the collection of price data for various species of fish without consideration to the places of origin. The synchronization of these data collection efforts enabled the survey team to trace, for each survey day, the quantity of each species of fish, its price at various stages of distribution, and its movement from the very beginning to the end.^{e/}

/During the

^{e/} To give the reader some idea about this task, each day an average of 40 local merchants was interviewed and recorded for (i) the quantity of each of the 18 major species of fish, (ii) the buying price of each species, (iii) the selling price of each species. If an average of 15 species of fish were involved in a day, it would mean a recording of 45 items of statistical information for one merchant or 1800 items for all the merchants for just one day. On top of this is the same kind of recording for all the wholesalers and fish processors. The collection, tabulation and analysis of this quantity and price information has therefore taken considerable time and expense.

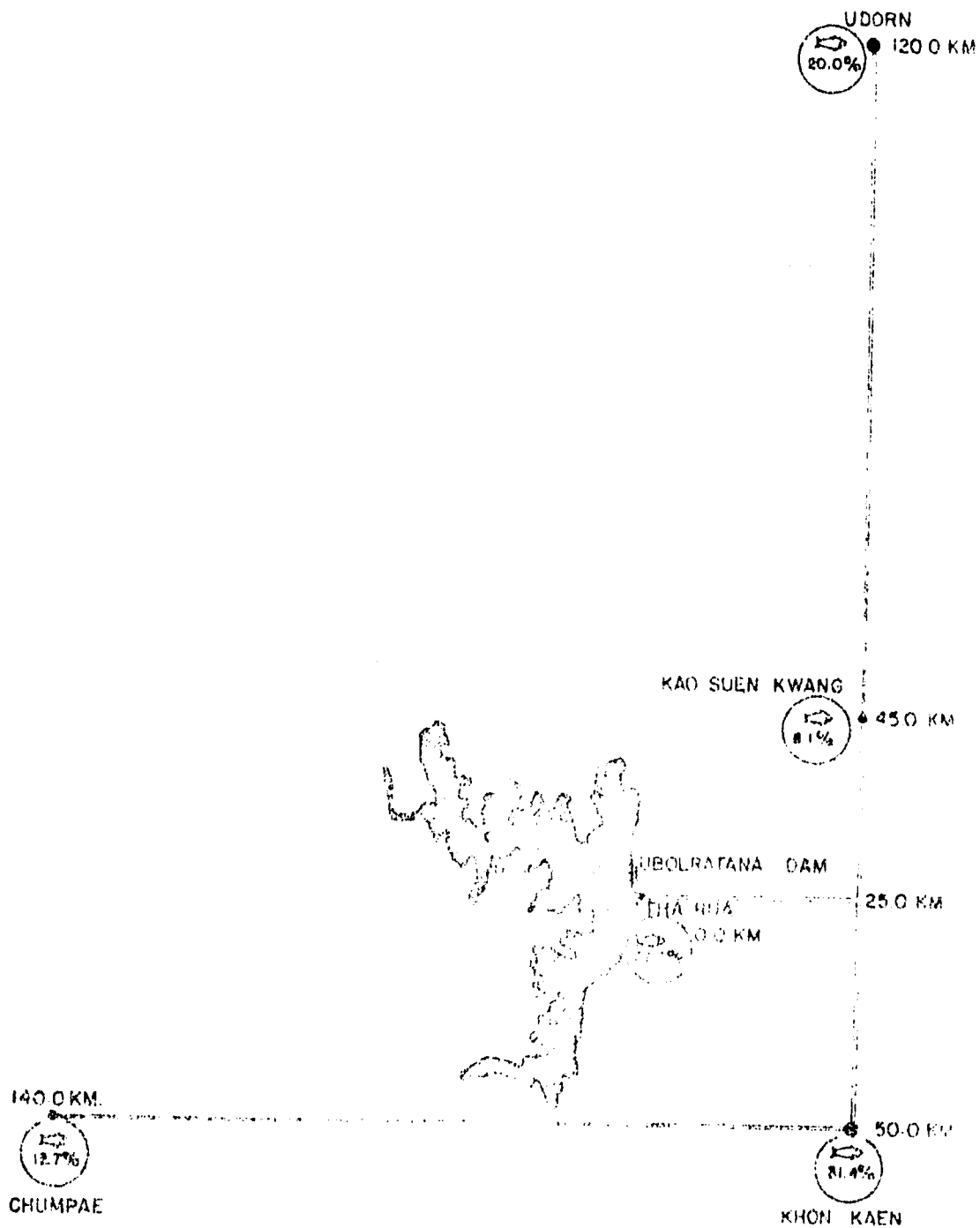
During the 12 month period under survey between December 1970 and November 1971, a total of 2,104 metric tons of fresh fish from Nam Pong was being marketed representing about 90 per cent of the total supply. Based on the statistics collected at Tha Rua, the annual catch was distributed to the following markets:

TABLE XXI

DESTINATIONS OF FISH FROM NAM PONG

<u>Destination</u>	<u>Percentage</u>
Khon Kaen Market	31.4
Udorn Market	20.0
Chumpae Market (in Khon Kaen Province)	12.7
Kao Suen Kwang Market (in Khon Kaen Province)	8.1
Tha Rua Market (Sold to fish processors)	
(i) For making Fermented fish (Pla Som)	14.2
(ii) For making smoked fish	13.6
	<u>100.0</u>

Foot-Note: For details concerning geographical location of the places mentioned, see map on the next page.



MEKONG COMMITTEE

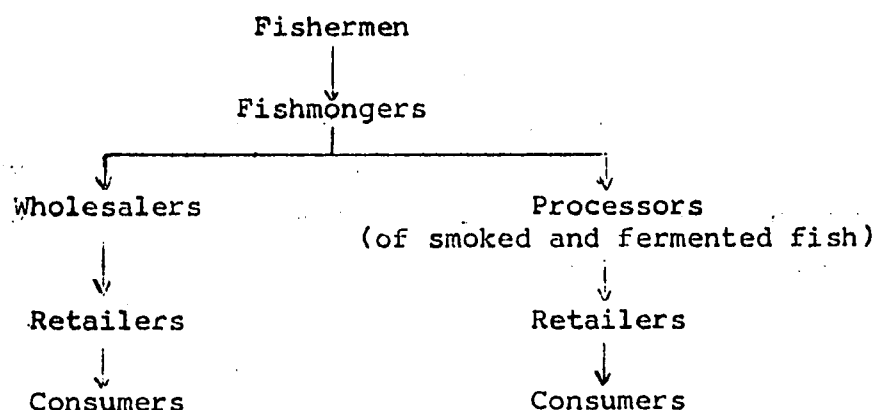
PERCENTAGE ANNUAL DISTRIBUTION
OF
FISH FROM NAM PONG RESERVOIR

FIG 5 DATE May 1972

5.3 Distribution Network

This can best be understood from the diagram shown below:

Distribution Network for the Nam Pong Fish



The distribution activities of fish from Nam Pong start early in the morning when fishermen go out to haul in their nets and hook-lines. In every village there are one or more fishmongers who move about in motor-driven boats to buy fish almost as soon as it is caught. Usually a fishmonger would buy from fishermen who live in the same village and sell to the wholesaler at Tha Rua, especially the areas around the estuary of Nam Chern River, some fishmongers may not be able to collect sufficient quantities of fish to warrant his long journey (of 20-30 km.) by boat to Tha Rua. A local fish market at Tha Lart Village was as a result developed at which a lot of fish changes hands from one fishmonger to another. After a few hours, the transactions are over and the buyers will then bring their fish to Tha Rua for resale.

Tha Rua, the fish landing and central market place for the Nam Pong Reservoir, is quite a hectic place from late in the

/morning

morning to about noon when about 50 motor-driven boats bring some 90 per cent of the total catch for sale. Until recently the place was filthy and scattered with all kinds of merchandise on the way to market from the various parts of the reservoir. The Department of Fishery recently took action in making some physical arrangements which resulted in a more orderly appearance and an improved condition of the road leading to Tha Rua. Here the fish is sold principally to a) the wholesalers who buy fish for resale in fresh condition at the retail markets such as Udorn and Khon Kaen, b) the fish processors who buy fish for making fermented or smoked fish. The former, which through the 12 month period of survey consisted of only 5 persons, would sit under the shade of big umbrellas to do business for only about 2-3 hours. By about noon, all of them would leave with small trucks full of fish for the various towns where they normally live. On the other hand, the fermented fish makers of whom there are about 4 or 5 would buy fish and engage labourers, mostly women, to process it manually in the same vicinity. Lastly the smoked fish makers who buy only one species of fish, have their fish smoked in kilns constructed in the backyard of their houses not far away from the landing.

5.4 Fishermen vs. Fishmongers

The first time fish is sold as a commodity is when it changes hand from fishermen to the fishmongers. The latter were mostly the inhabitants of the same or nearby villages or fishing camps as the fishermen's. With a little capital outlay with which to buy a small motor boat and with a small working capital, these enterprising people took up fish selling and buying, taking advantage of the location of their dwelling places. Free mobility of the fishmongers provided by their motor boats prevented any of them from taking undue advantage of the fishermen with the result that the buying prices were always uniform except in exceptional cases where there was some sort of a special agreement such as

/where the

where the fishmonger extended credit to a certain fishermen. This competition of course was favourable to the fishermen as they were in general not in a position to sell their catch anywhere else due to a lack of a means of transportation, and had to accept whatever price was offered to them by the buyers. Over a period of time, many fishermen have developed a personal relationship with some buyers whom they felt they could trust as always offering prices no less than those his neighbours were offered. Sometimes the relationship was based on personal favours extended to the fishermen. Furthermore, there was quite a number who obtained straight loans from the fish buyers to purchase fishing gear when they first moved into the reservoir or when their equipment was lost or stolen. Nearly all fishermen in this category were obliged to sell their fish to the creditors only.

In our survey, it was found that 32 per cent of all the fishermen under survey in November - December 1970 sold fish directly to their creditors, 24 per cent to regular buyers of their own choice, while the rest sold theirs freely to anyone who offered the best prices. Despite the rather small monetary value of the daily catch, fish transactions involved a large number of people. On the sellers' side, there were more than a thousand. The four censuses taken during the period of survey revealed the following results:

TABLE XXII
NUMBER OF FISHERMEN IN THE NAM PONG RESERVOIR

	<u>No. of fishermen</u>
1 st census (November - December 1970)	1,060
2 nd census (March - April 1971)	1,244
3 rd census (July - August 1971)	1,139
4 th census (November - December 1971)	<u>1,196</u>
<u>Average for the whole year</u>	<u>1,160</u>

/Against

Against this number was a small group of fish buyers whose census was taken 3 times a month at the fishing port; on the 10th, 20th and 30th (except February) of every month. The summary of the results are as follows:

TABLE XXIII

NUMBER OF FISHMONGERS IN THE NAM PONG RESERVOIR

	<u>No. of merchants operating daily</u>
Minimum	28
Maximum	55
Average	<u>40.5</u>

In spite of a large number of buyers and sellers, and the apparent absence of any collusion on the part of the buyers, the competition among the latter did not result in a free movement of price of fish. For example, if the quantity of fish in any particular day dropped by 20 per cent, one might at first sight, and assuming conditions of a free competition expect the price of fish to go up by more or less the same magnitude. This was not the case with the Nam Pong fish. From a sample taken of all transactions between the fishermen and the fishmongers during the 36 equally spaced sample days during the 365 day period, we have computed the correlation co-efficient between the total supply and (weighted average) price, which is only 0.11. This situation therefore gave rise to the suspicion that the fishmongers' freedom to compete among themselves was not real. As we shall see in the following paragraphs, they were controlled at the distribution outlet by a small group of wholesalers who to some extent dictated rather than responded to the price of fish.

/Average price

Average price for each species of fish is given in the following table. Details concerning the monthly prices are given in the appendices.

TABLE XXIV

FISHERMEN'S SELLING PRICES OF TWELVE MAIN SPECIES
OF THE NAM PONG FISH

<u>No.</u>	<u>Thai Name</u>	<u>Scientific Name</u>	<u>Weighted Average</u>		<u>Distribution</u> <u>of Weight</u> <u>(%)</u>
			<u>Price (Bt/kg)</u> (Dec. 1970 Nov. 1971)		
1.	Ka	<u>Morulus Chrysophekadion</u> (Bleeker)	2.36		2.9
2.	Soi Nok Khao	<u>Oxygaster hasselti</u> (Cuv. & Val.)	2.33		11.9
3.	Khac Noi	<u>Cyprinus spp.</u>	1.88		20.5
4.	Kasooop	<u>Hampala dispar</u> H. M. Smith	3.55		2.1
5.	Soi Khao	<u>Cirrhinus jullieni</u> Sauvage	2.18		29.5
6.	Chon	<u>Ophicephalus striatus</u> (Bloch)	7.55		2.6
7.	Chado	<u>Ophicephalus micropeltes</u> (Cuv. & Val.)	3.29		1.2
8.	Bu	<u>Oxyleotris marmoratus</u>	12.44		4.0
9.	Salat	<u>N. Notopterus</u> (Pallas)	4.91		13.5
10.	Nua Orn	<u>Ompok bimaculatus</u> (Bloch)	7.95		2.3
11.	Kayaeng	<u>Mystus cavasius</u> (Hamilton)	4.08		4.7
12.	Kamang	<u>Puntioplites proctozyron</u> (Bleeker)	4.34		2.4
13.	Others		3.01		2.4
					100.0

5.5 Fishmongers vs. Wholesalers

The fish wholesalers of Nam Pong as a group were in a strong position to dictate the price of fish. They derived their advantage first of all from their small number relative to that of the sellers. The former number has invariably been five whereas the latter averaged about forty, thus ratio of about one to eight. This made it relatively easy for the wholesalers to enter into some kind of a collusion with the goal of fixing the buying price. Secondly, they know the retail market. It would be very difficult for anyone to break in without knowledge of the market and, more important still, the old acquaintance with the individual retailers most of whom have, over the years of buying and selling, developed a feeling of business loyalty toward their respective wholesalers. Thirdly, a certain amount of capital in the form of cash is required before anyone can attempt to break into this business. Moreover, it involves an unusually high degree of uncertainty due to the perishable nature of the commodity. There are as yet no cold storage facilities at Nam Pong or at the markets such as Udorn or Khon Kaen to preserve the fish. The newcomer may therefore have to accept a rather high degree of business risk at the beginning. All these factors serve to enhance the monopolistic position of the Nam Pong wholesalers which enables them to set the buying price of fish in such a manner that they can continue to enjoy a wide profit margin.

On the fishmongers' side, as long as they buy and sell individually, their bargaining strength tends to be inferior to that of the wholesalers, at least in the short run. The fishmongers are in effect told of, or implicitly promised, the price before actually starting to buy fish from the fishermen. Since the fishermen are as equally unorganized as they are, all that they have to do is to set the buying price after allowing for a profit margin for themselves. As we shall see later, this profit

/margin earned

margin earned by the fishmongers is not very high because of the competition among themselves. In this way, they cannot be so responsive to the changes in the supply. They would continue to pay the same price irrespective of the volume of the catch. At the fish market at Tha Rua, almost every fishmonger has his regular buyer who has the first choice with respect to both the kinds of fish and the quantities, the prices being left understood. Whatever the wholesaler does not want will then be offered to the petty fishmongers who would peddle fresh fish right at the landing site or in the nearby villages, or to the producers of preserved fish. In either case, the price is somewhat lower than in the first choice. For this reason, each fishmonger tries not to have any quarrel with his regular buyer for fear that he might receive a reprisal in the form of a drastic cut in the first choice purchase. Such an action could easily wipe out the individual fishmonger's small profit for the day, sometimes even incurring a loss.

There is still another special group of buyers, viz. the producers of smoked fish for which only one species, i.e. the *Notopterus*, is required. For this fish, a price was fixed by the producers which was high enough to assure a steady supply throughout the year. There was no conflict with the wholesalers in respect of this fish because the consumption of this fish, which is thin and bony, is limited in its fresh form.

5.6 Fishmongers vs. Processors

As can be seen from Table XXI, about 14 per cent of fish landed at Tha Rua was bought as raw material for processing into fermented fish, and about 14 per cent was used for processing into smoked fish. During the whole period of survey, there were 2 fermented fish and 2 smoked fish producers, all located in the vicinity of Tha Rua.

/Fermented

Fermented fish producers whose requirement of fish is not limited to any particular species, would normally buy up all the fish that was left after all the other buyers had taken what they wanted. Taking advantage of the fact that there was no cold storage facilities at Tha Rua, the fermented fish producers would set the buying price slightly lower than that of the first-round buyers. Readers who are interested in details concerning the price differentials may consult the tables on prices which are appended to this report. To conclude this paragraph, it should be mentioned that processing of fish for fermentation at Tha Rua has created jobs for some 50-100 women and children all the year round.

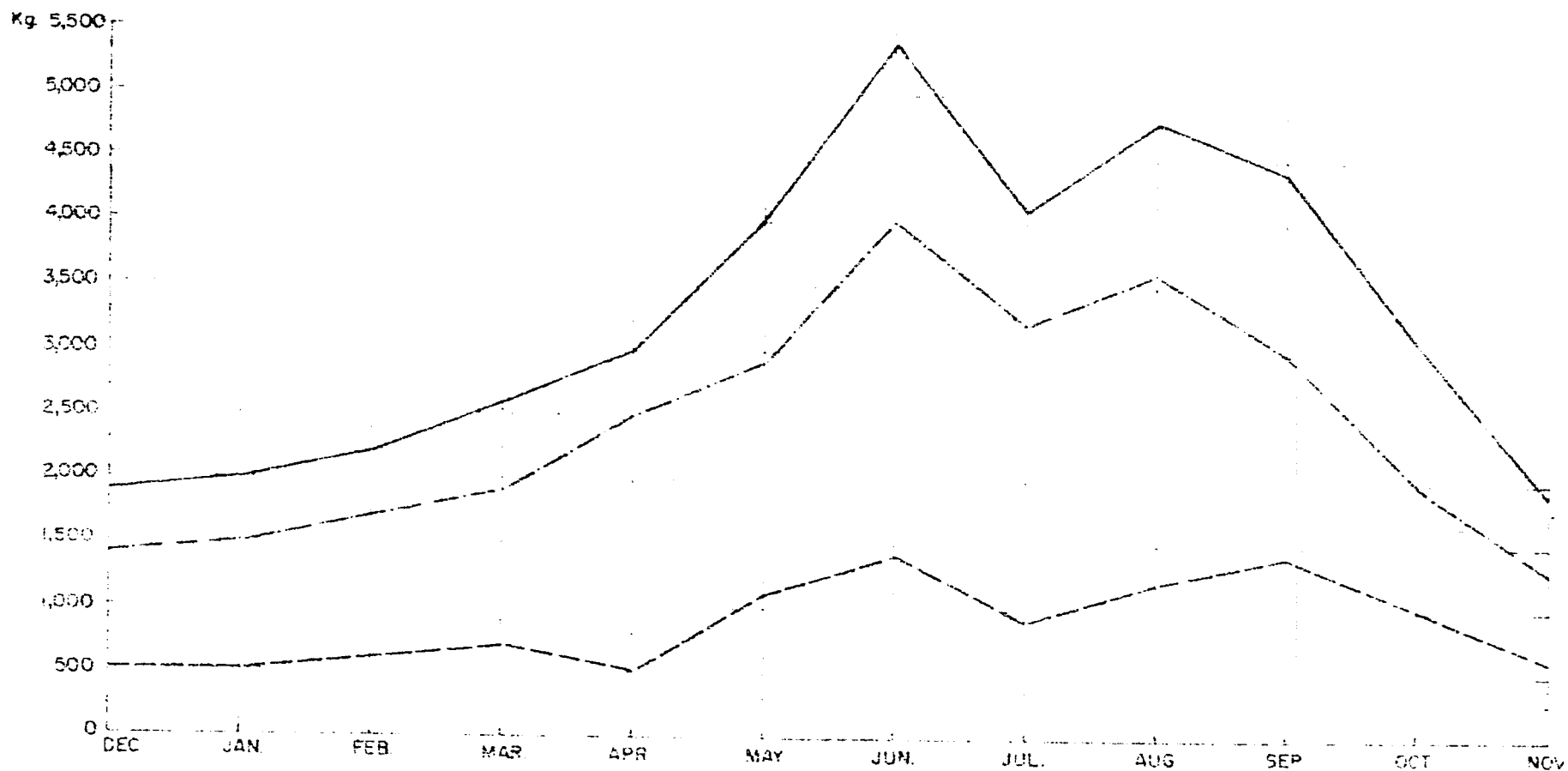
Unlike the fermented fish producers, the smoked fish producers required only a special kind of fish, i.e. the Notopterus, for processing. Since this fish is not much in demand by housewives for cooking in fresh form, the processors could have practically all the fish that was caught from the reservoir. Both processors, who incidentally had moved to Nam Pong from the Central Plain, were reported to have suffered from an insufficient supply of the fish to make the business a profitable one.

5.7 Wholesalers vs. Retailers

The retail market in places such as Khon Kaen or Udorn is supplied with fish from several sources: sea-fish and sea food from or via Bangkok, fresh water fish from the Central Plain, from Nam Pong, and from the farmers peddling fish caught in the rivers, canals, swamps, and, during the rainy season, in the paddy fields. By and large the demand and supply of sea-fish bear little relationship with the demand and supply of fresh water fish; the former usually commands a higher price and is consumed mostly by the people in the medium and high income brackets. As regards fresh water fish, the three sources of supply are interdependent. The supply of fish from the small subsistence farmers, who earn an extra cash income from fishing during spare time is

/understandably

TONNAGE OF FISH LANDED DAILY AT THA RUA, DEC. 1970 - NOV 1971

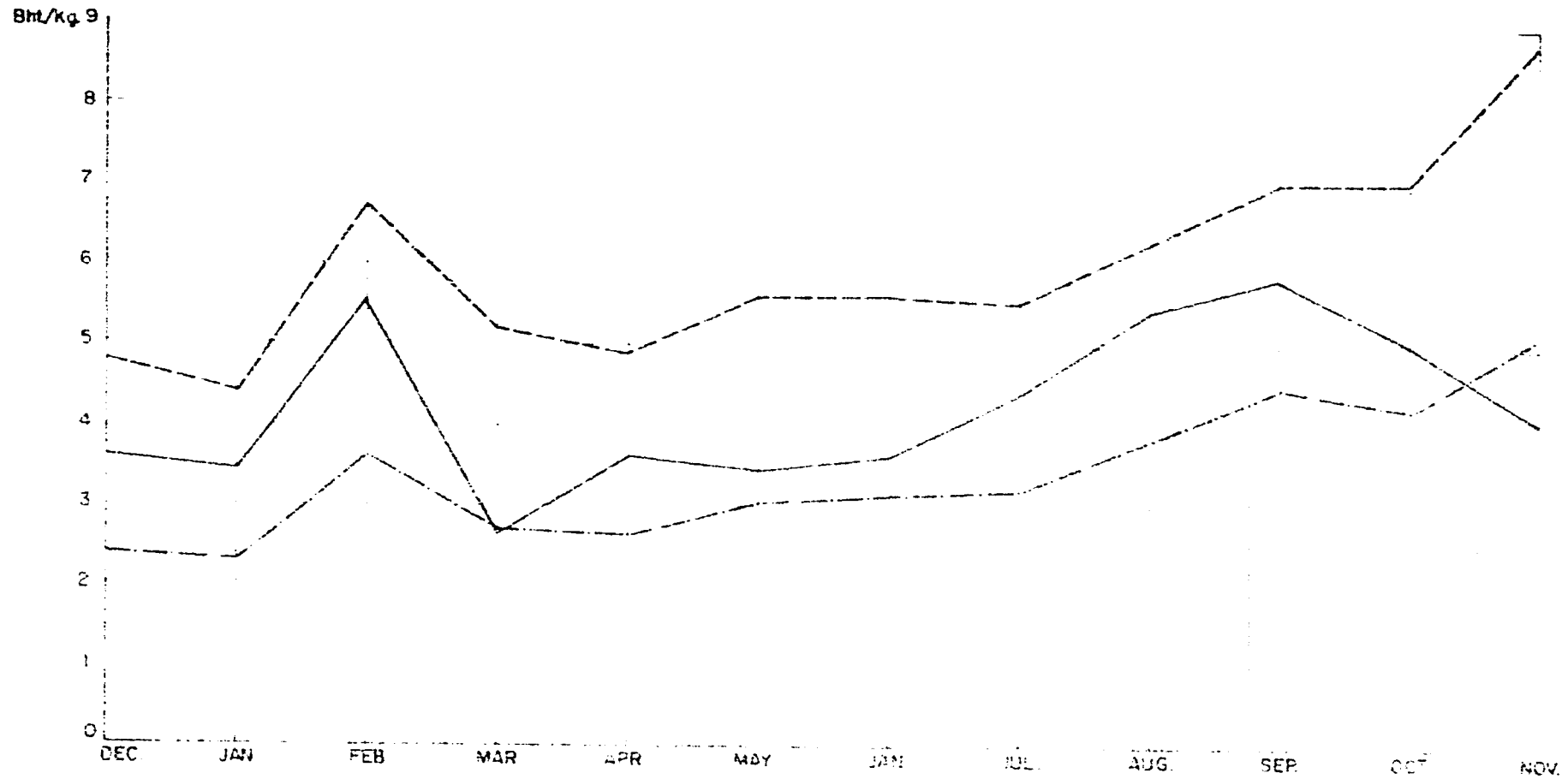


- Tonnage of fresh fish sold by fishermen to fishmongers
- Tonnage of fresh fish sold to retail market
- Tonnage of fresh fish sold to processors

NEKONG COMMITTEE

TONNAGE OF FISH LANDED DAILY AT THA RUA,
DEC 1970 - NOV 1971

AVERAGE DAILY PRICES OF NAM PONG FISH, DEC.1970-NOV.1971



- Price paid by retailers.
- Price paid by processors
- · - · - Price received by fishermen

MEMORANDUM COMMITTEE

AVERAGE DAILY PRICES OF NAM PONG FISH,
DEC 1970 - NOV 1971

DATE May 1972

understandably independent of the market price of fish. The other two main sources, which are important in terms of the volume of business, are closely interdependent. The importers of fish from the Central Plain or elsewhere have to take into consideration the market situation after allowing for the estimated supply from Nam Pong. They will import only the kinds of fish which are not available or which cannot be sufficiently supplied from that source such as *Ophicephalus striatus*. During the interview, every fish importer readily admitted this as the most important factor in calculating the quantity of fish which was going to be ordered from the Central Plain. The reason for this is because of the relative advantage of the Nam Pong fish with respect to the distance from the dam site to the market, hence the transportation savings. The varieties most commonly imported from the Central Plain, in addition to *Ophicephalus striatus*, are *Clarius batrachus* and *Pangasius sutchi*. It was estimated that fresh water fish imported from the Central Plain constituted about 60 per cent of the total daily supply for Khon Kaen, and about 30 per cent for Udorn. Since the Nam Pong fish wholesaler and the fish importer in both Khon Kaen and Udorn were not one and the same person, the latter was always watching for an opportunity to increase his share of the market if and when the former pushed the selling price too high. The wholesaler's ability to maintain the selling price just a shade below whatever price the importer was going to charge and the fact that some of the wholesalers or their partners were engaged also in retailing, put them in a strong position in the fish market. Their monopolistic influence on the selling side coupled with their monopsonistic influence on the buying side have earned for this small group of only five middlemen a net income which, as we shall see later on, roughly equals a total amount of money earned by 200 fishermen.

6. COMPARATIVE STUDY OF INCOME EARNED BY FISHERMEN, FISHMONGERS AND WHOLESALERS

If the wholesaler makes profit six times as much as the fishmonger who in turn earns an income seven times as much as the man who actually catches the fish, is he exploited? On what basis can one give an answer to this question?

If such a question is asked in the context of a Western, or rather capitalist-oriented, economic theory on which basis the rate of returns on capital invested is the best known and most widely accepted yardstick, Mr. A may earn 100 times more than Mr. B because Mr. A has invested 100 times more than Mr. B. Unfortunately in most of the under-developed economies where the membership of the capitalist class is much more limited than in the advanced countries, the problem more often confronted is in the form of a comparison of income from capital (profit) with income from labour (wages). The comparison of income earned by the fishermen with that earned by the two categories of middlemen is, strictly speaking, impossible due to this lack of a common basis on which to compare. The case of Nam Pong fishery is, in addition, compounded by the fact that the majority of fishermen are living at a real subsistence level, with barely enough to live on and to maintain an economic status quo, but with not enough to improve their situation economically.

6.1 Income Earned by Fishmongers

Most fishmongers were residents living in fishing villages from where they bought fish for resale at Tha Rua. A typical fishmonger was an enterprising person who, after having saved up some money, saw the opportunity of earning income from buying and selling fish. What was required was a small amount of working capital, a small motor-driven boat costing about Bt. 8,000 - 10,000, and a good relationship with fishermen who lived in the same neighbourhood.

/All fishmongers

All fishmongers were interviewed 3 times a month at Tha Rua in order to obtain information on the quantities, species, and prices of fish bought and sold for the day. The calculation of profit shown below is based on data obtained from such interviews.

TABLE XXV
AVERAGE DAILY INCOME EARNED BY THE FISHMONGER

	<u>Baht</u>
Gross sales by all fishmongers for 36 sample days	525,669.51
Average per day	14,601.93
Gross purchases by all fishmongers for 36 sample days	402,313.90
Average per day	11,175.39
Total gross profit	3,426.54
<u>Less</u> 20 per cent expenses (estimated)	685.31
Total net profit	2,741.23
<u>Net daily profit per person</u>	<u>2,741.23</u>
	40.5
	67.68

6.2 Income Earned by Wholesalers

There were altogether only 5 wholesalers who purchased fish from local fish merchants at Tha Rua for resale to retailers at the market in Udorn, Khon Kaen, etc. Their annual purchase, sales and gross profit are presented on the next page:

/TABLE XXVI

TABLE XXVI

INDIVIDUAL DAILY INCOME EARNED BY FIVE WHOLESALERS
(Based on the data for 36 sample days)

<u>Wholesaler</u> <u>Number</u>	<u>Annual</u> <u>Purchase</u> (Baht)	<u>Annual</u> <u>Sale</u> (Baht)	<u>Gross Profit</u> (Baht)	<u>Est. Annual</u> <u>Net Profit</u> (Baht)	<u>Est. Daily</u> <u>Net Profit</u> (Baht)
1	700,635	928,150	227,523	159,266	436
2	539,774	707,053	167,279	117,095	320
3	932,569	1,169,459	236,890	165,823	454
4	975,622	1,417,633	442,011	309,407	847
5	374,484	554,825	180,341	126,239	345
<u>Average</u>	704,617	955,426	250,809	175,566	481

Foot-Note: After deducting 30 per cent for the estimated operating expenses including the expenses in operating a small truck.

6.3 Income Earned by Fish Processors

There were 2 fish smokers and 5-10 fermented fish makers all of whom bought fish directly or indirectly from fishmongers at Tha Rua. Some of them were also engaged in buying fish which was left over after wholesalers had satisfied their demands, and resold it a few hours later to those who peddled fish in small village markets. Of late, there was a demand for a fish, *Oxyleotris marmoratus* which, at certain sizes or weights, could be exported to Hong Kong at a price which was several times higher than the average price of other fish.

During the survey period, there were 2 fish smokers and 2 fermented fish makers who regularly bought fish at Tha Rua. While we were allowed access to their books of accounts concerning the selling and buying, data on the processing costs were not well

/kept with

kept with the result that reliable informations were available only up to the point of estimating the "gross" profit, i.e. the difference between the value of sale of processed fish and fresh fish, and the value of fish bought as raw material. To enable us to arrive at the estimate of the "net" profit, the operating expenses have to be assumed on the basis of available information.

TABLE XXVII
INCOME EARNED BY FISH PROCESSORS

No.	Fish product	Annual purchase ^{1/} (Bt)	Annual sale ^{2/} (Bt)	Annual Gross profit (Bt)	Annual net profit (Bt)	Average daily earnings (Bt)
1	Fermented	229,519	385,243	155,724	46,717	128
2	Fermented	249,998	397,616	147,618	44,285	121
3	Smoked	629,912	832,478	202,566	81,926	222
4	Smoked	604,276	979,249	374,973	149,990	411

- Foot-Notes:
1. Data were obtained from survey of 36 sample days
 2. Data were obtained from survey of 36 sample days. Sales include the value of both processed fish and fresh fish which was resold to peddlers. The ratios used in converting fresh into processed fish are:

Fresh fish : Processed fish

4:5 for fermented fish

3:1 for smoked fish

Selling prices for processed fish per kg. are:

Bt.15.5 for smoked Morurious Chrysophekadion

Bt.29.0 for smoked Notopterus

Bt.52.5 for smoked Ompok bimabulatus

Bt. 3.75 for fermented fish.

6.4 The Existence of the Tha Rua Community

It is to a large extent true to say that this small community of 125 households exists because its economy depends on fishing in the reservoir. Practically all the purchasing power comes from the fishermen who live around the lake. Without fishing, the number of customers of these little shops around Tha Rua would be so small that the shop-keepers could no longer stay in business. In this respect, therefore, fishing has yielded its secondary benefit in terms of additional employment and income to hundreds of persons.

Details concerning their occupations are given in the following table:

TABLE XXVIII

MAJOR OCCUPATIONS OF THE THA RUA RESIDENTS

<u>Activity</u>	<u>No. of households</u>
Making fermented, dried and smoked fish	26
Selling general merchandise	24
Selling food	14
Hiring out for wages	11
Fishing	9
Farming kenaf and other crops	8
Tailoring	7
Fish peddling	4
Boat operating	3
Hair cutting	3
Ice and drink selling	2
Truck and bus driving	2
Motor repairing	2
Others	7
Total	<u>125</u>

6.5 Comparison of Income

The income figures which appear in Table XVI, XVII, XXV, XXVI and XXVII can now be compared as follows:

TABLE XXIX
COMPARISON OF GROSS INCOME EARNED BY FISHERMEN
FISHMONGERS, FISH PROCESSORS AND WHOLESALERS

<u>Party</u>	<u>Average No. of Persons</u>	<u>Average Daily Income</u> <u>per Person</u> (Bt)
Fishermen	1,160	10.70 - 12.88
Fishmongers	40	68
Fish processors	4	220
Wholesalers	5	481
Retailers	Not available	Not available

As mentioned in the beginning of this chapter, our main difficulty in determining whether each of the four parties has received a fair share of the income from fishery lies in a lack of a common basis. The fisherman's earnings are by and large wages whereas the wholesaler's earnings are principally profit. His excuse for making a juicy profit on the back of the poor fishermen is going to be that he has the entrepreneurial skill and the capital. While the entrepreneurship is something which is subjective even in itself, let alone its value, we can still try, at least to satisfy our own curiosity, to make an adjustment for it. Based on the observation, we shall assume that the capital employed was Bt.10,000 per fishmonger (consisting of a small motor boat and some revolving capital), Bt.50,000 per wholesaler (consisting of a small truck and working capital, and Bt.25,000 per fish processor (mostly for working capital). We shall also assume an interest on capital of 24 per cent which is equal to the prevailing rate in the business community in Thailand. The results are shown as follows:

/TABLE XXX.

TABLE XXX

COMPARISON OF NET INCOME EARNED BY FISHERMEN,
FISHMONGERS, FISH PROCESSORS, AND WHOLESALERS

<u>Party</u>	<u>Average Daily Income per person (Baht)</u>	<u>Average Daily Income Excl. Return on Capital (Baht)</u>
Fishermen	10.70 - 12.88	10.70 - 12.88
Fishmongers	68	61
Fish processors	220	204
Wholesalers	431	448
Retailers	Not available	Not available

From the above figures, it appears that even if we were to allow for double the amount of capital employed, the overall picture is not going to be much different. It seems reasonable therefore, to conclude that in comparison with the fishermen, the fishmongers, processors, and, more so, the wholesalers of Nam Pong are getting more than their fair share.

Another way of looking at the relative share of each of those who depended on fishing in Nam Pong for a living would be to see who the price which a housewife pays for fish at the market is divided among them. This can be seen from the following table:

TABLE XXXI

RELATIVE SHARE OF THE MARKET PRICE OF FISH

	<u>Price Bt/kg</u>	<u>Percentage</u>	<u>Share of earnings (%)</u>	<u>Earners</u>
Average retail price at Udorn/Khon Kaen	7.77	100	24	Retailer
Wholesale price at Udorn/Khon Kaen	5.90	76	19	Wholesaler
Wholesale price at Tha Rua	4.45	57	13	Fishmonger
Buying price received by fisherman	3.39	44	44	Fisherman

/It must be

It must be emphasized that this table does not tell the whole story since it does not take into account the quantities of fish and the number of persons engaged at each level of the distribution. The apparently lower percentage of the wholesaler's share of the housewife's dollar spent on fish should not, therefore, be interpreted to mean that he is earning less than other types of middlemen.

7. PROBLEMS AND ASSISTANCE NEEDED

To find out the problems as seen by the fishermen themselves, an open-ended question was asked of the 280 sample households as to the kinds of assistance which they would like to have. The results are presented in the following table:

TABLE XXXII
ASSISTANCE REQUESTED BY FISHERMEN

<u>Assistance requested</u>	<u>No. of households</u>	<u>Percentage</u>
Taking legal action against net-stealers	231	82.5
Improving the selling price of fish	211	75.4
Getting rid of the water hyacinth	19	6.8
Building temples (wats)	16	5.7
Building schools	14	5.0
Allocating land for cultivation	10	3.6
Sinking wells for drinking water	7	2.5
Building health clinics	6	2.1
Introducing more varieties of fish	2	0.7
Others	2	0.7

From this table, it appears that net stealing is the biggest problem.. Throughout the period of field investigation, numerous complaints have been heard about the prevalence of theft. Many fishermen who have invested their meagre savings in the fishing net wake up one morning to find that their only means of making a living has been stolen. As mentioned earlier, the influx of a large number of strangers along the lakeshore of Nam Pong has created both a sociological and an administrative problem. Many fishing camps are self-established without the proper administrative arrangements made to take care of the newly arrived.

/The existing

The existing local administrative machinery is thus weakened, giving rise to the outbreak of net-stealing which was easy because the nets were left unattended during the night. Towards the end of 1971, some action was taken by the police in cracking down on the theft gangs as well as grouping the scattered fishermen together so as to facilitate the maintenance of law and order in the reservoir.

Another important problem which emerged from the survey concerns the price of fish received by the fishermen. They know that the price which they have received is well below the retail price in the market, and naturally have felt unhappy about the way in which they have had to sell their catch.

The relative prices of fish at different stages of the distribution are presented in summary form as follows:

TABLE XXXIII
RELATIVE SELLING PRICES OF FISH PER KILOGRAM
(ALL SPECIES) IN 1971

	<u>Fishermen</u>	<u>Peddler</u>	<u>Wholesaler</u>	<u>Retailer</u>	
				<u>Khon Kaen</u>	<u>Udon</u>
Dec. (1970)	2.42	3.28	4.77	6.59	7.83
Jan.	2.30	3.11	4.44	6.45	7.57
Feb.	3.59	5.13	6.69	6.65	8.13
Mar.	2.67	4.17	5.20	6.92	7.62
Apr.	2.64	3.52	4.85	6.36	7.33
May	2.98	4.09	5.55	7.08	8.96
June	3.05	4.03	5.99	6.91	8.79
July	3.17	3.95	5.45	7.31	8.66
Aug.	3.73	4.54	6.18	6.96	7.91
Sept.	4.46	5.65	7.01	6.31	9.54
Oct.	4.19	5.45	7.02	6.95	8.83
Nov.	5.07	7.45	3.76	7.93	7.51
Annual Average	<u>3.39</u>	<u>4.45</u>	<u>5.90</u>	<u>6.87</u>	<u>8.31</u>

Foot-Note: All the figures except retail price are weighted average
/To increase

To increase the fishermen's price at the expense of the middlemen will not be easy even with full government support. There is, however, a possibility of setting up some kind of a fish marketing organization which must have the strong support from the Fish Marketing Organization or the Department of Fishery itself, especially in relation to the procurement of efficient, devoted personnel to run the organization and the use of the landing site at Tha Rua. It should also receive the support of the municipalities of Udorn and Khon Kaen by allocating a space in the retail market for wholesaling on the principle of a co-operative whereby the profit earned by the marketing organization is paid to the fishermen on the basis of the relative quantity of fish which they have supplied. The fishermen would thus be more attracted to the organization than to the middlemen. It must be pointed out, however, that the fishermen themselves should not be permitted to participate directly in the operation or the policy making as for many reasons they are not capable of so doing, at least for the immediate future. The key factor to the successful operation of such a marketing organization, which will compete for at least a good share of the profit now going to the middlemen for subsequent distribution to the fishermen, lies in the ability to recruit efficient, honest, devoted, and entrepreneurial-minded personnel who can operate free from red-tape and cumbersome regulations.

The next problem concerns the growth of large quantities of water hyacinth. During the survey, it was observed that certain parts of the reservoir were so full of water hyacinth that it was not possible to land the boat at the shore line. As large formations of this water plant obstruct the passage of sunlight to the bottom of the lake, the growth of phytoplankton on which several species of fish depend for food is obstructed.

Up to now, EGAT, the authority which is in charge of the reservoir maintenance, has done very little to control water hyacinth which seems understandable as its primary function is the generation of electric power and the weeds do not at least for the time being, interfere to any substantial degree with that function. EGAT has assigned a few employees to spray manually 2-4 D, a kind of

/hormone

hormone weed-killer, on to the plant formation. So far, this small effort has produced very little results. It is questionable even whether this is the best and least harmful way to get rid of water hyacinth. As a matter of fact, this problem is not a local problem for Nam Pong. It is a national problem and should be faced as such. The eradication of water hyacinth from Nam Pong will not have a long lasting effect if this plant is still floating around in the nearby swamps. If the campaign against water hyacinth is not intensified in the near future, it is possible that its proliferation may reach the point where the entire fishing industry is endangered.

The problem which, although somewhat elusive to the fishermen themselves, is obvious and of paramount importance is the high density of fishermen for a given surface area of water. During the period of the survey, an average of 1,160 fishing families have been earning income from fishing on about 410 square kilometres of water - an average of 2.8 fishermen per square kilometre. That this ratio is high can be substantiated by the low level of income from fishery which, as can be seen from Paragraph 2.5, is in the order of Bt. 4,000 per family of 6 persons without any supplementary income from other sources. This gives the per capita income figure of about Bt. 660 which is very low in comparison with the national average of about Bt. 2,600. The Nam Pong fishermen's per capita income will have to be increased by something like fourfold to bring it up to the same level as the national average. Since the capital investment required in fishing in the reservoir is not very much, this increase could be achieved if the number of fishermen could be reduced by about four times, i.e. from about 1,160 to about 300 families, to allow about 1.3 km of surface water area per family. In actual practice, however, the rate of change will almost certainly be different from what was suggested in the preceding paragraph depending on a number of factors other than the number of fishermen.

/Comparing

Comparing Nam Pong with the irrigable area of Nong Wai, some 30 km. east of Nam Pong where a survey was conducted of the farmers three years ago, the level of per capita income from Nam Pong fishing is about 50 per cent of the average total (i.e. farm and off-farm) income of farmers, and about 75 per cent of the average farm income. The obvious drawback of living on the lakeshore of Nam Pong is that the opportunity of earning an extra income as wage-labourers, etc., is almost nil because of the relative isolation from the urban centres.

It would not be possible for many reasons to reduce the number of the fishermen in Nam Pong by as much as four times. However, the experience there provides us at least with some idea as to the course which reservoir fishing may take if a free-fishing policy is adopted.

8. CONCLUSION AND RECOMMENDATION

8.1 The Planning and Supervision of Fishing Resettlements

The Nam Fong experience shows that in areas where there is a large number of people making a living at near subsistence level, there is a strong tendency for too many people to settle along the lakeshore for fishing, giving rise to a low level of fishing income per family. To avoid this in future reservoirs and to maintain a satisfactory level of fishery earnings per family over a long period of time, it would be necessary to control the number and location of fishermen. In the case of Thailand, a solution might be to allow the Department of Fishery to co-manage the reservoir with the Electricity Generating Authority of Thailand in the case of a power producing project, or with the Royal Irrigation Department in the case of irrigation project. As the requirements of the fishery interests do not conflict with those of power production and irrigation, there would seem to be no reason why such dual management should give rise to inter-agency disputes.

In future, and to the extent that it can be done, each of the fishing villages should be planned with respect to the village layout so as to ensure a reasonable standard of health and sanitation. The executing agency should have no real problem in this respect if sufficient room has been provided for fishing resettlement at the time when the geographical boundary of the reservoir is determined on the drawing board. The administrative arrangement for the integration of such communities with the existing administrative setup should also be planned and arranged for by the appropriate governmental authority so that the administrative machinery, including the maintenance of law and order, the provision of the education, etc., would be extended to the reservoir margin.

Since income from fishing in reservoirs can by and large be estimated if planning and control measures are adopted, priority for resettlement for fishing purposes should be reserved to those

/who

who have lost their land for the reservoir construction. This seems logical from all points of view. It would certainly reduce the burden of having to find other places for them to resettle.

3.2 The Securing of a Fair Share of Fishery Benefit to Fishermen

The first recommendation, if followed, would lead to a greater unification of the fishermen. This is the first step towards strengthening their bargaining position vis-a-vis the middlemen. It might be desirable for the Department of Fishery which is essentially a technical institute to encourage the Department of Credit and Marketing Co-operative to collaborate with it in setting up some sort of a fish marketing co-operative with a strong support from the Government in the early period when the members are not likely to have the management capabilities. In a sense, the Nam Pong fishermen are more income-conscious than the rice farmers since they have to sell practically all their product for cash and pay for everything which they consume, including rice, in cash. Only if and when they can be convinced that they could get better terms on a long-lasting basis by selling to the co-operative, will the chance of running it successfully be much enhanced.

8.3 The Reservoir Management

A good beginning has been made by the Thai Fishery Department by setting up the Ubol Ratana Fishery Station at Nam Pong to do research and experiment. In addition to the limno-biological studies which are beginning to be undertaken, the following activities might also be the concern of the Department

- (i) the control of water hyacinth in the reservoir;
- (ii) the control of fishing gear and fishing practices in certain parts of the reservoir and during certain seasons to conserve the fish stock or to prevent undue disturbance of the fish during the spawning period;
- (iii) the improvement of fish landing and marketing facilities at ha Rua.

/Like

Like any other resources, fishery resources have their own limit as to how much they can accommodate the human need. The extent to which fishery potential can be realized depends upon the level of knowledge which we have about such limit. The more we know about it, the more we are able to maximize the benefit derivable from any reservoir. This study represents a modest beginning towards increasing our knowledge about the socio-economic implications of the development of fishing industry in a reservoir. The information contained in this report by itself is not likely to be of much use unless the same information can also be collected from other reservoirs in the same geographical area. It is earnestly hoped that this study will serve to stimulate an interest for more research among those whose duties are to plan water resource development projects for the benefit of mankind.

Weighted Average Price Received by Mae Hong Fishermen
(Baht/kg)

Thai Name	Scientific Name	Dec.70	Jan.71	Feb.71	Mar.71	Apr.71	May 71	Jun.71	Jul.71	Aug.71	Sept.71	Oct.71	Nov.71	Dec.70- Nov.71
1. Ya	<i>Morulus chrysophthalmus</i> (Bleeker)	2.03	1.98	2.27	2.57	2.31	3.09	3.11	2.48	2.21	2.48	2.23	2.21	2.36
2. Soi Nok Khao	<i>Oxygaster hasselti</i> (Cuv. & Val.)	2.26	1.89	2.04	1.99	2.13	2.33	2.56	2.28	2.67	2.48	2.49	2.38	2.33
3. Khao Noi	<i>Cyprinus</i> spp.	1.72	1.66	1.76	1.70	1.90	2.20	2.10	2.11	2.01	1.51	1.74	2.02	1.88
4. Kasooop	<i>Rampula dispar</i> H.M. Smith	3.20	2.91	3.11	3.18	3.43	3.80	3.55	2.74	4.16	4.28	4.55	4.45	3.55
5. Soi Khao	<i>Cirrhinus jullieni</i> (Sauvage)	1.68	2.10	1.71	1.83	2.00	2.24	2.27	2.21	2.37	2.22	2.40	2.49	2.18
6. Chen	<i>Ophicephalus striatus</i> (Bloch)	6.84	6.24	6.65	6.63	6.73	7.89	8.20	7.56	8.17	7.57	6.26	8.30	7.55
7. Chado	<i>Ophicephalus micro-polites</i> (Cuv. & Val.)	2.43	2.99	2.91	3.00	3.00	3.56	3.83	3.77	3.28	3.31	3.63	3.67	3.29
8. Bu	<i>Oxylocheilus marmoratus</i>	5.13	4.13	16.41	9.63	8.99	8.41	6.38	7.16	6.49	15.73	25.42	32.94	12.44
9. Salat	<i>M. Notopterus</i> (Pallas)	4.00	3.27	3.00	3.00	3.17	3.71	3.95	5.04	6.44	6.57	5.82	3.80	4.91
10. Nae Lam	<i>Ompok bimaculatus</i> (Bloch)	7.83	7.04	7.56	7.88	8.35	7.68	7.37	6.97	7.75	8.21	8.86	9.46	7.95
11. Kayaeng	<i>Mystus cavasium</i> (Hamilton)	3.22	5.25	3.04	3.63	4.00	4.07	4.30	3.45	4.58	4.42	3.96	4.28	4.08
12. Kamang	<i>Puntioplites proctozysron</i> (Bleeker)	3.85	4.02	4.24	4.95	5.00	5.00	4.96	3.50	4.45	4.43	4.61	4.71	4.94
13. Others		2.07	1.78	2.52	2.36	1.98	3.66	3.74	2.07	3.37	4.17	4.94	6.63	3.01
<u>Average for all species</u>		2.42	2.30	3.59	2.67	2.64	2.98	3.05	3.17	3.78	4.46	4.19	5.07	3.39

Foot Note:

Data from which these statistics were derived were collected from all the fishermen at Tha Rue on the 10th, 20th and 30th (28th for Feb.) of each month.

Weighted Average Price Received by Fishmongers at The Ruu
(Baht/kg)
(For fish sold to wholesalers and processors)

Thai Name	Scientific Name	Dec.70	Jan.71	Feb.71	Mar.71	Apr.71	May 71	Jun.71	Jul.71	Aug.71	Sept.71	Oct.71	Nov.71	Dec.70- Nov.71
1. Ka	<i>Merulius Chrysophe-</i> <i>dion</i> (Bleeker)	2.89	3.06	3.29	3.14	3.24	3.74	3.88	3.12	3.16	3.25	3.16	3.01	3.18
2. Soi Nok Khao	<i>Cyngaster hesselti</i> (Cuv. & Val.)	3.13	2.81	3.01	2.84	2.83	3.14	3.32	2.97	3.42	3.37	2.97	3.19	3.11
3. Khao Noi	<i>Cyprinus</i> spp.	2.51	2.39	2.68	2.47	2.61	2.74	2.93	2.76	2.69	2.07	2.33	2.82	2.69
4. Kasop	<i>Bambusa disper</i> H.M. Smith	4.13	3.92	4.22	4.22	4.41	4.79	4.55	3.67	5.51	5.49	5.69	5.46	4.58
5. Soi Khao	<i>Cirrhinus jullieni</i> (Savages)	2.63	2.95	2.67	2.71	2.65	2.94	2.87	2.86	3.12	3.08	2.98	3.24	2.91
6. Chon	<i>Ophiocephalus stri-</i> <i>atus</i> (Bleech)	8.11	7.81	8.04	8.47	8.00	9.61	9.92	9.21	9.84	9.30	8.84	9.81	9.18
7. Chao	<i>Ophiocephalus micro-</i> <i>faltes</i> (Cuv. & Val)	3.43	3.66	3.87	2.68	4.00	4.56	5.3	4.74	4.31	4.22	4.68	4.67	4.25
8. Ba	<i>Oxyletris marmoratus</i>	6.71	5.41	2.38	14.29	13.10	12.35	3.39	10.35	11.85	23.76	33.90	39.56	17.56
9. Salat	<i>N. Netopterus</i> (Pallas)	5.00	4.27	4.00	4.00	4.18	4.71	5.00	6.18	7.43	7.57	6.84	5.04	5.94
10. Nua Orn	<i>Onpok bimaculatus</i> (Bleech)	9.59	9.27	9.18	10.00	9.93	9.37	9.09	8.83	9.30	10.37	10.28	10.99	9.67
11. Kayaeng	<i>Mystus cavasius</i> (Hamilton)	4.21	4.40	4.36	4.63	5.00	5.08	5.30	4.50	5.62	5.42	4.98	5.28	5.11
12. Kamang	<i>Puntionites procto-</i> <i>lysson</i> (Bleeker)	4.81	5.02	5.40	6.00	6.00	6.00	5.99	4.49	5.45	5.53	3.62	5.78	5.36
13. Others		2.82	2.32	4.55	3.26	2.80	4.47	4.60	3.90	4.29	5.18	4.18	7.91	3.87
<u>average for all species</u>		3.35	3.18	5.21	3.77	3.52	3.91	3.94	4.05	4.77	5.71	5.31	4.66	4.43

Foot Note: Data from which these statistics were derived were collected from all the fishmongers at The Ruu on the 10th, 20th and 30th (28th for Feb.) of each month.

Estimated Average Prices Paid by Processors
(Baht/kg)

(For fish sold for processing into fermented and smoked fish)

Thai Name	Scientific Name	Dec. 70	Jan. 71	Feb. 71	Mar. 71	Apr. 71	May 71	Jun. 71	Jul. 71	Aug. 71	Sept. 71	Oct. 71	Nov. 71	Dec. 70- Nov. 71
1. Ea	<i>Morulus Chrysophe-</i> <i>kadion</i> (Bleeker)		3.00											3.00
2. Khao Noi	<i>Cyprinus</i> spp.	2.50	2.50	2.66	2.50	2.50								2.55
3. Sai Khao	<i>Cirrhinus julliani</i> (Sauvage)	2.50	2.50	2.50	1.74	2.62	2.74	2.86	2.68	3.18	3.10	3.00	3.44	2.82
4. Bu	<i>Oxyeletris marmoratus</i>	8.00	5.93	22.70		15.00			14.07					15.35
5. Salat	<i>M. Notopterus</i> (Pallas)	5.00	4.25	4.00	4.00	4.14	4.68	4.63	6.21	7.37	7.43	6.86	5.00	5.85
6. Nua Orn	<i>Ompok bimaculatus</i> (Bloch)								8.00					8.00
7. Others			2.28											2.28
<u>Average for all species</u>		3.55	3.42	5.45	2.62	3.55	3.44	3.56	4.40	5.44	5.83	5.02	4.14	4.37

- Foot Notes:
- (1) All fish except *Notopterus* and *Oxyeletris marmoratus* were processed into fermented fish.
 - (2) *Notopterus* and *Oxyeletris marmoratus* were smoked.
 - (3) The data from which these statistics were derived were separately collected from all the fishmongers and processors at Tha Rue and were subsequently checked against each other. The data collection was done on the 10th, 20th and 30th (28th for Feb.) of each month.

Weighted Average Price of Fish Sold by Fishmongers to Wholesalers Only
(Baht/kg)

Thai Name	Scientific Name	Dec.70	Jan.71	Feb.71	Mar.71	Apr.71	May 71	June71	Jul.71	Aug.71	Sept.71	Oct.71	Nov.71	Dec.70- Nov.71
1. Ma	<i>Morulus Chrysophekdion</i> (Bleeker)	2.89	3.07	3.29	3.14	3.24	3.78	3.80	3.12	3.16	3.25	3.16	3.01	3.18
2. Soi Nak Khac	<i>Cyngaster hasselti</i> (Cuv. & Val.)	3.13	2.81	3.01	2.84	2.83	3.14	3.32	2.97	3.43	3.37	2.97	3.19	3.11
3. Khac Noi	<i>Cyprinus</i> spp.	2.51	2.37	2.59	2.46	2.62	2.74	2.93	2.76	2.69	2.12	2.33	2.82	2.64
4. Kasop	<i>Hampala dispar</i> H.M. Smith	4.13	3.92	4.22	4.22	4.41	4.79	4.55	3.67	5.51	5.49	5.69	5.46	4.58
5. Soi Khac	<i>Cirrhinus jullieni</i> (Sauvage)	2.66	3.07	2.75	3.60	2.65	3.07	2.88	3.10	3.06	3.06	2.96	2.96	2.98
6. Chon	<i>Ophicephalus striatus</i> (Bloch)	8.11	7.81	8.04	8.47	8.00	9.61	9.92	9.21	9.84	9.30	8.84	9.81	9.29
7. Chado	<i>Ophicephalus microteltes</i> (Cuv. & Val.)	3.43	3.65	3.87	2.68	4.00	4.56	4.93	4.74	4.31	4.22	4.68	4.67	4.25
8. Pu	<i>Oryzias marmoratus</i>	5.93	5.12	23.22	14.29	13.02	12.35	9.39	9.33	10.35	23.76	33.90	39.56	17.79
9. Salat	<i>N. Notopterus</i> (Pallas)	5.00	4.65	4.00	4.03	4.53	5.00	5.00	5.98	8.05	8.53	6.72	5.30	6.25
10. Nua Orn	<i>Ompok bimaculatus</i> (Bloch)	9.59	9.27	9.18	10.00	9.93	9.37	9.09	9.00	9.30	10.36	10.28	10.99	9.71
11. Kayaeng	<i>Myxus cavasius</i> (Hamilton)	4.21	4.40	4.36	4.63	5.00	5.08	5.30	4.50	5.62	5.42	4.98	5.28	5.11
12. Kayaeng	<i>Puntioplites proctozysron</i> (Bleeker)	4.81	5.02	5.40	6.00	6.00	6.00	5.99	4.49	5.45	5.53	5.62	5.78	5.36
13. Others		2.84	2.33	3.71	3.26	2.80	4.77	4.60	3.90	4.29	5.18	4.18	7.91	3.85
<u>Average for all species</u>		3.28	3.11	5.13	4.17	3.52	4.09	4.03	3.95	4.54	5.65	5.45	7.45	4.45

Foot Note: Data from which these statistics were derived were separately collected from all fishmongers and wholesalers at The Rim and were subsequently checked against each other. The collection was done on the 10th, 20th and 30th (28th for Feb.) of each month.

Weighted Average Price Paid by Retailers to Nam Pang Wholesalers
(Baht/kg)

Thai Name	Scientific Name	Dec.70	Jan.71	Feb.71	Mar.71	Apr.71	May 71	Jun.71	Jul.71	Aug.71	Sept.71	Oct.71	Nov.71	Dec.70- Nov.71
1. Ka	<i>Merulius Chrysopheka-</i> <i>dion</i> (Bleeker)	4.34	4.18	4.60	4.61	4.31	5.08	5.04	4.45	4.93	4.39	4.49	4.42	4.56
2. Soi Nck Khao	<i>Oxygaster hasselti</i> (Cuv. & Val.)	4.46	4.25	4.75	4.24	4.22	4.63	4.95	4.53	5.01	4.78	4.39	4.83	4.63
3. Khao Noi	<i>Cyprinus</i> spp.	3.83	3.64	4.03	3.44	3.64	3.96	4.06	3.92	4.14	3.14	3.29	3.94	3.82
4. Kasoep	<i>Pangola dispar</i> n.l. Smith	5.83	5.68	5.67	5.59	5.73	6.00	6.44	5.67	6.63	6.48	6.95	6.63	6.04
5. Soi Khao	<i>Cirrinus jullieni</i> (Salvage)	4.14	4.17	4.02	3.86	4.14	4.52	4.57	4.50	4.88	4.49	4.46	4.51	4.42
6. Chon	<i>Ophicephalus stri-</i> <i>tatus</i> (Bloch)	10.02	8.98	9.53	9.18	9.58	11.20	11.67	10.84	11.60	10.97	11.01	11.05	10.94
7. Chado	<i>Ophicephalus micro-</i> <i>peltis</i> (Cuv. & Val.)	5.00	5.00	5.39	6.17	5.47	6.54	6.86	6.50	5.72	6.24	6.63	6.34	6.04
8. Bu	<i>Oxylectris marmoratus</i>	7.30	6.61	27.97	15.87	14.43	14.31	11.31	11.36	13.19	26.87	37.94	40.65	19.97
9. Salat	<i>N. Notopterus</i> (Fallax)	7.15	6.61	6.05	6.00	6.31	7.00	7.00	7.57	8.87	8.14	8.16	7.00	7.50
10. Nam Orn	<i>Ompok bimaculatus</i> (Bloch)	11.70	11.23	10.97	11.18	11.75	10.95	10.93	10.96	11.24	11.48	11.89	12.40	11.40
11. Kayaeng	<i>Mystus cavasius</i> (Hamilton)	5.84	5.86	5.77	6.04	6.55	6.76	7.11	6.02	7.43	6.77	6.40	6.74	6.65
12. Karang	<i>Puntiolites procto-</i> <i>zysson</i> (Bleeker)	7.47	6.50	6.90	7.14	7.72	7.86	7.74	6.16	7.05	6.90	6.97	6.88	6.91
13. Others		4.28	3.91	5.21	4.46	4.14	6.01	6.29	5.63	5.99	6.69	5.56	9.30	5.37
<u>Average for all species</u>		4.77	4.44	6.69	5.20	4.85	5.55	5.59	5.45	6.18	7.01	7.02	8.76	5.90

Foot Note:

Data from which these statistics were derived were collected directly from all wholesalers at The Run on the 10th, 20th and 30th (28th for Feb.) of each month.

Simple Average Retail Price of Fresh Fish at Udon
(Baht/kg)

Thai Name	Scientific Name	Dec.70	Jan.71	Feb.71	Mar.71	Apr.71	May 71	Jun.71	Jul.71	Aug.71	Sept.71	Oct.71	Nov.71	Dec.70- Nov.71
1. Ka	<i>Morulus Chrysopheka-</i> <i>dica</i> (Bleeker)	8.00	6.67	6.00	6.33	6.00	7.00	6.67	4.50	4.33	7.00	9.00	6.33	6.49
2. Soi Nok Khao	<i>Oxygaster hasselti</i> (Cuv. & Val)	5.33	5.67	7.00	6.33	6.00	8.33	7.50	6.00	5.33	7.00	7.67	6.00	6.51
3. Khao Noi	<i>Cyprinus</i> spp.	5.33	5.00	5.00	5.00	5.00	6.00	6.00	5.33	4.33	8.00	9.00	4.33	5.69
4. Kaoop	<i>Hampala dispar</i> H.M. Smith	7.67	6.33	8.00	6.50	7.00	6.33	5.00	8.33	6.00	10.00	7.67	6.33	7.10
5. Soi Khao	<i>Cirrhinus jullieni</i> (Sauvage)	6.33	5.67	5.00	5.00	5.00	6.50	6.58	5.50	5.00	7.33	7.33	4.33	5.88
6. Chon	<i>Ophicephalus stri-</i> <i>tus</i> (Bloch)	12.00	11.67	12.00	10.33	12.67	15.67	14.67	15.33	15.67	15.67	12.00	13.00	13.39
7. Chado	<i>Ophicephalus micro-</i> <i>peltes</i> (Cuv. & Val)	5.67	5.67	6.00	6.33	6.33	8.00	9.67	7.33	6.33	9.33	9.67	7.67	7.33
8. Su	<i>Gyleotris marginatus</i>	8.00	8.00	8.00	8.33	8.33	8.00	9.42	9.00	8.00	10.67	9.67	10.33	8.81
9. Salat	<i>N. Notopterus</i> (Pallas)	10.00	8.67	10.00	10.00	10.00	9.67	7.92	8.67	7.67	11.33	11.00	10.00	9.58
10. Nua Orn	<i>Ompok bimaculatus</i> (Bloch)	10.67	12.00	12.67	11.00	14.33	13.67	13.00	15.00	15.00	11.33	8.00	7.00	11.97
11. Kayaeng	<i>Mystus cavasius</i> (Hamilton)	7.00	7.33	9.33	8.33	8.33	8.83	10.00	10.00	9.67	8.33	6.00	6.00	8.25
12. Kamng	<i>Puntioclites procto-</i> <i>zysson</i> (Bleeker)	-	-	-	-	-	10.00	-	-	-	-	-	9.50	9.75
13. Others		7.93	8.17	8.58	8.00	10.00	8.47	9.06	8.89	7.56	8.50	8.89	6.87	8.41
<u>Average for all species</u>		7.83	7.57	8.13	7.62	8.33	8.56	8.79	8.66	7.91	9.54	8.83	7.51	8.31

Foot Note: Data from which these statistics were derived were collected from retailers in the market on the 10th, 20th and 30th (28th for Feb.) of each month.

Monthly Market Prices of Fresh Fish in Khon Kaen
(Baht/Kg)

Thai Name	Scientific Name	Dec.70	Jan.71	Feb.71	Mar.71	Apr.71	May 71	Jun.71	Jul.71	Aug.71	Sept.71	Oct.71	Nov.71	Dec.70- Nov.71
1. Ka	<i>Morulus Chrysocheiladion</i> (Bleeker)	4.50	4.00	4.67	4.00	4.33	5.00	4.00	5.50	5.00	4.00	4.00	4.50	4.38
2. Soi Nok Khao	<i>Oxyaster basselii</i> (Cuv. & Val.)	5.00	-	-	5.00	5.00	5.00	5.33	5.00	5.33	5.00	4.33	4.00	4.90
3. Khao Noi	<i>Cirrinus</i> spp.	4.67	4.67	4.67	5.33	4.33	4.67	5.50	5.00	3.67	4.00	4.00	4.67	4.60
4. Kasooop	<i>Hemula dispar</i> H.N. Smith	6.00	5.50	5.33	5.67	5.67	5.50	6.00	7.00	6.00	5.67	6.00	6.00	5.86
5. Soi Khao	<i>Cirrinus jullieni</i> (Sauvage)	5.00	4.50	5.00	6.00	4.67	5.00	4.00	4.00	4.00	4.50	4.00	4.50	4.60
6. Chon	<i>Ophiocephalus striatus</i> (Bloch)	9.33	9.67	8.33	9.00	8.00	8.00	9.33	10.00	12.67	8.00	9.67	12.00	9.50
7. Chado	<i>Ophiocephalus microsetes</i> (Cuv. & Val.)	5.00	4.33	7.00	5.00	5.33	6.50	-	-	5.50	7.00	-	8.00	5.96
8. Bu	<i>Oryzias varianatus</i>	8.00	8.00	7.67	7.00	7.00	8.00	8.67	9.67	8.67	7.33	9.67	10.00	8.31
9. Salat	<i>N. Notopterus</i> (Pallas)	7.67	7.50	6.50	7.00	7.00	11.50	8.67	7.33	7.00	8.00	8.00	10.33	8.04
10. Nua Orn	<i>Cyprichromis bimaculatus</i> (Bloch)	11.33	9.33	10.00	12.67	12.33	10.00	10.00	11.00	11.00	8.67	10.67	15.33	11.03
11. Kayaeng	<i>Mystus cavasius</i> (Hamilton)	6.00	-	8.00	7.00	6.00	8.50	8.33	7.00	8.67	7.67	7.67	7.67	7.68
12. Kamng	<i>Puntioleites proctozysron</i> (Bleeker)	-	-	-	-	-	-	-	-	-	-	-	-	-
13. Others		6.61	6.83	6.94	9.39	6.67	7.28	6.17	6.94	6.06	5.89	8.39	8.17	7.11
<u>Average for all species</u>		6.59	6.43	6.65	6.92	6.36	7.08	6.91	7.31	6.96	6.31	6.95	7.93	6.87

Foot Note: Data from which these statistics were derived were collected from retailers in the market on the 10th, 20th and 30th (26th for Feb.) of each month.

Simple Average Retail Price of Fresh Fish at Udorn and Khon Kaen
(Bant/kg)

Thai Name	Scientific Name	Dec.70	Jan.71	Feb.71	Mar.71	Apr.71	May 71	Jun.71	Jul.71	Aug.71	Sept.71	Oct.71	Nov.71	Dec.70- Nov.71
1. Ka	<i>Morulus Chrysopheka-dion</i> (Bleeker)	6.25	5.94	4.84	5.17	5.17	6.00	5.94	5.00	4.67	5.50	6.50	5.42	5.44
2. Soi Nok Khao	<i>Oxygaster hasselti</i> (Cuv. & Val)	5.17	5.67	7.00	5.67	5.50	6.67	6.42	5.50	5.33	6.00	6.00	5.00	5.71
3. Khao Noi	<i>Cyprinus</i> spp.	5.00	4.84	4.84	5.17	4.67	5.94	5.75	5.17	4.00	6.00	6.00	5.00	5.15
4. Kasooy	<i>Hampala dispar</i> H.H. Smith	6.84	5.92	6.67	6.09	6.94	5.92	5.50	7.67	6.00	7.84	6.84	6.17	6.48
5. Soi Erno	<i>Cirrhinus jullieni</i> (Sauvage)	5.67	5.09	5.00	5.50	5.94	5.75	5.29	4.75	4.50	5.92	5.67	4.42	5.24
6. Chon	<i>Ophicephalus striat-</i> <i>tus</i> (Bloch)	10.67	10.67	10.17	9.67	10.94	11.84	12.00	12.67	14.17	11.84	10.84	12.50	11.45
7. Chado	<i>Ophicephalus micro-</i> <i>peltus</i> (Cuv. & Val)	5.94	5.00	6.50	5.67	5.83	7.25	9.67	7.33	5.92	8.17	9.67	7.84	6.65
8. Su	<i>Oxylectris marmoratus</i>	8.00	8.00	7.84	7.67	7.67	8.00	9.05	9.94	8.94	9.00	9.67	10.17	8.56
9. S-lat	<i>N. Notopterus</i> (Pallas)	8.84	8.09	8.25	8.50	8.50	10.59	8.30	8.00	7.94	9.67	9.50	10.17	8.81
10. Nis Orn	<i>Ompok bimaculatus</i> (Bloch)	11.00	10.67	11.94	11.84	13.33	11.84	11.50	13.00	13.00	10.00	9.94	11.17	11.50
11. Kayzeng	<i>Hystus cavasius</i> (Hamilton)	6.50	7.33	8.67	7.67	7.17	8.67	9.17	9.50	9.17	8.00	6.84	6.84	7.97
12. Kaaang	<i>Puntioplites procto-</i> <i>zyaron</i> (Bleeker)	-	-	-	-	-	10.00	-	-	-	-	-	9.50	9.75
13. Others		7.27	7.50	7.76	8.70	8.94	7.88	7.62	7.92	6.82	7.20	8.84	7.52	7.76
<u>average for all species</u>		7.21	7.00	7.33	7.27	7.35	8.02	7.85	7.99	7.44	7.93	7.89	7.72	7.59

Foot Note: (1) Data from which these statistics were derived were collected from retailers in the market on the 10th, 20th and 30th (29th for Feb.) of each month.

(2) Each figure represent the average of the retail prices of each species in the two markets.

Quantities (kg) of Fresh Fish Recorded at Tha Rua
in 1969

Thai Name	Jan.	Feb.	Mar.	Apr.	May	June	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	All Year
1. Ka	1,871	6,014	5,084	3,591	4,008	3,997	5,757	10,716	24,445	15,793	8,609	8,256	98,051
2. Soi Nok Khao	9,933	24,719	36,904	41,934	44,908	37,114	35,966	11,820	18,564	1,717	1,294	1,128	266,001
3. Khac Noi	12,318	24,122	36,773	48,346	64,914	68,530	35,966	57,837	41,450	17,513	28,836	33,044	469,649
4. Kasoop	1,791	4,493	3,219	1,684	1,545	1,847	1,570	1,700	5,217	1,594	1,175	2,652	28,487
5. Soi Khac	-	-	-	-	-	-	-	-	-	-	1,288	21,762	23,050
6. Chen	2,840	1,624	3,032	5,030	6,720	6,552	6,161	3,743	3,614	5,461	2,165	1,274	48,216
7. Chado	4,091	4,020	5,499	4,760	4,036	5,071	5,443	6,261	7,810	9,256	4,702	6,115	67,064
8. Su	2,008	3,710	6,171	8,527	11,712	11,185	3,182	1,927	1,959	3,271	625	1,092	55,369
9. Salat	5,405	4,883	8,622	9,224	9,503	6,765	8,984	14,256	18,034	10,521	3,776	3,163	103,936
10. Hua Orn	213	638	851	385	823	932	3,207	2,443	2,627	1,085	945	953	15,102
11. Kayang	647	321	598	779	878	4,591	13,749	9,222	13,202	9,199	6,753	5,275	65,214
12. Kamang	-	-	-	-	-	-	-	-	-	-	-	-	-
13. Others	21,270	10,357	13,341	12,198	14,701	14,293	17,865	16,200	18,915	8,461	2,735	4,864	155,200
Total	62,387	84,901	120,094	136,458	163,748	160,877	137,850	136,125	156,637	83,781	62,903	89,578	1,395,339

Source: Department of Fisheries, Ministry of Agriculture.

Quantities (kg) of Fresh Fish Recorded at Tha Rue
in 1970

Thai Name	Jan.	Feb.	Mar.	Apr.	May	June	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	All Year
1. Ka	4,831	4,390	3,424	1,713	2,109	15,580	2,946	11,657	7,296	3,619	2,474	1,856	61,895
2. Soi Nok Kinc	1,611	2,428	4,439	7,063	12,565	17,809	7,250	13,540	9,932	4,225	4,603	6,565	92,094
3. Kinc Noi	39,771	38,508	51,254	60,221	80,172	81,566	67,522	315
4. Kasoep	4,178	4,911	3,069	1,582	1,338	2,844	2,197	3,267	3,098	3,638	3,150	2,938	36,210
5. Soi Kinc	8,212	6,621	1,450	1,487	10,744	7,807	3,888	3,630	5,450	2,993	9,104	11,412	72,798
6. Chcn	1,142	1,498	2,005	2,909	6,306	7,801	7,748	5,894	11,329	5,651	3,153	2,245	57,681
7. Chado	4,282	5,178	4,642	4,790	4,593	4,202	5,185	4,244	2,211	2,707	1,857	1,944	45,835
8. Eu	1,029	863	1,643	1,007	1,997	843	848	927	1,578	4,615	906	1,475	17,731
9. Salat	5,961	8,378	8,257	8,236	10,029	12,189	22,033	21,810	26,491	19,483	7,774	12,795	164,436
10. Nua . Crn	1,709	1,159	1,162	701	1,586	2,421	2,682	4,936	4,521	3,325	3,302	3,838	31,342
11. Kayaeng	3,851	2,932	4,465	3,761	9,028	13,885	13,105	14,012	16,087	6,870	5,061	3,348	96,405
12. Kamng	-	1,053	2,788	1,526	2,137	4,106	3,399	3,831	690	2,804	660	765	29,759
13. Others	4,542	4,302	4,119	3,224	7,287	9,293	7,260	5,669	10,444	3,204	3,247	2,892	65,503
Total	81,119	82,221	92,717	98,220	149,895	181,346	146,083	167,063	150,727	96,849	73,965	82,739	1,402,944

Source: Department of Fisheries, Ministry of Agriculture.

Quantities (Mtp) of Fresh Fish Reported at The Port
In 1971

Fish Name	Jan.	Feb.	Mar.	Apr.	May	June	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	All Year
1. Ka	2,987	1,772	3,548	2,468	3,650	4,612	23,611	27,547	12,363	8,870	7,977	3,110	102,415
2. Soi Nok Khac	11,476	13,705	20,319	25,303	21,212	27,840	57,335	27,664	17,925	2,969	4,168	6,971	236,600
3. Khac Noi	40,380	28,649	31,642	35,145	45,239	66,769	62,741	60,741	37,758	30,563	30,988	42,450	513,065
4. Kasoop	3,310	4,290	6,368	2,708	5,258	6,683	3,400	17,845	4,151	1,610	2,175	2,801	66,399
5. Soi Khac	10,690	21,128	28,144	31,901	71,353	92,900	54,224	28,227	40,301	42,130	16,248	5,848	444,300
6. Chen	2,836	2,120	3,774	4,320	8,535	10,752	6,950	7,268	6,857	5,561	2,200	1,580	62,712
7. Chado	1,767	1,941	3,075	2,891	4,675	5,826	6,865	4,875	4,604	3,676	2,893	1,263	44,451
8. Su	3,378	7,536	8,405	6,809	8,057	10,113	7,788	6,893	8,397	6,321	7,714	5,220	66,367
9. Salat	7,496	5,617	10,326	2,626	19,135	26,773	18,633	25,708	31,856	25,214	14,733	5,743	194,072
10. Hum Orn	2,696	3,141	3,678	4,137	4,615	4,928	11,321	13,833	9,753	7,531	4,533	2,731	72,923
11. Kaysang	3,547	2,154	3,015	3,503	8,403	13,972	17,280	20,587	20,436	12,340	3,056	4,310	112,413
12. Kamang	992	505	1,613	1,137	2,142	6,563	9,733	6,246	3,566	2,440	2,323	1,484	38,800
13. Others	5,306	3,589	8,874	9,733	15,253	17,373	21,267	14,350	16,137	12,301	6,749	4,848	135,586
Total	97,461	96,156	132,731	131,881	218,133	294,837	307,788	261,770	214,154	161,526	105,657	88,057	2,110,103

Source: Department of Fisheries, Ministry of Agriculture.

	<u>Average supply</u>		<u>fresh fish recorded at Tha Rua, 1969-1971</u> (Quantities in kilogram)				
	1969	70	1971	Total	Average	Index	
Jan.	62,387	8 19	97,461	240,967	80,322	96	
Feb.	84,901	8 21	96,156	263,278	87,759	105	
Mar.	120,094	92 717	132,731	345,542	115,181	137	
Apr.	136,458	98 20	131,881	366,559	122,186	146	
May	163,748	149 395	218,133	531,776	177,259	211	
June	160,877	181 346	294,837	637,060	212,353	253	
July	137,850	146 083	307,788	591,721	197,240	235	
Aug.	136,125	16 063	261,720	564,908	188,303	225	
Sept.	156,637	150 727	214,154	521,518	173,839	207	
Oct.	83,781	9 ,849	161,526	342,156	114,052	136	
Nov.	62,903	73,965	105,657	242,525	80,842	100	
Dec.	83,578	82,739	88,059	260,376	86,792	100	
	1,395,339	1,402,944	2,110,103	4,908,386			

Source: Department of Fisheries, Ministry of Agriculture.

Value of Fish Caught in Nam Pong Reservoir in 1966

	W e i g h t (kg)			Total Weight (kg)	1971 Retail ^{3/} Price (฿/kg)	Value (฿)
	Processed ^{1/} Fish	Fresh Fish	Fish Consumed ^{2/} by Fishermen			
Jan.						
Feb.						
Mar.	N O R E C O R D					
Apr.						
May						
Jun.						
Jul.	64,284.2	37,955.0	7,440.0	109,679.2	7.99	876,336.81
Aug.	82,934.6	47,670.0	7,440.0	138,044.6	7.44	1,027,051.82
Sept.	91,805.2	42,128.0	7,200.0	141,133.2	7.93	1,119,186.28
Oct.	29,946.6	28,954.0	7,440.0	66,340.6	7.89	523,427.33
Nov.	14,127.2	11,070.0	7,200.0	32,397.2	7.72	250,106.33
Dec.	10,353.4	10,161.0	7,440.0	27,954.4	7.21	201,551.22
	293,451.2	177,938.0	44,160.0	515,549.2		3,997,659.84

Foot Notes: (1) The figures represent fresh fish equivalents.
The ratios used in converting processed fish are:

Processed fish	=	Fresh fish	
1	=	3	for smoked fish
1	=	2	for salted fish
1	=	.8	for fermented fis. (Pla Ra, Pla Som)

(2) i) Fish consumed by fishermen and their families was conservatively estimated at 0.1 kg. per person per day.

ii) The number of fisherman families is estimated at 400.

(3) Average retail price at Khon Kaen and Udorn for 1971

Value of Fish Caught in Nam Pong Reservoir 1967

	W e i g h t (kg)		F i s h		Total Weight (kg)	1971 Retail ^{3/} Price (฿/kg)	Value (฿)
	Processed ^{1/} Fish	Fresh Fish	Fish Consumed ^{2/} by Fishermen				
Jan.	9,954.8	11,100.0	10,230.0		31,313.8	7.00	219,196.60
Feb.	5,548.6	10,200.0	9,240.0		25,051.6	7.39	185,131.32
Mar.	4,144.2	21,100.0	10,230.0		35,508.2	7.27	258,144.61
Apr.	2,277.0	26,100.0	9,900.0		38,287.0	7.35	281,409.45
May	6,479.4	35,300.0	10,230.0		52,030.4	8.02	417,283.81
Jun.	8,157.0	61,300.0	9,900.0		79,419.0	7.85	623,439.15
Jul.	12,692.0	103,000.0	10,230.0		126,014.0	7.99	1,006,851.86
Aug.	18,456.0	157,900.0	10,230.0		186,649.0	7.44	1,388,668.56
Sept.	15,083.2	175,200.0	9,900.0		200,114.2	7.93	1,586,905.61
Oct.	13,947.0	100,984.0	10,230.0		125,161.0	7.89	987,520.29
Nov.	7,792.0	54,452.0	9,900.0		72,144.0	7.72	559,951.68
Dec.	5,959.0	46,922.0	10,230.0		63,111.0	7.21	455,030.31
	110,490.2	803,863.0	120,450.0		1,034,803.2		7,966,533.25

Foot Notes: (1) The figures represent fresh fish equivalents. The ratios used in converting processed fish are:

Processed fish = Fresh fish
 1 = 3 for smoked fish
 1 = 2 for salted fish
 1 = .8 for fermented fish (Pla Ra, Pla Som)

(2) i) Fish consumed by fishermen and their families was conservatively estimated at 0.1 kg. per person per day.

ii) The number of fisherman families is estimated at 550.

(3) Average retail price at Khon Kaen and Udorn for 1971.

Value of Fish Caught in Nam Pong Reservoir 1968

	W e i g h t (kg)			Total Weight (kg)	1971 Retail ^{3/} Price (฿/kg)	Value (฿)
	Processed ^{1/} Fish	Fresh Fish	Fish Consumed ^{2/} by Fishermen			
Jan.	6,859.0	45,566.0	13,020.0	65,445.0	7.00	458,115.00
Feb.	4,373.0	47,687.0	12,180.0	64,240.0	7.39	474,733.60
Mar.	2,979.0	62,226.0	13,020.0	78,225.0	7.27	568,695.75
Apr.	1,601.0	83,727.0	12,600.0	97,928.0	7.35	719,770.80
May	4,458.0	100,760.0	13,020.0	118,238.0	8.02	948,268.76
Jun.	16,509.0	121,402.0	12,600.0	150,511.0	7.85	1,181,511.35
Jul.	13,798.8	127,851.0	13,020.0	154,669.8	7.99	1,235,811.70
Aug.	11,995.0	107,963.0	13,020.0	132,978.0	7.44	989,356.32
Sept.	13,886.0	112,385.0	12,600.0	138,871.0	7.93	1,101,247.03
Oct.	14,275.0	109,897.0	13,020.0	137,192.0	7.89	1,082,444.88
Nov.	244.0	94,181.0	12,600.0	107,025.0	7.72	826,233.00
Dec.	427.0	95,580.0	13,020.0	109,027.0	7.21	786,084.67
	91,404.8	1,109,225.0	153,720.0	1,354,349.8		10,372,272.86

Foot Notes: (1) The figures represent fresh fish equivalents. The ratios used in converting processed fish are:

Processed fish	=	Fresh fish	
1	=	3	for smoked fish
1	=	2	for salted fish
1	=	.8	for fermented fish (Pla Ra, Pla Som)

(2) i) Fish consumed by fishermen and their families was conservatively estimated at 0.1 kg. per person per day.

ii) The number of fisherman families is estimated at 700.

(3) Average retail price at Khon Kaen and Udorn for 1971.

Value of Fish Caught in Nam Pong Reservoir 1969

	W e i g h t (t)		Fish Consumed ^{2/} by Fishermen	Total Weight (kg)	1971 Retail ^{3/} Price (฿/kg)	Value (฿)
	Processed ^{1/} Fish	Fr h Fi				
Jan.	45,202.1	62 37.5	15,810.0	123,399.6	7.00	863,797.20
Feb.	28,579.4	84 00.1	14,280.0	127,759.5	7.39	944,142.71
Mar.	34,675.6	120 94.7	15,810.0	170,580.3	7.27	1,240,118.78
Apr.	44,407.9	136 55.4	15,300.0	196,163.3	7.35	1,441,800.26
May	65,682.2	163 49.1	15,810.0	245,241.3	8.02	1,966,835.23
Jun.	66,296.6	160 76.7	15,300.0	242,473.3	7.85	1,903,415.41
Jul.	12,954.8	137 49.3	15,810.0	166,614.1	7.99	1,331,246.66
Aug.	4,152.6	136 23.5	15,810.0	156,086.1	7.44	1,161,280.58
Sept.	9,010.4	156 36.2	15,300.0	180,946.6	7.93	1,434,906.54
Oct.	12,607.0	83 781.4	15,810.0	112,198.4	7.89	885,245.38
Nov.	6,453.7	6 903.3	15,300.0	84,657.0	7.72	653,552.04
Dec.	6,058.8	89 577.3	15,810.0	111,446.1	7.21	803,526.38
	336,081.1	1,395,334.5	186,150.0	1,917,565.6		14,629,867.17

Foot Notes: (1) The figures represent fresh fish equivalents. The ratio used in converting processed fish are:

Processed fish	=	Fresh fish
1	=	3 for smoked fish
1	=	2 for salted fish
1	=	.8 for fermented fish (Pla Ra, Pla Som)

(2) i) Fish consumed by fishermen and their families was conservatively estimated at 0.1 kg. per person per day.

ii) The number of fisherman families is estimated at 850.

(3) Average retail price at Khon Kaen and Udorn for 1971.

Value of Fish Caught in Nam Pong Reservoir 1970

	W e i g h t (kg)			Total Weight (kg)	1971 Retail ^{3/} Price (฿/kg)	Value (฿)
	Processed ^{1/} Fish	Fresh Fish	Fish Consumed ^{2/} by fishermen			
Jan.	6,874.4	81,119.3	18,600.0	106,593.7	7.00	746,155.90
Feb.	9,014.5	82,219.8	16,800.0	108,034.3	7.39	798,373.48
Mar.	16,783.2	92,718.0	18,600.0	128,101.2	7.27	931,295.72
Apr.	9,876.8	98,219.7	18,000.0	126,096.5	7.35	926,809.28
May	15,775.4	149,894.3	18,600.0	184,269.7	8.02	1,477,842.99
Jun.	22,358.6	181,346.5	18,000.0	221,705.1	7.85	1,740,385.04
Jul.	14,355.1	146,081.5	18,600.0	179,036.6	7.99	1,430,502.43
Aug.	21,456.6	167,063.4	18,600.0	207,120.0	7.44	1,540,972.80
Sept.	24,894.6	150,727.1	18,000.0	193,621.7	7.93	1,535,420.08
Oct.	12,832.0	96,848.3	18,600.0	128,280.3	7.89	1,012,131.57
Nov.	3,114.8	73,965.0	19,080.0	96,159.8	7.72	742,353.66
Dec.	5,106.4	82,738.0	19,716.0	107,560.4	7.21	775,510.48
	162,442.4	1,402,940.9	220,116.0	1,785,499.3		13,649,415.83

Foot Notes: (1) The figures represent fresh fish equivalents. The ratios used in converting processed fish are:

Processed fish	=	Fresh fish	
1	=	3	for smoked fish
1	=	2	for salted fish
1	=	.8	for fermented fish (Pla Ra, Pla Som)

(2) i) Fish consumed by fishermen and their families was conservatively estimated at 0.1 kg. per person per day.

ii) The number of fisherman families is estimated as follows:

Month	No.
Jan.	1,000
Feb.	1,000
⋮	⋮
Nov.	1,060
Dec.	1,060

(3) Average retail price at Khon Kaen and Udorn for 1971.

Value of Fish Caught in Nam Pong Reservoir 1971

	W e i g h t		Fish Consumed <u>2/</u> by Fishermen	Total Weight (kg)	1971 Retail ^{3/} Price	Value (฿)
	Processed ^{1/} Fish	Fr Fi				
Jan.	7,306.0	97,09.9	21,427.2	126,193.1	7.00	883,351.70
Feb.	4,368.8	96,55.3	19,353.6	119,877.7	7.39	885,896.20
Mar.	1,867.0	132,30.0	23,138.4	157,735.4	7.27	1,146,736.36
Apr.	2,959.6	131,79.0	22,392.0	157,230.6	7.35	1,155,644.91
May	4,100.8	218,30.5	22,161.9	244,393.2	8.02	1,960,033.46
Jun.	6,114.4	294,36.2	21,447.0	322,397.6	7.85	2,530,821.16
Jul.	9,054.0	307,38.0	21,185.4	338,027.4	7.99	2,700,838.93
Aug.	18,496.0	261,21.3	21,185.4	301,402.7	7.44	2,242,436.09
Sept.	6,332.0	214,153.7	21,015.0	241,500.7	7.93	1,915,100.55
Oct.	4,196.0	161,525.5	21,715.5	187,437.0	7.89	1,478,877.93
Nov.	4,436.0	105,656.6	21,528.0	131,620.6	7.72	1,016,111.03
Dec.	5,028.0	88,057.6	22,245.6	115,331.2	7.21	831,537.95
	74,258.6	2,110,093.6	258,795.0	2,443,147.2		18,747,386.27

Foot Notes: (1) The figures represent fresh fish equivalents. The ratios used in converting processed fish are:

Processed fish = Fresh fish
 1 = 3 for smoked fish
 1 = 2 for salted fish
 1 = .8 for fermented fish (Pla Ra, Pla Som)

(2) i) Fish consumed by fishermen and their families was conservatively estimated at 0.1 kg. per person per day.

ii) The number of fisherman families are estimated as follows:

Month	No.	Month	No.
Jan.	1152	Jul.	1139
Feb.	1152	Aug.	1139
Mar.	1244	Sept.	1167.5
Apr.	1244	Oct.	1167.5
May	1191.5	Nov.	1196
Jun.	1191.5	Dec.	1196

List of Villages in the Nam Pong Reservoir

(This list has been so arranged that it begins with the first village south of Tha Rua, then moving clockwise around the reservoir until the round is completed)

1. Non Hin	โนนหิน
2. Pai Khao	ป่าขาว
3. Fai Hin (Neua)	ฝายหิน (เหนือ)
4. Nong Yai	หนองใหญ่
5. Come Bao	คำเบา
6. Non Sawang	โนนสว่าง
7. Kaeng Sila	แก่งศิลา
8. Phu Khao Wong	ภูเขาวง
9. Tung Jode	ตุงโจด
10. Non Hin Kong	โนนหินกอง
11. Don Kok	ดอนกอก
12. Nong Phue	หนองฝือ
13. Don Kranuan	ดอนกระหนวน
14. Hua Lo	หัวโล
15. Pho Tak	โพธิ์ตาก
16. Non Tong	โนนทอง
17. Ban Kong	บ้านกง
18. Hin Hae	หินแห่
19. Kud Hin	กุดหิน
20. Kok Bok	กกบก
21. Kut Khrai Nun	กุดไคร้ nun
22. Non Taen	โนนแตง

23. Nong Saeng	หนองแซง
24. Nor Moung	โนนม่วง
25. Ko' ɛ Ei-Kaew	โคกอีแกว
26. No Kung Chern	หนองกุงเจริญ
27. Tu Po	ทุ่งโพธิ์
28. Hu Yao	ห้วยยาว
29. Hi Tum	หินดำ
30. No Klang Kok	หนองกลางโคก
31. Na a	นาหว้า
32. Nor Muad Ae (Tai)	เหมือดแอ่
33. No Udom	โนนอุดม
34. Hi Lard (Tai)	หินลาดไ้
35. No Sa-Ard	โนนสะอาด
36. K'ud Nam Khieo	กุดน้ำเขียว
37. Khao Klang	เกาะกลาง
38. Sa Dao	สะเดา
39. Fai Hin (Tai)	ฝายหินไ้
40. Nong No	หนองโน
41. Soke Hang	โศกห่าง
42. Ban Come	บ้านคำ
43. Huey Kee Nu	ห้วยขี้หนู
44. Kok Khor	กกคอ
45. Kut Kaen	กุดแคน
46. Song Pluei	สงเปลือย
47. Kut Pla Thao	กุดปลาเช่า
48. Pong Sung	โป่งสังข์
49. Nong Ploung	หนองพลวง

50. Nong Phak Vaen	หนองผักแว่น
51. Kut Duke	กุดดุก
52. Non Rong Rien	โนนโรงเรียน
53. Nong Pu	หนองพุ
54. Kut Tang	กุดตัง
55. Ban Moung	บ้านม่วง
56. Nong Na Come	หนองนาคำ
57. Koke Na Fai	โคกนาฝาย
58. Non Larn	โนนลาน
59. Nong Kharm	หนองขาม
60. Kut Ke	กุดเข้
61. Koke Moung	โคกม่วง
62. Saeng Mon	แซงมด
63. Kut Houa Hat	กุดหัวแฮด
64. Ban Kha Noi	บ้านขาน้อย
65. Huey Bong	ห้วยบง
66. Moung Chume	ม่วงชุม
67. Hin Lard (Neua)	หินลาด (เหนือ)
68. Huey Pai	ห้วยไผ่
69. Non Thong	โนนทอง
70. Kut Khoo	กุดคู
71. Huey Mali	ห้วยมะลิ
72. Non Muang	หนองเหมือง
73. Tha Lard Noi	ทาลาดน้อย
74. Tha Lard	ทาลาด
75. Kut Hin	กุดหิน
76. Non Hin Hae	โนนหินแห่

77. Nong Muad Ae (Neua)	หนองเหมือดแอ่ (เหนือ)
78. Sila	ศิลา
79. Nonḡ Yai	หนองใหญ่
80. Ban ḡk Noi	บ้านโกลกน้อย
81. Non ḡn	โนนหิน
82. Kok ḡai	โคกใหญ่
83. Tha ḡuen	เขาหมื่น
84. Nonḡ Sa Baeng	หนองสะแบง
85. Nonḡ Pa Na	หนองตานา
86. Tap ḡwai	ทัพควาย
87. Kok ḡkarm	กกขาม
88. Sam ḡiem	สามเหลี่ยม
89. Kok ḡklang	โคกกลาง
90. Non Phu Khao Tong	โนนภูเขาทอง
91. Song Pluei	สงเปลือย
92. Kut Chim	กุดฉิม
93. Nong Thum	หนองทุ่ม
94. Khai Sam Khar	ไถสามขา
95. Tun Jai	ทันใจ
96. Hua Pu	หัวภู