Fishermen of the Middle Mekong

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RÉSUMÉ

Cet article tente de fournir des renseignements de base sur les types de pêche pratiqués dans la section du moyen Mekong et ses affluents. L'auteur tente d'inventorier les types de changements que les pêcheurs auront à effectuer pour exploiter leur milieu maintenant modifié par la construction d'un barrage.

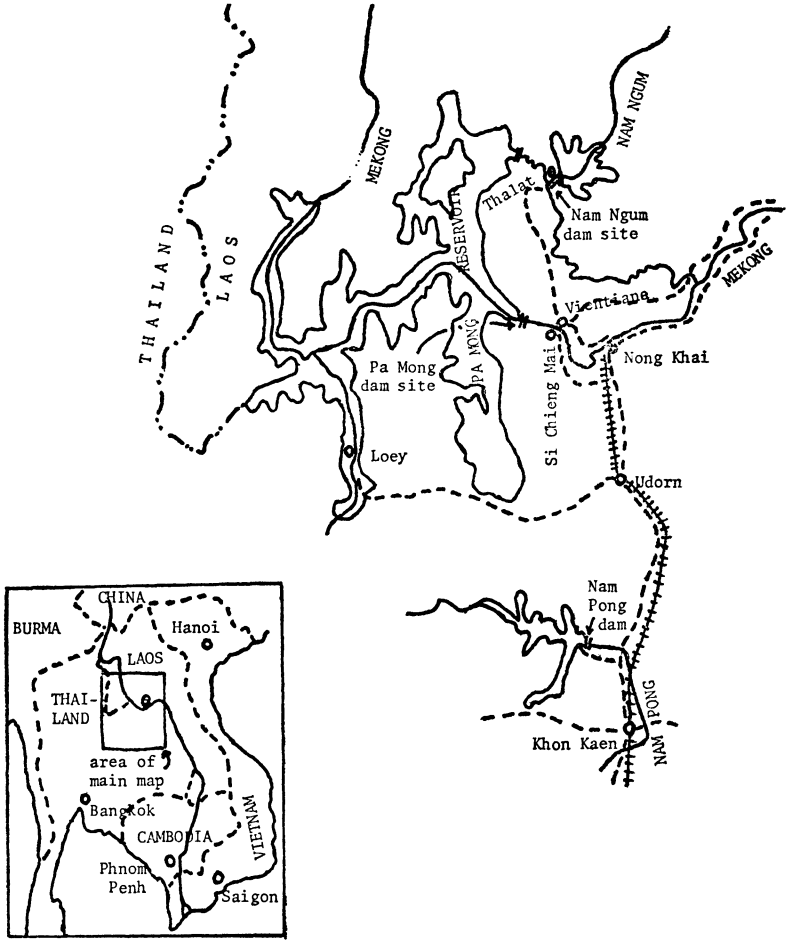
"The Mekong[1] River... one of the mightiest streams in the world is in the process of being harnessed for the advantage of mankind. Either directly or indirectly, some 40 million inhabitants in this corner of Asia stand to benefit from the multiple uses of running water" (Schaaf and Fifield 1963:3). One of the resources of the Mekong River which is of great present significance and of even greater future potential is fish. While some information exists in regard to the organization of human groups for harvesting this resource in the lower reaches of the Mekong (Bardach 1959; d'Aubenton 1962-63; Fily 1962-63),

[1] Field work was carried on during the summer of 1969. The bulk of the time was spent in observing and interviewing fishermen and fisheries advisors along the Mekong itself (from Nong Khai upstream past the proposed Pa Mong dam site to King Amphur Song Kam.) Shorter periods were spent investigating the fishing operations on the Nam Pong reservoir recently created by the construction of the Ubolratana dam in Changwat Khon Kaen, and on the Nam Ngum (in the vicinity of the proposed Nam Ngum dam site) in Laos. Throughout the period of field work attention was given to the economic chains by which the fish pass from fisherman to the ultimate consumer.

The research was supported by a grant from the Southeast Asia Development Advisory Group, and forms a part of a coordinated program of research undertaken, with SEADAG support, by a group of social and biological scientists who had been meeting regularly during the academic year to discuss with officials from government and various international agencies problems of Mekong development. In addition to SEADAG support, supplemental support for all research activities while in Thailand and Laos was generously provided by the Office of Regional Development of the American Embassy, Bangkok.

little is known of the situation further upstream. This area focused on Vientiane, the administrative capital of Laos, and the Thai town of Nong Khai is of particular interest as it is here that planning for a major, multipurpose dam project is furthest advanced (Bureau of Reclamation 1970). This dam, Pa Mong, will dramatically alter the environment upstream, changing a swiftly flowing river into a reservoir close to 4,000 square kilometers in extent (see figure 1).

FIGURE 1. — *Map of the Mekong Basin, Northeast Thailand and Laos*



The present study is an attempt to provide some base-line information on the types of fishing activity presently engaged in on this section of the Mekong and its tributaries, and to assess some of the types of adaptive changes fishermen will be required to make in order to exploit this changed environment. Unfortunately, socioeconomic survey data on fishermen of this section of the river (Maskasme 1968), although meticulously collected, tend to becloud a factor of fundamental importance in considering the problems of development in the area, that is, the ethnic identity of the groups involved in fishing activities. Perhaps even more unfortunate is the fact that this failure to differentiate between two groups presently exploiting the river's resources has been perpetuated in the *Pa Mong Stage One Feasibility Report* (Bureau of Reclamation 1970:ix,6).

MAINSTREAM FISHING

In general, neither the Thai nor the Lao are full-time or commercial fishermen. Almost every family in the villages along the Mekong (as well as in nonriverine villages) devotes a portion of its daily activity to catching fish. However, the fish are specifically sought as food, not for sale. The family living in a permanent village along the river either owns or has access to agricultural lands, and the pursuit of agriculture is considered the family's chief occupation. For fishing to be undertaken in a systematic, commercial fashion it would require not only releasing one or more productive members of the family from farming, but also would involve capital expenditure for more elaborate fishing gear. Furthermore the farmer shies away from involvement in co-operative ventures, such as would be required for efficient large-scale fishing; he is suspicious of his neighbors, especially when his own financial resources are involved.

Villagers along the river report occasional daily catches for consumption of up to two kilograms per family. However, the average daily catch tends to be only a kilogram or less. Villagers also feel that over the last fifteen to twenty years the quantity of fish caught in the river has decreased significantly. They attribute this to the use by "other villages" of vastly improved gear. If there is any basis in fact to the villagers' contention,

it is probably due to an increased Vietnamese fishing population (see below) rather than to any improvements in fishing gear.

To the Thai and Lao peasant, fishing is an enjoyable pastime as well as a subsistence occupation. Men look forward to making an overnight jaunt to a particularly good fishing site. They also on occasion go fishing to avoid arduous agricultural tasks such as transplanting rice. Groups of children on their way home from school are constantly seen splashing through the smaller rivers and flooded fields in pursuit of enjoyment, and also fish. Groups of women frequently sit together and gossip, relaxing from normal household chores, while working their dip nets in shallow spots in the river or in nearby ponds and fields.

As one moves farther downstream, there appears to be a gradual increase in the rate of villagers' exploitation of river fish. This takes the form of seasonal blocking of larger and larger tributaries and finally, in the area of Khone Falls, the Mekong itself. Tributary damming customarily occurs at the end of the rains when fish are returning to the Mekong after spawning. A catch of six tons at one of these dams is not uncommon. However, as all fish in the tributary are caught regardless of degree of maturity, widespread adoption of this method would have serious consequences for populations of the species concerned. The damming of the river at Khone Falls, although illegal, is done twice a year — as the fish ascend the river to spawn and again at their descent after spawning. The Laotian government is attempting, with only partial success, to prevent this form of fishing in the river.

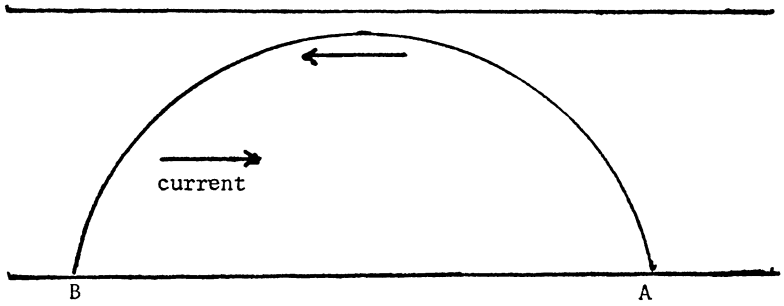
It is reported that the surveyed section of the Mekong annually yields a fish harvest of some 2,300 metric tons (Pantulu and Vardach 1969). This marketable harvest is not produced by the Thai or Lao villager, but by a large Vietnamese population (over 50 per cent of the total population in certain amphurs of Nong Khai). The Vietnamese population is largely on the Thai side of the river, thus explaining the far smaller amount of fishing activity on the Lao side. These fishermen have no permanent villages, but set up temporary camps of river-grass huts on the low-water sand bars of the river, moving, as

the river rises, to higher but still gently sloping ground. Such a camp may consist of only one family dwelling, but more common is a camp consisting of four or five related families, each in its own hut. The largest such camp observed during this study consisted of fourteen houses. In theory, at least, the land on which the camp is erected belongs to a particular permanent village, and the squatters are obliged to pay rent to the village. However, in most cases the rent appears not to be paid. Unlike the fishing camp sites on the islands of the Nam Pong reservoir (see below) the river camps are not physically isolated from the permanent villages, but their social isolation is just as complete. Because they are a migrant, refugee population, ethnically distinct from the Thai villagers, they have no access to the social life of the village, nor to its religious, educational, medical, or protective facilities. Characteristically, even the path leading from the camp to the road on which the village is located and over which the fish must be transported to market does not enter the village but skirts it, even at the expense of involving a greater distance.

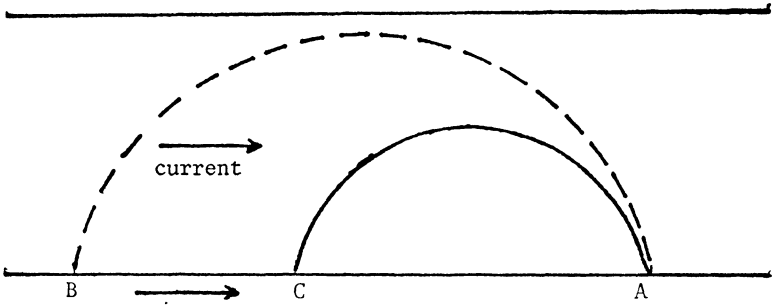
Fishing in these camps is a full-time occupation, except during the time of very high water, when the fishermen go inland attempting to find wage labor. Generally, all members of the camp, if it is small, co-operate in the major operation; if it is a large camp, subgroups of twelve to twenty members (women and children included) are formed on the basis of closeness of kinship to undertake these tasks. On the Mekong itself most of the fishing is done with the *mong* or large gill net (see figure 2), while near the mouths of the tributaries and in two or three sheltered (and more permanent) locations on the mainstream, the Vietnamese fisherman makes use of the *sadung,* a large dip net operated from a floating base (see figure 3).

Two factors tend to differentiate the *mong* fishermen from the *sadung* fishermen. In the first place the working unit is somewhat smaller in the latter type of fishing. A man and wife can manage to operate the equipment alone, but a family of four or five is preferable. If assistance is required from someone not belonging to the nuclear family, he is either given

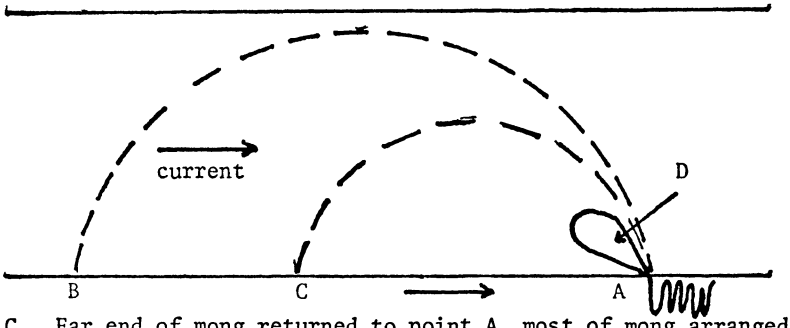
FIGURE 2. — *Operation of the* mong *or Large Gill Net.*



A. Mong secured at point A, paid out from boat in arc to point B.

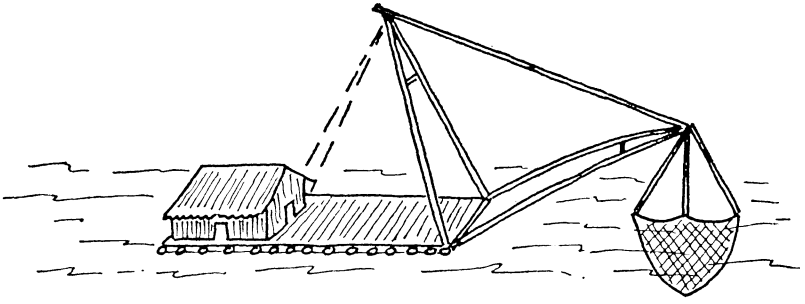


B. As group hauls in mong at point A, one or two men (C) return along shore toward point A with far end of mong.



C. Far end of mong returned to point A, most of mong arranged on beach, hauling group removes fish from small net circle D.

FIGURE 3. — *The* sadung *or Large Dip Net.*



an equal share of the catch or is repaid by reciprocal labor (in any case, he is a member of the same camp and, therefore, a relative). The second differentiating factor is that because of the size and basic unseaworthiness of the *sadung,* these fishermen usually live in semipermanent or even permanent camps (they are still considered camps because of the impermanent construction of the dwellings). Such permanence greatly facilitates the exercize of administrative control. One of the least popular measures of control (and apparently enforced only among the Vietnamese fishermen in Thailand) is a closed season on tributary fishing during the spawning season from the middle of June until the end of September. Fishermen thus must run the risk of arrest if they continue fishing, move to temporary camps along the mainstream, or pursue a temporary, nonfishing occupation, such as wage labor or duck raising.

In neither of these types of commercial fishing are the yields particularly great. An average haul of the gill net (which takes about one and one-half hours and involves four to six people constantly with up to fourteen during the hauling in of the net) produces only about four to five kilograms of fish; no fisherman interviewed could recall a haul yielding more than twelve kilograms. The dip net may yield considerably more per haul, particularly when large quantities of fish are migrating up or down the tributary, but the yield is less certain and many hauls produce nothing. Thus each type of fishing probably yields a daily average of no more than twenty kilograms of fish. The fish caught during the day are stored live in submerged baskets

until the following morning, when they are either collected by a wholesaler or transported to market by a member of the fisherman's family.

As is pointed out by Pantulu and Bardach (1969), "fishing techniques and gear are generally inefficient and inadequate, and admit of improvements." By far the most common type of fishing gear in the area of the Mekong surveyed was the gill net. These nets varied in size from small, relatively fine-meshed nets, 40 to 50 meters long that could be handled by a man alone or working with his wife, to large, big-meshed nets up to a kilometer long requiring twelve to fifteen persons to handle. In no case was the gill net of great depth, the deepest observed being less than two meters. Use of the larger nets was confined to the Vietnamese fishing camps, discussed above, and the labor to set and haul them was recruited from the group of coresident kinsmen. Many of the smaller nets, usually set drifting from a small boat, were also operated by Vietnamese; however, a small number of Thai and Lao were also observed using such gear. In all, on the stretch of river between Nong Khai and Si Chieng Mai (a stretch of almost 50 kilometers), 45 gill netting operations were observed in the course of one morning. During the same period, only five *sadung* were noted, located at the mouths of tributaries or in sheltered spots along the river. Because the *sadung* cannot be operated in very swift water, there were undoubtedly far fewer at this time than during periods of lower and slower water in the river; and, of course, as pointed out above, many of the *sadung* (whether operating legally or not) are located slightly up the tributaries, out of sight from the mainstream.

A large number of minor types of fishing gear were observed along the river, and also in the inland ponds and flooded fields. Such equipment as casting nets (used by men), small dip nets (used by women and children), a variety of traps and weirs, and hooked lines suspended from poles in the river are to be found wherever there is water. While by far the most numerous type of equipment, this gear is of little or no commercial importance, although it is of considerable significance in providing the farm family with protein.

Three illegal methods of harvesting fish in the Mekong have been reported as being fairly widespread. The first of these was mentioned above, namely the practice of totally blocking the mouth of a tributary stream, or in places the mainstream itself, and harvesting all the fish moving in either direction. The two other methods, apparently far more prevalent on the Laotian side of the river, involve the use of explosives (dynamite or, more often, hand grenades) and poisons (usually in the form of insecticides.) While all three of these fishing methods result in large marketable harvests, their continued use would obviously be disastrous to long-range fisheries development. Thai fisheries officials working with local police and administrative personnel have been fairly successful in halting the first practice; and totally so, if reports are to be believed, in halting the latter two. In Laos, where the number of fisheries officers is totally inadequate for their manifold tasks, it is alleged that it is the police and military (who have access to the materials) who are in fact reaping the illegal fish harvests.

RESERVOIR FISHING

With the completion of the Ubolratana dam across the Nam Pong in 1965, significant changes began to occur in the patterns of local fishing. Most dramatic was the transition, as the reservoir filled, from small-scale subsistence fishing along the Nam Pong and its minor tributaries to a relatively large-scale commercial fishery on the reservoir in association with a number of sales and distribution points along the shore. Of particular relevance is the fact that these developments were not planned in advance; in fact neither the fishermen nor the distribution points "are supposed to be there" at all. As in the case of mainstream Mekong fishing it is important to differentiate between the commercial fishermen and the subsistence fishermen operating on the Nam Pong reservoir. The latter, again, are primarily farmers living in settled villages and fishing largely for the use of their own families. These part-time fishermen do occasionally, particularly during slack periods in the agricultural cycle, devote sufficient time to fishing so that they produce a marketable

surplus; but evidence indicates that their contribution to the total commercial fishery of the reservoir is relatively insignificant.

By far the most important element in commercial reservoir fishing is the group of migrant, full-time fishermen. Because of the impermanence of their settlements, an accurate assessment of the full-time fishing population and its fluctuations since the filling of the reservoir is difficult to make. On the basis of observations of the present study, there are possibly as many as one thousand full-time fishing families on the reservoir. It is probable that this represents a total decrease in population from a peak in 1966 or 1967. A major factor in this population decrease is the fisherman's dissatisfaction with life on the reservoir. This includes not only the fact that the fishing camps are isolated and lack any form of organized community services, but also the fact that the traditional "good life" is the life of a rice farmer. Thus there has been a large turnover in the reservoir fishing population. At first, the majority of the fishermen were people whose lands and villages had been flooded out by the reservoir. As these people were able to move off onto agricultural land either in a resettlement area or in an established village, their place was taken by others from farther away wishing to acquire money through fishing to enable them to settle permanently as agriculturalists. Today a majority of the people coming to the reservoir as fishermen are moving from the central plains, where conditions of tenancy or loss of land have driven them to seek the same route to permanency.

Because, as on the Mekong, fishing conditions are best on the gently sloping reservoir shores, seasonal water-level fluctuations render it impossible to have villages permanently situated on the shore. In fact, a village which is right at the edge of the reservoir during high water can be as far as three kilometers from the closest access to the reservoir where the most productive fishing is carried on. Consequently, practically all the settlements from which commercial fishing is done are temporary camps composed of tiny, bamboo and grass dwellings, and lacking in any form of sanitation or health facilities, schools, temples, or formal means of social control. Unlike the fishing camps along the Mekong River, however, these camps often

contain up to twenty dwelling units, each housing a nuclear family; but there are no ties of kinship binding the families of a community together. In fact, the resident families of a single camp may come from as many as five different changwats. Arguments are common, thefts of fish from the nets of others or of the nets themselves occur quite regularly, and, unless there is a particularly forceful man who can serve as mediator within the camp, these often lead to violence and the break-up of the camp.

Land on which the fishing camps are situated is for the most part included within the area of the reservoir (at full high water) and as such is the property of the Northeast Electricity Authority. Occupancy of this land is illegal (the fishermen interpret this to mean that they should be paying rent for the use of it); however, the almost impossible task of removing "squatters" has not been, nor is it likely to be attempted. As indicated above, social tensions not uncommonly cause the movement of at least a portion of a fishing camp to another location. Real or imagined shifts in the concentration of reservoir fish also contribute to mobility. The greatest movement occurs during the rice-growing season, when high water reduces the numbers of fishing shoals and when the opportunities for agricultural wage work or other labor are most abundant. The fishermen are generally not happy with their existence on the reservoir. Specific grievances include: (1) the lack of any formal authority to control theft and social conflict; (2) insufficient income, for which blame is placed less on profits taken by various middlemen and relatively inefficient fishing gear than on the government's failure to stock the reservoir with fish; and (3) the forests of trees left standing in the reservoir basin, which frequently cause great damage to nets and which preclude the use of more efficient, deeper reaching equipment.

Permanent villages located near the reservoir edge have felt the effect of the reservoir mainly in terms of loss of rice-growing land. While individuals affected were compensated for what they lost, the gradual decline in water level has caused some of the lost land to be usable once more, leading to numerous disputes over rights to the new lands. Fishing in these

communities has tended to increase considerably, but only as a secondary, subsistence occupation. During low water the reservoir is relatively inaccessible to the village, while at high water, when fish resources are accessible, the population is engaged in heavy agricultural activities.

Fishing gear is similar to that used on the rivers, but the special conditions of reservoir fishing cause some forms to be more popular than others. Subsistence fishing techniques along the shores of the reservoir and in the tributary streams and channels are similar to those elsewhere: small dip nets, casting nets, relatively few traps, and the use of small gill nets no more than two meters in length which can be set by one man across a small tributary or channel. On the reservoir itself, by far the most common type of gear is the drift gill net. These are set by the fisherman from his boat in the late afternoon and pulled in the morning. The fishermen have experimented with daytime netting but find that the larger night yields outweigh the greater opportunities for theft and damage by submerged trees. While these nets are relatively expensive, costing up to three hundred baht ($15), most of the firshermen fully own their equipment and do not appear to be involved in debt relationships with middlemen or suppliers. Both large dip nets (*sadung*) and long lines have been tried by the reservoir fishermen, but have been found to yield fewer fish than the gill nets; because of submerged vegetation, drag netting has not been attempted. Considerable use, however, is made of "jack-light" spearing of larger fish. As on the river, a certain amount of illegal dynamiting, use of insecticides, and electric shock is practiced on the reservoir. Fisheries officials are concerned about these practices, but are unable to enlist the co-operation of the police in controlling them.

Fisheries officials are presently completing a survey of yields from the Nam Pong reservoir (only the two landing sites in Changwat Khon Kaen, but not the one in Changwat Udorn), and until its publication only rough estimates of yield and their changes from year to year can be made. Bardach (1968) estimates a total annual yield of some 1,400 metric tons per year, while FAO estimates an annual yield of some 680 metric tons in 1965-66, the first year of impoundment (Sidthimunka *et al.* 1969).

Since 1968, both fishermen and fish wholesalers feel the total yields have been decreasing. However, it is possible that this represents in fact a small annual increase in fish population, but a more significant reduction in the population of active fishermen. The fishermen are unhappy and would like to see massive government stocking; the middlemen are quite satisfied as there is no glut on the market and prices can be kept high.

The fishing operations observed along the Nam Ngum, just downstream from the site of dam construction generally conformed to the pattern of Thai-Lao subsistence fishing. Most of the activity on the river involved the use of casting nets operated from boats, and fishing gear for sale in the shops of Ban Thalat consisted exclusively of these nets. Reports indicate that individual fishermen harvest a surplus more frequently than Thai and Lao fishermen along the Mekong. This is sold in the local market, making up the bulk of its fish supply; thus on an average of two or three days a week nonfishing families of the area may be able to purchase fish.

In order effectively to exploit the fisheries resources of the Nam Ngum reservoir when it comes into existence, a number of problems will have to be overcome. First of all, as Laos lacks the degree of population pressure found in Thailand, much of the Nam Ngum fishing activity will probably be in the hands of local fishermen. Judging by the observations of this study, considerable effort will have to be put into training the fishermen in the use of new gear and equipment. (This problem will be less acute for Pa Mong, an area in which, because of the size of the present river, fishermen are already employing relatively sophisticated techniques.) Present fishing activity in the area is on a completely individual basis. It is felt by many officials and advisors, however, that proper exploitation of the reservoir will demand some form of supra-individual co-operation. So far, workers in the area have had little success in producing this type of co-operation in any of their projects (it is reported that the Pathet Lao have had some success in "communalizing" villages in their areas of control). The general problem of tree clearance to facilitate types of deep fishing is complicated in the Nam Ngum reservoir basin by political and security

considerations. It is still uncertain how timber rights (estimated to be worth five million dollars) will be allocated, or if they will be at all. Assuming that they are, the problems of security and access still remain; the reservoir basin is an area of rather firm Pathet Lao control. In order to avoid some of the problems encountered on the Nam Pong reservoir, adequate planning should be undertaken for landing sites with access to major markets. Although a rim road around the reservoir is planned, no thought appears to have been given to fish wholesaling and distribution facilities; in fact, it is rumored that all lands around the reservoir have been, or soon will be, allocated as bungalow sites to elite families from Vientiane.

POND AND FIELD FISHING

Fishing in ponds, both natural and artificial, and in flooded rice fields is widespread throughout Laos and Thailand. While of little commercial importance at present, there is considerable potential for development of these resources, and both the Thai and Laotian governments are encouraging farmers to increase their pond and field production. In general, this fishing is identical to the subsistence fishing on the Thai and Lao farmer along the rivers and reservoirs, relying almost entirely on the natural fish populations and employing the same simple and inexpensive gear. One added harvesting technique, which often produces a surplus for intravillage distribution, involves scooping the fish out of the mud after water has been drained off the rice fields. On some of the natural lakes and ponds in Changwat Nong Khai, "inland fisheries" are somewhat more developed. The equipment is the same, but usually with the addition of a boat from which men operate their casting nets. Such lake fishing is for the most part subsistence oriented, but a small surplus is usually produced which can be marketed directly by the fisherman's wife, or through a wholesaler. The cash returns from this "subsistence-plus" fishing are minimal, but they do provide a slight margin of difference between these people and those who market no fish at all.

Both the Thai and Lao fisheries departments are involved in programs of research, extension, pond engineering, and breed-

ing of tilapia and carp stock. It is anticipated by officials that these activities can be naturally expanded when and if it seems desirable to stock present or planned reservoirs with fish (at Nam Pong this desirability will be assessed, in part, in terms of the findings of the fish census presently nearing completion). The Lao fish propagation stations are expected to become self-supporting after their first year of operation (1970). For instance, the station at Nong Teng expects to produce 1,300,000 carp and tilapia fingerlings for sale to farmers at three kip (approximately 1¢) each, and in addition some 35 tons of adult fish for sale in the Vientiane markets at an average price of 550 kip ($1.10 free exchange) per kilogram.

Many officials consider that the breeding-extension-stocking programs have been of relatively great success, but in fact little control, or even observation, has been exercised after the farmer has been provided with his fingerlings. The assumption is that the farmer manages his fish efficiently and thus significantly adds to the protein intake of his family (as this is presumed to be a subsistence rather than commercial activity). It is true that a number of private fish farms run by officials and military men, where the fingerlings are carefully protected and maintained, have resulted in handsome profits for their owners (these fish are raised to be marketed). However, some experts seriously question the success of the stocking programs aimed at the farmer. Even the government stations are experiencing fry and fingerling mortality rates often as high as 85 per cent. At Nong Teng an elaborate fence had to be erected around the open tanks to keep snakes and frogs from decimating the fish population. In addition to this, farmers' ponds rapidly become clogged with destructive aquatic weeds. Perhaps the most serious problem of all is the very common practice in both Thailand and Laos of a farmer coming to the fisheries station, purchasing a plastic bag full of fingerlings, and taking them home for his wife to cook for dinner.

MARKETING

The social and economic processes involved in getting the fish from the fisherman to the ultimate consumer are basically the same throughout the area of the present study. The variations

which do occur consist simply of the addition or removal of links in the economic chain, always in the middleman position. While the general pattern is for the fisherman to sell to a middleman-wholesaler who in turn sells the fish to the retailer in the market, fishermen near the market center sometimes sell directly to the retailer (direct sales to the consumer by the fisherman do not occur). On the other hand, particularly where distances from the fishing grounds to the market are great, intermediate boatmen and truckers may be added to the chain. This latter situation will be discussed further below in connection with reservoir marketing problems.

Along the Mekong it is customary for the wholesaler to visit a fixed group of fishing camps early each morning. Here the fish, which have been caught the previous day and stored in basket cages, are sorted according to species and size and bought by the middleman. In some cases the fishermen meet the wholesaler on the village road, at the end of the path leading to the fishing camp, to accomplish the sale. In any event each camp ordinarily deals with only one wholesaler, who thus obligates himself to take all but the smallest and most inferior fish. On the Thai side of the river, middlemen, like fishermen and also the retailers, are usually Vietnamese. In addition to the local supply of fish, most wholesalers receive a fixed daily shipment of fish from Bangkok and Khon Kaen. Only the wealthier wholesalers, dealing with large volumes, import marine fish, but almost all receive at least a small daily consignment of Central Thai catfish. With his local and exotic fish on hand, the wholesaler determines on the basis of quantity and quality how best to dispose of his local fish. Better quality fish, and average fish if there is a local surplus, are passed on to agents for sale in Vientiane; the rest is taken to the local market for retailing. At this stage various types of relationships are possible. The wholesaler may actually hire women to sell his fish; he prefers this arrangement if he can be sure of a large and regular supply, as in this way he can retain a greater share of the sale price. Another arrangement popular with large volume wholesalers is to contract for regular sale a fixed amount of fish at a fixed price to a constant group of retailers. Probably most of the middlemen are content with simply selling their fish on a

competitive basis to any interested retailer. While this method exposes them to the dangers of downward price fluctuation, it does not require them to provide a fixed amount of fish daily. Finally, some of the least well-established wholesalers may market their fish directly to the consumer. This alternative is not a popular one, as all the wholesalers are male whereas the retailers are mostly women. It is probably only resorted to as a temporary expedient when the wholesaler has an extremely small supply of fish.

It is clear that the demand for fish in the markets of northeast Thailand and Laos far exceeds the supply. Fish stalls are almost invariably bare within two hours of the delivery of the fish. Furthermore, from one-third to over one-half of the fish in any major market in the area, including Khon Kaen, has been imported from outside of the area. The proportion of fish from various sources in the Laotian markets is variable, both from market to market and from day to day, but the following daily figures are illustrative. In one Vientiane market total sales included 122 kilograms of sea fish from Thailand, 181 kilograms of pond and field fish from Laos, 170 kilograms of fresh water fish legally imported from Thailand, and another 192 kilograms of Mekong River fish, probably largely brought over informally from the Thai town of Si Chieng Mai. In the larger evening market in Vientiane total sales included 882 kilograms of Bangkok sea fish, 400 kilograms of legally imported Thai fresh-water fish, and 1,077 kilograms of "Lao" fish, including Mekong fish, a portion of which certainly came from Thailand. The situation in Savannakhet is similar; in one market survey it was found that 168 kilograms of Thai fish were sold as compared with only 81 kilograms of Laotian fish. There seems no question that there will continue to be a demand for whatever fish resources can be developed in future reservoirs in the area.

There is considerable variation in the retail price of fish (e.g., from about five baht (25¢) per kilogram for various small fish no longer than about thirty centimeters, to forty or fifty baht ($2.00 to $2.50) per kilo for some of the choice large river fish). However, there is relatively little variation in price paid the fisherman, which varies from three and one-half to five baht

(17¢-25¢) per kilogram. For the great majority of fish caught (and sold) the fisherman can expect to sell at four baht (20¢), the wholesaler sells to the retailer at eight baht (40¢), and the consumer pays ten baht (50¢); if extra links are added to this chain, their profit comes from the wholesaler's share. Thus a fisherman with a near maximum catch would have a daily income of forty baht ($2.00); a large wholesaler with standing orders of twenty kilograms from 25 retailers would receive 2,000 baht ($100), out of which he must maintain his truck and generally provide ice; and the retailer would make forty baht ($2.00). Because of the price variation mentioned above, the retailer is often in a position to profit more, as her mark-up on some of the most desirable fish may be as high as ten baht (50¢) per kilogram.

An important difference exists between river fisheries and reservoir fisheries in terms of their location relative to market centers, and this difference is felt most strongly in terms of marketing activity. Many of the market centers in northeastern Thailand and in Laos are situated on rivers; those that are not have well established transportation and communication channels connecting them with river villages. Reservoirs, on the other hand, tend to be located in sparsely populated areas where transportation to market centers is neither well established nor, in terms of distance, convenient. Because a river runs through a populated area, there are multiple points of access to the shore and markets (e.g., the fishing camps along the Mekong can sell their fish at the camp or at various points along the parallel road). Reservoirs have relatively few points of access to shore transportation (e.g., there are only three roads, one of which is mostly paved, linking the Nam Pong reservoir to outside markets), thus requiring that all the fish and all the land transportation converge at one or a few locations.

The situation at Tha Ruea, the major landing site of the Nam Pong reservoir, illustrates some of the problems that can be created by this situation as well as the solutions that are developed to meet them. In the first place, the town itself arose almost spontaneously to meet the demand for a central landing and distribution point. Land on which it is built is either owned

by the fisheries department or the electricity authority, neither of which was consulted before the town started to develop. Its access road out to the paved highway connecting the Ubolratana dam with Khon Kaen and Udorn developed through use; nobody has assumed responsibility for maintaining it. Likewise the town itself, not having been properly authorized, is ignored by government agencies: "it doesn't legally exist." Consequently it has been provided with no public facilities whatever.

However, the town is serving an indispensable function, and one which will have to be served on any reservoir where fisheries are allowed to develop. Through this one center an estimated two or three tons of fish pass daily. The immediate impression is one of utter confusion. Up to five hundred people, struggling through ankle-deep mud to transfer baskets of fish from boat to shore, and then, often fish by fish, transferring them into the baskets of the truckers. In some cases fishermen from nearby camps bring their own fish to Tha Ruea to sell to the truckers, but usually a boatman purchases fish at the fishing camps for resale at Tha Ruea. The majority of the boatmen are not themselves fishermen, and their boats, covered and somewhat larger than the fishing boats, are used as reservoir taxis when not engaged in transporting fish. These boats, particularly when loaded with ten to twelve 100-kilogram baskets of fish, are prone to capsizing when sudden strong winds and rough waves strike the reservoir (by mid-1969 over 100 fatal boat accidents had been reported).

Once landed, the transfer of fish is handled in a number of ways. Among these are direct contractual arrangements between boatman and trucker, a series of such arrangements between boatman and shore agent (often a Vietnamese woman) and agent and trucker, or selective, competitive purchase by the trucker from either the boatman or the shore agent. Once the trucker has purchased sufficient fish to meet the demand of his regular retailers, he departs for his home area, which may be any market center between Korat and Nong Khai (with some subsequent distribution from there to Vientiane). Part of the task of the trucker is to insure that the fish reaches the market in good condition. Thus he is careful to pad his baskets with banana

leaves and to pack in sufficient ice to prevent spoilage. Both the leaves and the ice are brought in by the trucks from Khon Kaen (until recently ice had to be imported from Korat). A small proportion of fish landed at Tha Ruea is purchased by local residents for drying, slating, smoking, or fermenting into fish paste — all industries which have developed at the landing site.

The marketing situation, as well as the physical aspects of the town have been criticized by many observers. Their feeling, probably justified, is that there are far too many small economic transactions going on for any hope of efficiency. Various government agencies have plans on the one hand to make major improvements in the town, including concrete landing aprons and a cold storage plant, and on the other hand to close the town altogether. A major problem involved in establishing any kind of permanent improvement is again that of fluctuations in reservoir level; the flat ground where landing and economic transactions take place during low water is at least five meters under water at flood period. With present temporary constructions and most activity conducted out of doors, it is relatively simple to adapt to changing water levels; however, a concrete apron or paved selling area suitable to one season would be useless the next.

Traditionally the decision-making processes in Thailand and Laos have been based on chains of relationships running from the very top of the bureaucratic (or royal) hierarchy down through series of intermediaries to district and village officials. Each link in these chains is essentially an assymetrical dyad of patronage and clientage. Chains may be reformed when an intermediary link breaks with its patron and attaches to another who seems to offer greater advantage — but always the structure of single strands joining the very top to the very bottom remains — and authority and decision-making continue to flow in the same direction. The implications of this traditional pattern for political decision-making today are obvious. In any one agency operating at the village level, decisions have to be made or at least cleared by the responsible minister or head of the agency in Bangkok or Vientiane before local action can be taken. Thus horizontal communication and joint decisions between local development agencies involved in the same or closely related

areas becomes almost completely impossible. Also, given this one-way flow of authority, inputs from the local level concerning village needs, problems, and even important resources, rarely figure in decisions concerning the implementation of programs.

Two broader consequences of this form of organization, though not directly related to the problems discussed in this paper, have to do with support of alternative political regimes, and with the formation of international alliances. Given the essentially patronage-clientage nature of social and political relationships, and the relative ease with which chains may be broken at any level and relinked to a new patron, it is important for the individual at the top end of a series of chains to maintain the impression that he (and the intermediate links below him) can provide more resources down the chain than can any potential rival. Historically, monarchs used the allocation of districts and provinces including all of their resources to noblemen for this purpose. Even today in Laos the situation is not altogether different. Military control of particular territories enables the head of the controlling government to allocate its resources (though not as blatatly as in the past) down his chain of authority. The fact that one of the contesting factions calls itself "communist" and the other "democratic" is essentially irrelevant in terms of support of the regime — both operate and compete on the basis of the traditional patron-client chain of relationships. In this same light the formation of international alliences may be seen as a means of bolstering the impression of the regimes ability to provide resources down the chain of authority thus minimizing the fragility of the component links.

CONCLUSIONS

The present survey of the organization of fishing activities and the marketing of fish in selected areas of northeastern Thailand and Laos has indicated that there is little committment on the part of the villager toward fishing as a way of life. Fishing is widely carried on by the Thai and Lao, but as a subsistence activity in addition to the primary agricultural occupations. The major exception to this generalization was the

numerous groups of Vietnamese located along the Mekong primarily in northeastern Thailand who, through choice or necessity, engage in fishing and fish marketing activities as a full time occupation. The situation on the Nam Pong reservoir seems to fit this generalization as well, for, although the fishermen on the reservoir are Thai, they themselves consider their fishing occupation to be purely temporary until such time as they can re-establish themselves as farmers.

The fish marketing situation throughout the area can be characterized simply as one in which the demand far outruns the available local supplies. Even the importation of fish from outside of the area cannot meet the local demand. The economic chain from fisherman to consumer is similar to that found throughout Southeast Asia, with the probably insignificant difference that in parts of the surveyed area economic roles ordinarily taken by Chinese belong to Vietnamese. It is true that middlemen here, as elsewhere, tend to reap profits which may appear to be more than equitable. This is in part balanced by the middleman's usually far greater capital investment in his segment of the chain.

On the basis of the data presented, it is possible to predict in very broad outlines the kinds of exploitative arrangements which might be expected to develop with the creation of reservoirs in northeastern Thailand and adjoining Laos. Table I indicates how these may develop and lists the chief factors influencing the outcome. It must be emphasized, however, that these developments are predicted only in the absence of strong pressures by the governments concerned or other agencies to alter the patterns. For instance, the anticipated expansion of Vietnamese fishermen into the Pa Mong reservoir would certainly not occur if the Thai government effectively restricted the movement of the Vietnamese out of the areas in which they now live and on to the reservoir.

The initial force in determining who will make use of reservoir resources and how they will go about it is quite simply one of population pressures in relation to exploitable resources. This pattern was clear in the development of Nam Pong reservoir fishing. The first people to take up this occupation were those who had just been displaced from their homes and lands by the

TABLE I. — *Changes Expected in Exploitation Patterns after Reservoir Impoundment*

Location	*Pre-impoundment pattern*	*Post-impoundment pattern*	*Factors involved*
NAM PONG	Subsistence fishing by Thai farmers	Commercial fishing by transient Thai	Population-land pressures
MEKONG below Pa Mong	Commercial fishing by mobile Vietnamese	Exodus of bulk of fishing population. Some subsistence fishing remains	Sharp decrease in fish population after dam construction
MEKONG above Pa Mong	Subsistence fishing by Thai farmers	Commercial fishing by: a) transient Thai b) Vietnamese	a) displacement from land b) displacement from downstream
NAM NGUM	Subsistence fishing by Lao farmers	Subsistence fishing by Lao farmers	Absence of: a) population-land presures b) Vietnamese

impounded water. As they were gradually able to relocate on new agricultural land or in urban, nonagricultural occupations, their place on the reservoir was taken by other Thai from ever increasing distances who had also, for one reason or another, been deprived of their exploitative agricultural rights to land.

In seeking to apply an admittedly oversimplified pattern such as this to future developments on the Mekong River, a complication is introduced in that two types of fisheries exploitation presently exist on the river, whereas before impoundment of the Nam Pong exploitation of its resources had been of one common, subsistence type both above and below the dam site. From a point about half-way between the Pa Mong dam site

and Vientiane and extending downstream well past Nong Khai, the predominant fishing activity is carried on by the Vietnamese with relatively sophisticated equipment for commercial sale. This, of course, is related to the fact of accessibility to market. Upstream from this point, out of effective reach of market centers and not accessible by road, the main form of fishing is for subsistence, carried on by Thai and Lao with simple and inexpensive gear. Construction of the Pa Mong dam not far from this dividing point would serve to reinforce the division through creation of a significant ecological difference between reservoir above and river below. Moreover, as Pantulu and Bardach (1969) point out, a sharp reduction in numbers of fish for some distance below the dam can be expected at least for the first several years after impoundment, while significant increases should occur in the newly forming reservoir.

The construction of the Pa Mong dam, then, will have two immediate effects on the fishermen dowstream from the site. The first is that the fish population available to them will be sharply reduced, and the second is that good roads will by then connect the dam site with marketing centers (probably on the Laotian side, security conditions permitting, as well as on the Thai side of the dam). Because these Vietnamese fishermen are not now settled in permanent villages, and show a very sensitive response to changes in the river environment, it is almost certain that they will make up a major part of the impounded area's first fishermen. As the reservoir gradually fills, permanent Thai villages in the basin and their agricultural lands will gradually have to be evacuated. While most of these villagers will desire relocation in lowland areas where they can continue practicing their agricultural occupations, it is highly improbable that the vast majority can be so accommodated. Even though evacuation will be gradual, the total numbers that will have to be relocated are conservatively estimated at over 200,000. A figure of half a million is probably a more correct guess.

Therefore, it can be expected that within a few years of the construction of the Pa Mong dam, two distinct populations will be attempting to gain a living from the reservoir's resources. Certainly in the beginning, the Vietnamese fishermen will have

a competitive advantage because of their present pattern of mobility, their reliance on kin-based co-operation, their commercial orientation, their more sophisticated gear, and the fact of their probable priority on the reservoir. The Thai fishermen will probably have little difficulty in adapting to more suitable techniques and equipment for use in the reservoir, particularly if government assistance is available; however, judging from the present situation on the Nam Pong reservoir, they may not as readily adapt to the requirements of greater mobility and co-operation. Assuming that this will be the case and that, like the Nam Pong fishermen, their ultimate objective will be to re-establish themselves on the land, it seems reasonable to predict that during the course of the decade or so after the construction of the Pa Mong dam the Vietnamese fishermen will come to dominate the reservoir fishing. Also, as Thai wishing relocation are accommodated, those that remain will probably become more or less permanently settled as the water level of the reservoir is stabilized and slowly revert back to subsistence rather than commercial fishing.

The situation in the area of the Nam Ngum dam site in Laos is quite different from that discussed above. In the first place, Vietnamese refugees have not been provided even as limited a haven in Laos as they have in Thailand, as is clear from their absence on the Laotian shore of the Mekong. In the second place, the population pressures on the land in Laos nowhere near approximate those in Thailand, nor will any significant population have to be relocated from the reservoir basin. It seems likely, unless considerable initiative and organization are provided by whichever government is in control of the reservoir when it is created, that patterns of fishing will not change dramatically from what they are today on the river. If transportation facilities connecting the reservoir with Vientiane are improved, a noticeable increase in the amount of time devoted to reservoir fishing by nearby farmers may occur. This would produce a greater surplus which would be readily marketable in the city. However, it seems unlikely that any of the fundamental social readjustments seen among the Thai of the Nam Pong reservoir, and probably among the Thai fishermen of the Pa Mong, would occur on the Nam Ngum.

Judging from the situation at Nam Pong, problems of reservoir landing sites and transportation of fish to market centers will take care of themselves with a tolerable degree of efficiency even in the absence of any advance planning. The middleman role on the Thai side of the Mekong is now largely taken by Vietnamese, there seems little reason to predict that this will not continue to be the case, again barring government intervention. Traditionally in Laos, as in most other areas of Southeast Asia, Chinese dominate the middleman position, and, with Vientiane serving as the market focus of both Nam Ngum and the north bank of the Pa Mong reservoir, it would be safe to assume that transportation and wholesale fish operations would naturally be developed by Vientiane Chinese, again assuming the absence of explicit policies to the contrary.

Future developments in the patterns of fish harvesting and marketing on newly created reservoirs may well be significantly affected by programs undertaken by government or international agencies. The most critical area for agency action appears to be in providing necessary controls over the interaction of exploitative technology and numbers and distributions of fish populations. The needs, present and potential, for this aspect of ecological control are spelled out in detail by Van Cleve (1970). They are aimed primarily at biological protection and need not be reiterated here. At present, government agencies involved in fisheries research, extension, and management-control, while generally staffed by capable and often dedicated men, have produced results which are uneven at best. The reasons for this situation are not unique. First there is the broad question of what agency has jurisdiction over a particular area, project, or portion of a project. Often confusion over this issue results in complete inactivity. Perhaps of more basic significance is a second problem, communication. Traditionally, in Thailand and Laos, communication has been largely up and down single chains of authority. However, in matters of regional development, this is not enough. Within two kilometers of the office of the chief fisheries officer of Laos, the Thai fisheries officer at Amphur Si Chieng Mai is working on identical problems of research and extension, yet neither is even aware of the other's existence. Likewise, on the Nam Pong reservoir which is situated in two

changwats, the fisheries officers from Udorn and Khon Kaen have never met; and the Khon Kaen officer is attempting to compile a census of fish yields from the reservoir with no control over the yields landed in Udorn.

While problems such as these are serious and, as development procedes, will undoubtedly be solved in large measure, it is important to realize that fishermen and fish marketers will form a relatively small proportion of the people affected by the development of Pa Mong and other reservoirs in the area. The effects on these people will largely be positive, in terms of greater yields and consequently more profit and in terms of increased fish supplies in regional markets. The role of government agencies, therefore, would be for the most part in *maximizing* these positive effects. However, for the majority of the population, particularly those deprived of their lands, the effects of the reservoirs will be negative, and government agencies' roles would be to *minimize* these effects. While maximization of aspects of economic development such as fisheries is of great importance socially, nationally and regionally, it would not seem to deserve quite the same force of priority as minimization of social disruption and human suffering.

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