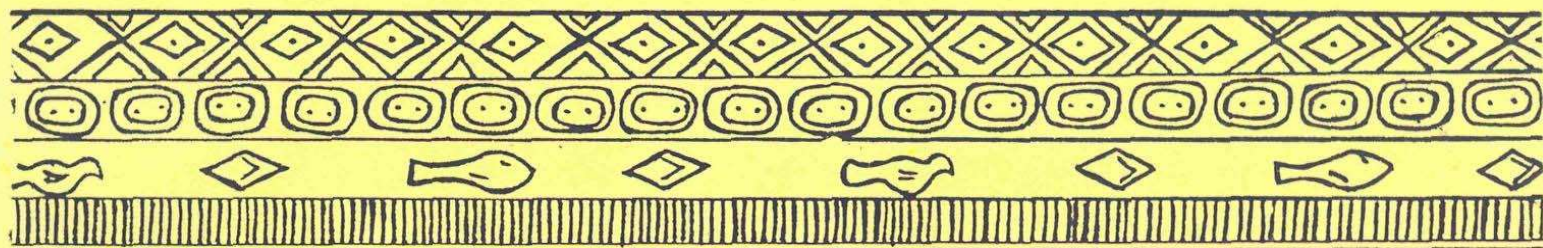
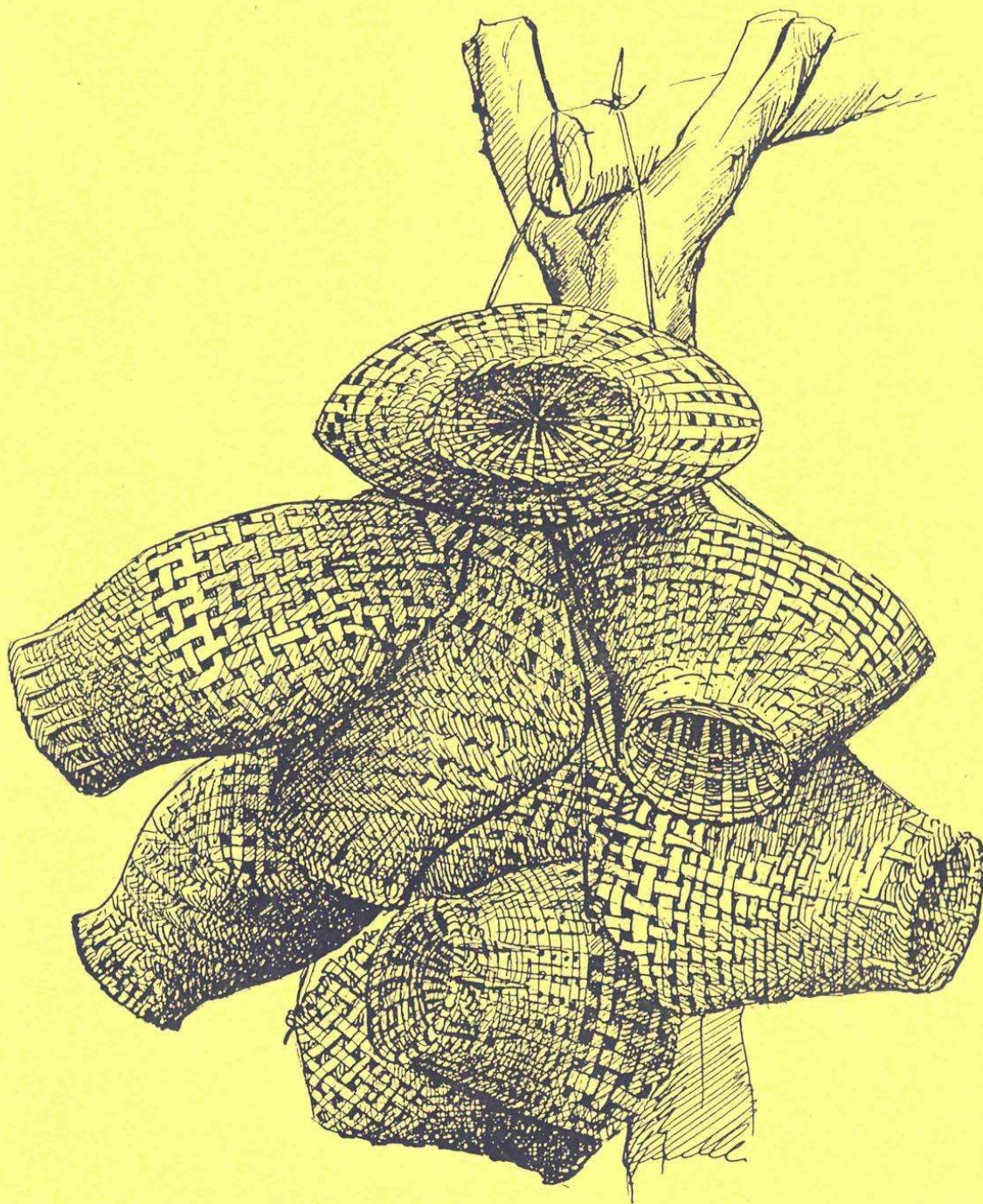


# COMMUNITY FISHERIES IN LAO PDR: A SURVEY OF TECHNIQUES AND ISSUES



**IUCN Lao PDR I**

TECHNICAL REPORT

**1**

COMMUNITY FISHERIES IN LAO PDR: A  
SURVEY OF TECHNIQUES AND ISSUES

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# COMMUNITY FISHERIES IN LAO PDR: A SURVEY OF TECHNIQUES AND ISSUES

Gordon Claridge, Thanongsi Sorangkhoun and Ian Baird

*Artwork by* Sisom

phone Hansai

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Basket frog traps (*ngep*) stored during the dry season (artwork  
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## PREFACE

IUCN has been working in partnership with the Government of Lao PDR since 1988, and the Government has been a State member of the Union since 1969. IUCN maintains a country office in Vientiane and implements a programme on behalf of the Government focussed on biodiversity conservation and sustainable development. Within this broad framework, specific activities include protected area planning and management, sustainable use of non-timber forest products and integrated conservation and community development activities.

Lao PDR is the owner and custodian of some of the most important biodiversity and natural resources in Asia. More than this, the people of this ethnically diverse nation still practice a range of traditional resource uses and techniques. This is exemplified in the diversity of techniques applied to community fisheries throughout the country.

In 1996 the IUCN Wetlands Programme, in collaboration with UNEP, published *An Inventory of Wetlands of the Lao PDR*. This publication was the result of three years of work by the compiler, Gordon Claridge, and has highlighted not only the number and types of wetland resources in Lao PDR but also the dependency of the people on a vast range of aquatic products.

It was during the course of the fieldwork for the inventory that Gordon Claridge and Thanongsi Sorangkhoun started to record the technology used by the communities they visited to harvest these aquatic resources. This led to a collaboration with Ian Baird of the Community Fisheries and Dolphin Protection Project, who had also recorded substantial information about fishing techniques, particularly in the southern part of the country.

This publication is the result of that collecting and recording, and reflects the dedication of the authors in bringing together the information in their own time so that it can be shared with the wider community.

What is needed now is the application of what we know about the nature of wetland resources in Lao PDR, the importance of traditional knowledge, and the issues concerning sustainable use, to development of an integrated management framework which can be implemented at national and community levels.

Achieving long term sustainability of community fisheries will involve a number of stakeholders. As national development proceeds new issues, which go beyond the confines of the village community, will have to be taken into account. Retention of valuable traditional knowledge, and more importantly its application and evolution, is not guaranteed in an increasingly modern and market-oriented development context. There needs to be a conscious process to involve traditional resource users in the development of a strategy for conserving not only community fisheries resources, but also the whole range of wetland resources of Lao PDR.

IUCN is pleased to be able to publish this report as part of its Lao PDR programme. It makes an important contribution to the level of knowledge about the use of wetland resources in the country, and complements the earlier inventory work. It is hoped that the document will not only be a valuable record of the fishing technology of the Lao people, but that it will be used as part of a process to develop and implement the kind of strategy referred to above.

Stuart Chape  
IUCN Representative  
Lao PDR

## ACKNOWLEDGEMENTS

It would be impossible to list adequately all of the people who have assisted the authors during their numerous field trips in Lao PDR. Our many counterparts have provided invaluable assistance in locating techniques which were new to us and in securing accurate descriptions of their construction and use. Without fail the people in the communities where we have worked have enthusiastically provided us with information about their fishing techniques and the factors affecting the fishery in their area. To all of them we express our sincere appreciation. We hope that this publication will justify their efforts.

In particular we wish to acknowledge the cooperation of the staff of the Lao Community Fisheries and Dolphin Protection Project.

While we hesitate to name the multitude of people who have provided assistance because of the impossibility of making a comprehensive list, we do wish to acknowledge the ongoing support and encouragement of Stuart Chape, IUCN Representative in Lao PDR. Without his support this book would not have been completed.

Gordon Claridge  
Thanongsi  
Sorangkoun  
Ian Baird

## INTRODUCTION

One thing that strikes the traveller in Laos<sup>1</sup> is that it is a country of amazing diversity - in its people, cultures, topography, vegetation and wildlife. This diversity is reflected in the fishing techniques. Even for a society which is heavily dependent on fish as a major food source, Laos has an amazing variety of fishing equipment.

In neighbouring Thailand one is beginning to see nostalgic articles in glossy nature and culture magazines bemoaning the loss of the traditional fishing gears. This is in stark contrast with Laos where the traditional equipment is still very much in use and still very important in securing daily protein supplies.

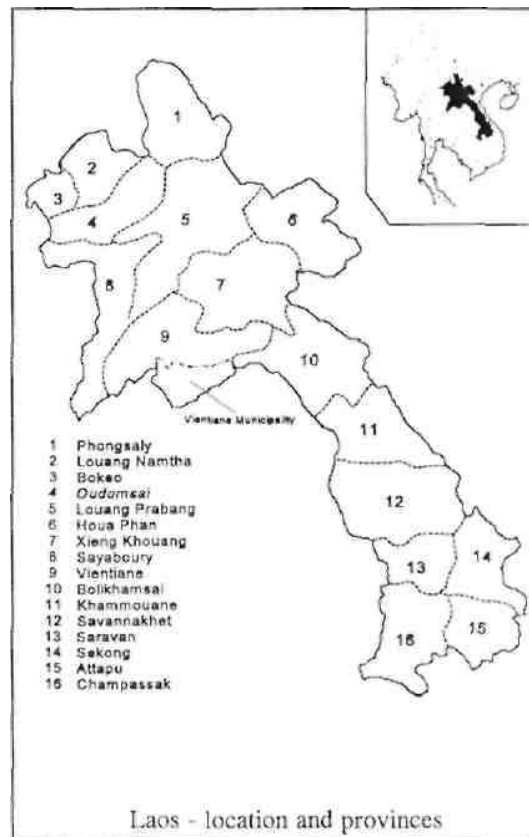
The fishing techniques which can be found in Laos provide a good illustration of the principle that culture is not a static museum display but a living, evolving aspect of everyday life. In virtually every part of the country new gears are being developed or adopted and old gears are being abandoned or modified to meet the changing social, economic and environmental conditions. Not only are fishing technologies evolving, they are also being moved around the country as people become more mobile with the continuing improvement of the transportation infrastructure. For example, in the suburbs of Vientiane one can see types of fishing equipment in daily use which were once confined to their places of origin in remote parts of the country.

Such change has its good and bad aspects. Fishing is becoming more efficient through the introduction of new gear types. This has benefits for the economy and for the nutritional health of the people. On the other hand fish stocks are more easily depleted by the more efficient gear. In addition, the discarding of some of the traditional techniques can represent a loss of part of the culture, particularly if these are not recorded in some way.

This book has a three-fold purpose. First it seeks to record some of the fishing gears currently in use to ensure that the people of Laos have some

record of this aspect of their culture. Second, it provides a starting point or checklist for those involved in fisheries management who need to identify the fishing techniques used in a particular area. Third, the changes in technology described here tell a story about changing pressures on the fish stocks.

It is important that a range of people become aware of these pressures and their potential consequences. These include the fisher communities themselves, government policy and decision makers, and advisors to government and communities, whether international consultants or non-government organisations.



### LAOS

The topography of Laos is dominated by rivers and mountains. The Mekong River forms much

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<sup>1</sup>The official name of the country is the Lao People's Democratic Republic - Lao P.D.R.

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of the western border with Thailand and nearly ninety percent of the country lies in the Mekong Basin. However the term "basin" belies the generally rugged and mountainous nature of the terrain.

Seventy percent of the land area is mountain or plateau. Lowlands are concentrated in the south and southeast, principally around Vientiane and Savannakhet.

The plains of the lowland rivers are characterised by overflow wetlands which are generally seasonal, extensive and very productive. These lowland rivers are not necessarily the slow, meandering rivers typical of lower river basins. In places they are fast flowing with stretches of rapids. Upland rivers are generally faster flowing and, apart from the major Mekong tributaries, they are frequently seasonal, often with little or no flow between pools during the dry season.

This country of 236,800 square kilometres (slightly larger than Great Britain) is home to an estimated 4.5 million people. More than 80 percent of the population live in rural areas, often in villages of no more than 300 people.

The Lao Government divides the population into four ethnic categories: Lao Loum; Lao Thai; Lao Theung; and Lao Sung, though for official purposes the Lao Loum and Lao Thai categories are often combined and together constitute around 60 percent of the population. In reality there are at least 68 ethnic groups in the Lao PDR.

Lao Loum are the ethnic Lao. They are generally lowland dwellers and have traditionally resided adjacent to the Mekong River and along the lower reaches of its tributaries. They speak the Lao language. Lao Thai is a term which includes a number of ethnic sub-groups. They are closely related to the Lao Loum and generally occupy slightly higher positions along the river courses.

The Lao Theung are a loose affiliation of mostly Mon-Khmer peoples. They are not typically lowland dwellers, though many now live in the lowlands. Their traditional settlement areas are the middle altitudes of mountain areas, generally near streams. This group comprises some 30 percent of the population.

The Lao Sung ethnic group generally live at higher altitudes and are mainly found in the north of the country.

The range of cultural traditions, together with the different topographic settings in which they have traditionally existed, has led to differences in the fishing equipment developed by the various ethnic groups. Over time, particularly with movement of upland people to lowland communities, there has been a tendency for the more efficient gear types to be spread more widely among the population. At the same time, names for gear types are passed from group to group, though the name does not always remain attached to the original gear. For this reason it is not easy for non-anthropologists and non-linguists to distinguish accurately the origins of gear types or names of gear. The assignment of gear names to particular lar ■ age groups in the following descriptions is generally based on the ethnic group in which the gear has been most frequently encountered.

#### IMPORTANCE OF FISH AND FISHING

Fish is the major source of animal protein for the majority of people in Laos. Though there do not appear to be any recent systematic studies, it is clear from the experience of the authors and other development workers in Laos that this is the case. Frequently when asked whether they eat fish every day villagers will reply "Not every day - every meal!".

The frequent presence of poultry, pigs and buffalo in villages might suggest that other forms of animal protein rival fish. This is generally not the case. Our studies have shown that chickens are generally a stand-by food - if other protein cannot be obtained for a period of several days a chicken might be killed. Or chicken might be served when impromptu gatherings mean that the fish and forest protein to hand is not sufficient. In any case, in many places frequent (often annual) epidemics of poultry disease tend to keep the supply too low to make this a dependable protein source.

Pig and buffalo are generally regarded as "festival foods", to be utilised only on special occasions. They are not a major protein source in much of the country. The situation is different where settlements are sufficiently large to ensure sufficient demand for a beast to be killed on

---

market days. This, however, supposes that there are sufficient community members able to afford to purchase pork or beef on a regular basis. To some extent the rapidly increasing transport infrastructure means that a buffalo, for instance, might be shared among a number of markets. Nevertheless, at the present time not only is fish the main protein source for most of the people, for most there is no affordable substitute.

Fishing also provides a role for women in the securing of the family protein supply, it would be unusual in most communities in Laos for women to hunt for forest game. However, fishing is widely recognised as something in which women participate, though in some places there are restrictions on the techniques that they can use - as there are restrictions in some places on the techniques that men can use. Where men are forced through economic circumstances to move away from the village to earn cash this tends to curtail the availability of forest-based protein to their families. However, some level of family protein supply can be maintained by the women through fishing.

Fishing also plays an important role as part of the economic safety net for farming communities in Laos. In lowland areas typically some or all of the rice crop is lost between one year in four and one year in eight as a result of prolonged flooding. In some areas drought can also reduce the rice harvest significantly. When this happens families need to have a strategy for obtaining sufficient rice to get them through to the next harvest, either through cash purchase or barter.

Fish (and other aquatic products) together with forest products are generally a part of the strategy, with their relative importance depending on proximity to good wetland or large forest areas. In times of rice scarcity, an increase in fishing effort can provide fresh, dried or smoked fish to exchange for rice.

## FISH MIGRATIONS

A significant proportion of the fish stocks in the Mekong system is migratory. However little is known of the life cycles of individual species and even the gross details of multi-species migrations are far from clear. For many migratory species it is not even clear whether individuals undertake long distance migrations or whether they make

short migrations within a defined part of the system. This lack of information is one of the most important factors which will retard the sustainable management of fisheries in Laos.

There are two major migration patterns - vertical migrations up and down the large rivers and lateral migrations to and from these large rivers into tributaries and wetlands. Superimposed on these general patterns are a number of strategies determined by the life cycles of individual species and by local conditions.

In the lateral migrations many fish species migrate out of the rivers during the early wet season into flooded forest and grassland. Villagers in some areas report mass movements of fish into forests in rising floodwater barely deep enough to cover the fish.

Vertical migrations occur at different times during the year for different taxonomic groups.

The migrations generally constitute the time of greatest fishing pressure on the fish stocks. For example, a number of the techniques described in this book are designed specifically to take advantage of these migrations. It is therefore particularly important that an understanding of the ecological significance of the migrations is developed as soon as possible.

## FISHERIES MANAGEMENT ISSUES

A number of issues relevant to fisheries management have a bearing on the types of fishing gear used and, of course, on the future of the fisheries themselves. These are dealt with briefly below.

### DECLINE IN FISH STOCKS

There are consistent reports from around Laos of long-term declines in fish stocks. Some researchers and others with an interest in activities which might impact on fisheries tend to deny that there is any good evidence for this. Certainly there is no hard scientific evidence. However it is also becoming widely recognised that community information sources should be treated with respect and given the attention they deserve as originating from those most closely involved with the resource.

In the case of the Lao fish stocks there are a number of aspects of the situation which suggest that a real and probably significant decline has occurred. These are:

- the reports are widespread, coming from many parts of the Lao portion of the Mekong Basin;
- people are often able to provide details such as the species which have declined, the extent of the decline, the time period over which the decline has occurred, etc.; Some types of fishing gear are being abandoned and the reasons given for this are associated with the lack of fish stocks; and
- there is frequently local consistency, from village to village, in the descriptions of the decline.

A number of factors seem to be involved in this decline, among them:

- introduction and overuse of monofilament gill nets;
- use of explosives;
- other unsustainable fishing practices;
- ulcerative fish disease - which affected some areas so badly that people report not being able to go near some streams for the smell of dead fish;
- infrastructure and market development leading to much higher harvesting levels;

- increases in population, having an effect through both increasing demand and increasing numbers of fishers;
- habitat destruction and environmental degradation; and
- a long-term (twenty-year) decrease in flows in the Mekong.

### UNSUSTAINABLE FISHING METHODS

A number of unsustainable fishing methods are, unfortunately, fairly widespread in Laos. These include:

- overuse of gill nets;
- blast fishing;
- use of poisons;
- pumping out of wetlands; and
- inappropriate use of fence traps.

There are a number of reasons for the continued use of unsustainable methods. These include:

- lack of knowledge of viable alternative methods;
- lack of affordable alternatives;
- "economic" pressures such as failure of rice crops, leading to a need for a commodity to exchange for rice; and
- a desire to gain maximum advantage from newly opened or expanded markets.

Three factors play a major role in hindering the adoption of more sustainable fishing practices. The first is the lack of government initiative in promoting sustainable fishery management. The major focus of government effort in fishery matters until now has been in aquaculture development and breeding of exotic species for release into natural waters.

The second is a cultural reluctance to forbid others to do something - particularly when the others are known to those affected by the action. Thus where communities are aware that their fish stocks are being depleted by overuse of gill nets, for instance, they are not usually willing to take action to prevent this, unless consensus can be reached with the gill net users on the need for change.

The third factor is the lack of mechanisms for consultation and communication among fishing communities over sufficiently large areas such as river basins. Unless people are aware that the

resource is widely shared (and widely impacted) they are less willing to take cooperative steps to deal with the problems.

**IMPROVED MARKET ACCESS AND LOCALLY INCREASED DEMAND** The widespread improvements to the road system in Laos together with the increasing number of private vehicles mean that many formerly remote fishing communities now have access to markets. In addition new markets are developing, partly as a result of the very high levels of population growth (estimated at 2.9% per year) and partly through the growth of project settlements such as those associated with the Nam Theun dams.

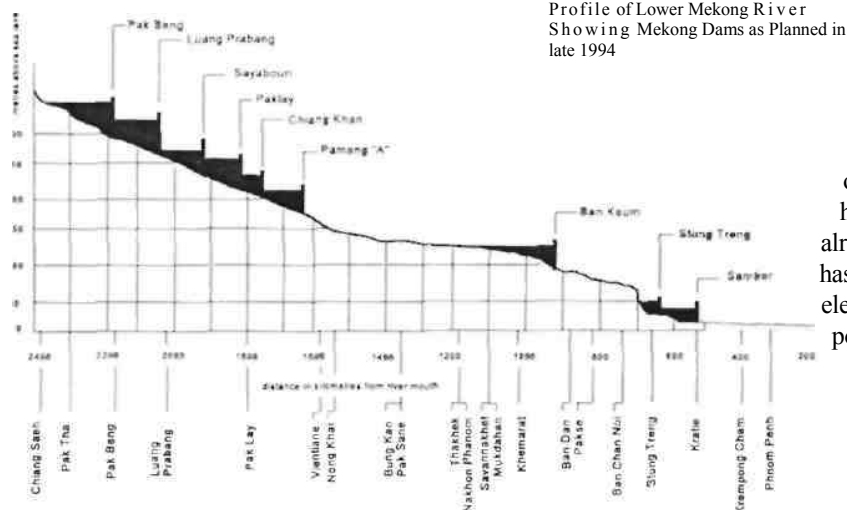
Communities which have the opportunity to supply these markets are generally turning to the most efficient techniques available - usually gill nets but frequently blast fishing and poisons. This is having a marked impact on fish stocks. For example, along the section of the Nam Hinboun which has improved access to Ban Hinboun, Thakhek and Lak Sao the excessive use of gill nets has led to noticeable reductions in some previously common species. As one moves upstream on the Nam Hinboun, where access to the markets becomes progressively more difficult, the intensity of gill net usage decreases. This scenario is being repeated all over the country.

There are two main reasons that this situation has developed and is allowed to continue. The first is that there is no effective government control over, or supervision of, fisheries in Laos. The second is that traditional fisher management structures in Laos are not generally capable of dealing with widespread abuse of the stocks, particularly by people who are members of, or are known to, the community.

This is not to say that the situation is hopeless. While the government does not have either the expertise 'or the staff necessary to address these issues it would be possible in many instances to help communities to address the problems for themselves. Until now there are few workable models and far too few people committed to helping to develop them.

## HYDROPOWER DAMS

The number of major Mekong tributaries in Laos, combined with the generally mountainous terrain, give the country significant potential for the generation of hydroelectric power. Laos, with its low level of industrialisation, will have little need for large amounts of hydropower in the foreseeable future. Neighbouring Thailand, on the



other hand, already has an electric power

demand that has outstripped its domestically-generated supply and is purchasing electricity generated in Laos. Rapid development in Vietnam could see that country emerge as another customer for Lao electricity. The Lao Government is attempting to meet the forecasted demand by building 29 dams on Mekong tributaries by the year 2010. A further 31 dam sites are under consideration.

This proliferation of dams will have a significant effect on native fish stocks and on the fishing communities which depend on them. Because the details of fish migrations in Lao rivers are not well understood it is too early to say precisely what the impact will be. However it is highly



likely that the impact will be substantial. Apart from the nutritional and economic aspects, if fish migrations cease or are significantly reduced then a range of fishing techniques targeting these migrations will probably cease to be used.

#### COMMUNITY MANAGEMENT OF FISHERIES

Little is known of traditional fishery management in Laos. However in many places it seems that elements of traditional practices remain, and these are being modified to meet changing situations. These community management approaches take a number of forms and can be broadly grouped into: areas permanently or seasonally closed to certain activities; prohibitions or limitations on specific harvest techniques; and protection of particular fish species or groups.

These existing management controls can provide a basis for development of a more coherent, widespread and culturally relevant system of fisheries management for Laos. This requires some outside assistance to provide the impetus and expertise to support the communities in devising and implementing such a regime.

# FISHING TECHNIQUES

The following sections describe a wide range of fishing techniques in use in Laos.

## OF FISHING

### CLASSIFICATION TECHNIQUES

The sheer diversity of fishing techniques in Laos makes it difficult to classify them in any systematic way. The approach developed here is based more or less on the general form of the equipment used. It should be regarded only as a matter of convenience for organising the information rather than any technically rigid structure. What the classification used here does show is the great variety of the approaches used. The general headings adopted are:

- scoop nets and scoop baskets;
- nets with handles;

- cast nets;
- large nets;
- scissor nets;
- horizontal cylinder traps;
- upright basket traps;
- plunge basket;
- branch-bundle fish attractant devices;
- drop-door traps;
- hook and line gear;
- current filtering gear;
- box enclosures and fences;
- spears;
- guns;
- catching by hand;
- emptying wetlands;
- poisons;
- explosives.

## 1. SCOOP NETS AND SCOOP BASKETS

Nets and baskets are used for scooping through the water or submerged vegetation and sometimes soft mud, to catch fish, shrimp, crabs, molluscs, water insects, etc. These are among the most common fishing gear used in the Lao PDR. They are commonly used by women and children.



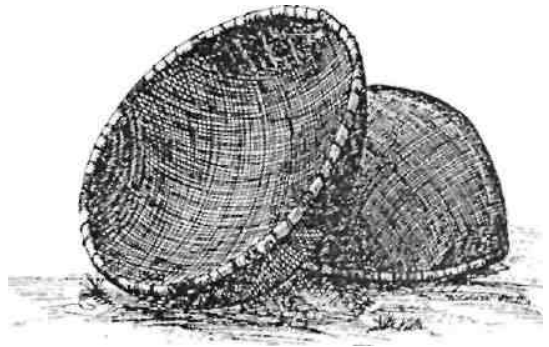
### 1.1 Scoop Net (dip net)

*sawing* [sa wing] (Lao Loum) *saving*  
[sa ving] (this seems to be a  
pronunciation used by Lao Theung)

A circular or triangular bamboo frame with a suspended (usually conical) net. Whether the frame is circular or triangular depends on the location and the ethnic group involved. The *sawing* is used to scoop and sieve water and is also used to scoop up leaves and other debris from the bottom with small fish, shrimp and insects. It is sometimes also pushed among water plants to catch aquatic animals lurking there. The net is often of fine mesh - either nylon, cotton or fine bamboo.

Fibre nets were originally made from the raffia-like inner bark (*piet*) of a climbing vine, and possibly sometimes from the bark of *Hibiscus* sp. (*theuang*). In some areas these were later replaced by jute (*pan*). More recently the net is of nylon or cotton, though fine bamboo nets persist in many places.

When made of fine bamboo the net is fairly stiff, keeping its shape rather than folding like a cotton net. In general the mesh material of *sawing* is finer than that of *kheung* (see next page). A *sawing* with a handle is used in some areas and is illustrated under Section 2: *Nets with Handles* below. *Sawing* are commonly used by women and children.



## 1.2 Scoop Basket

*kheung* [keung] (Lao Loum)

A basket with a circular frame, often hemispherical in shape, usually 50-60 cm in diameter and around 15-20 cm deep, used as a scoop to filter out shrimp or small fish in the same way as a *sawing* but also typically used to scoop and sieve soft mud. Commonly used by women and children. In this form the gear is more common in and north of Khammouane Province than in southern Laos



## 1.3 Cylindrical Scoop Basket

*kheung* [keung] (Lao Loum)



In some parts of Xe Kong and Attapeu *kheung* are cylindrical rather than hemispherical in shape. The style illustrated here (two drawings at left) is from the Alak ethnic group (Lao Theung) in Sansai District, Attapeu Province. It is made from bamboo and the basket work is coarser than that usually found on the hemispherical type. Nevertheless it is used in the same way, for catching small fish and shrimp in streams and rivers in mountainous areas.



#### 1.4 Conical Scoop Basket

*kanou* [kanoo](Lao Theung)

This conical bamboo basket is based on a single stem of bamboo, split finely to provide the vertical framework in the basket weaving. It is used in the same manner as *kheung* to catch fish, shrimp, etc. in mountainous areas in Sekong and Salavan Provinces.

#### 1.5 Wedge-shaped Scoop Basket

*ta seu* [ta seu] (sometimes *ka seu* [ka seu] (Lao Theung - name used north of Savannakhet Province) *saucing* [sanang] (Lao

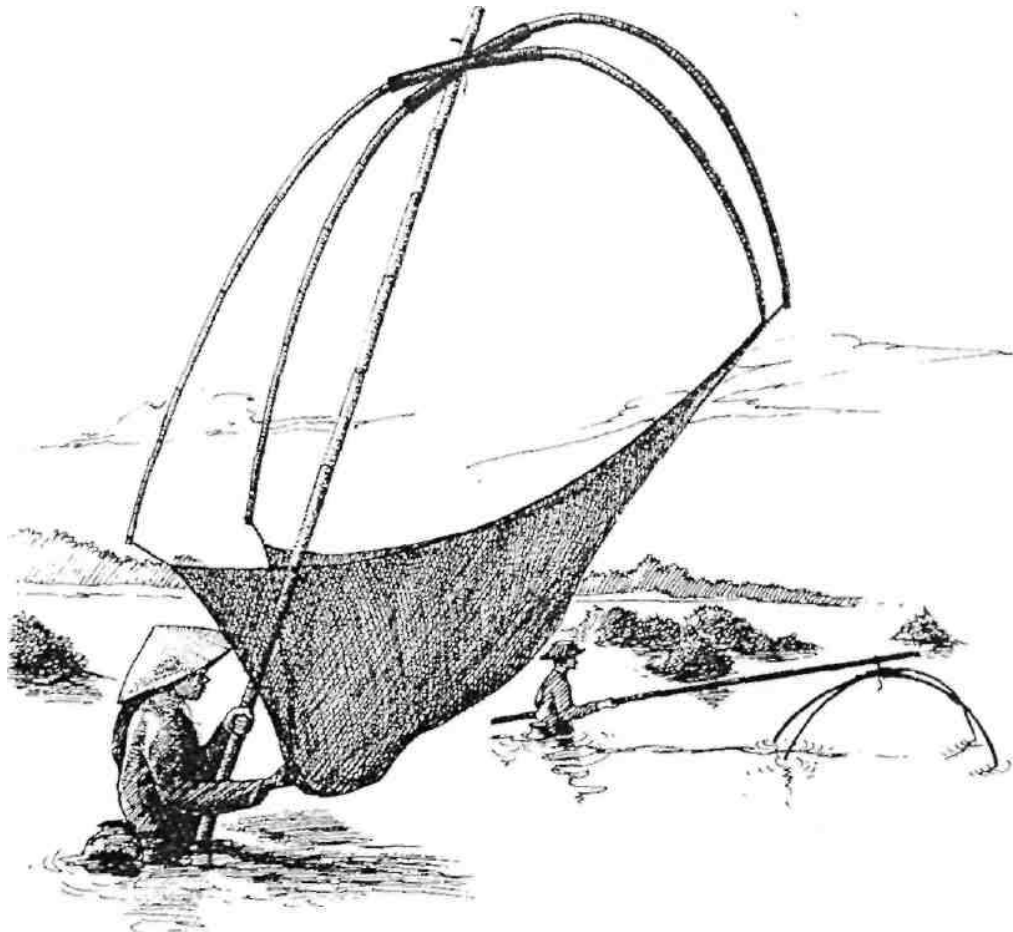
Loum - name used in Champassak, Attapeu, Saravane, Xe Kong Provinces)

A wedge-shaped bamboo basket, used in the same way as a *sawing* or *kheung*. It is also pushed vigorously under flooded bushes to scoop out small fish and shrimp. *Ta seu* are also used to collect bait fish and shrimp for line fishing. Commonly used by women and children.



## 2. NETS WITH HANDLES

This category includes one of the most common pieces of fishing gear in Southeast Asia - the lift net. In various forms it can be found from Indonesia at least as far as southern China.



### 2.1 Lift Net

*gadung* [ga doong] (Lao Loum - name used in Vientiane and north) *sadung* (sa doong) (Lao Loum - name used in provinces south of Vientiane)

This is one of the most common types of fishing gear in Indo-China. It consists of a fine net suspended by four corners from a frame. A small hand-held version is commonly used in quiet water along river sides, in canals and in overflow wetlands (*nong*). The frame in larger versions is attached to a beam that pivots on a bipod or tripod providing leverage to

lift the net and catch out of the water. The net is left in the water for some time and is then slowly raised, trapping any fish which were above the net.

At Ban Konglo on the upper Nam Hinboun in Khammouane Province fences of stakes and leafy branches are built across stream sections up to one metre deep and hand-held *sadung* are used in gaps in the fence.

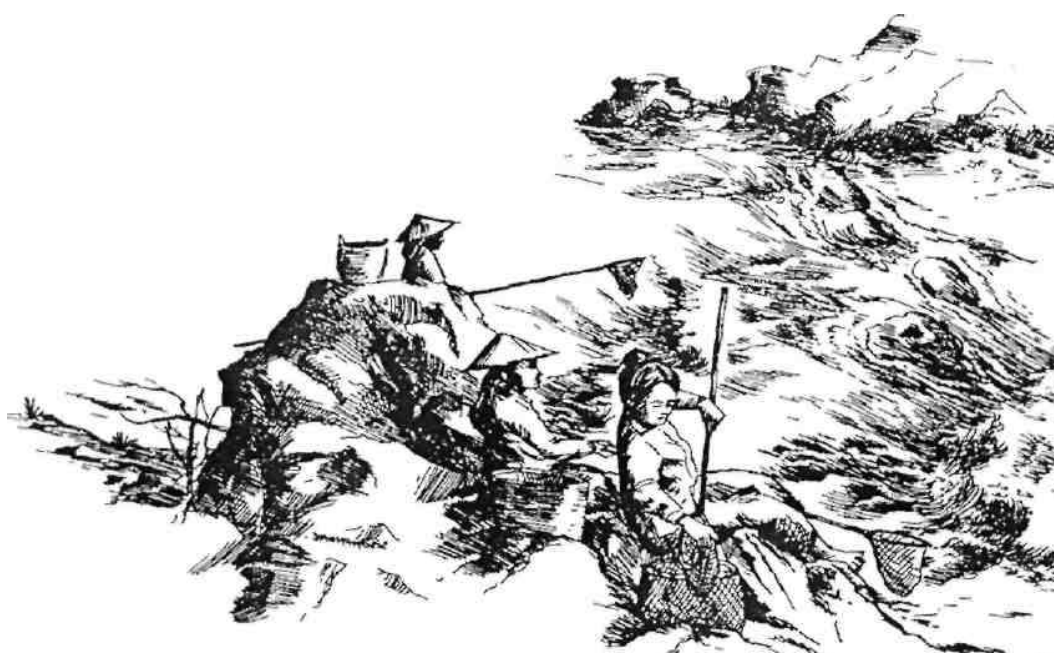
The small *sadung* illustrated here is most frequently used by women.



## 2.2 Handled Scoop Net

*sawing* [sa wing] (Lao Loum)

This version of the *sawing* has a long handle for manipulating the net more easily and giving a longer reach. The target species are generally small fish which like swiftly running water and a rocky bottom. It is used in flowing water all year round, mainly by women and children, in Attapeu and Champassak Provinces. *Sawing* with handles seem to be unknown in other provinces.

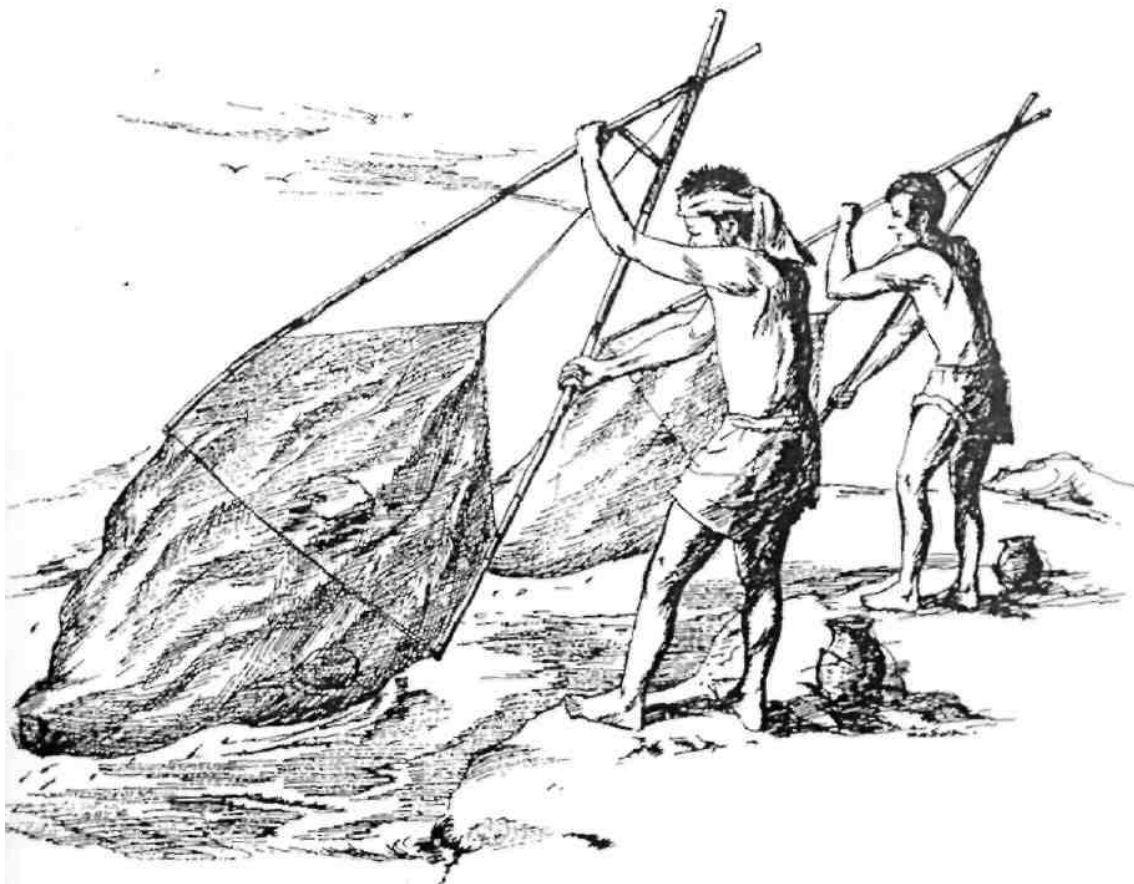


## 2.3 Long-handled Dip Net

*katong* [katong] (Lao Loum)

The *katong* is a conical net about 15-20 cms in diameter attached to the end of a pole 2-3 metres long. It is used in the Khone Falls where the net is placed in the falling water and fish (usually small cyprinids) are caught when they jump up sections of the falls and land in the net. This gear is used in this fashion from January to March (low water).

*Katong* are also commonly used in small lowland streams and wetlands in southern Laos in September and October to catch fish as they migrate out of streams to larger water bodies at the end of the rainy season.



#### 2.4 Triangular Scoop Net

*sone* [sawn] (Lao Loum)

A light triangular pole frame supporting a shallow fine net bag. The frame is typically 2 metres long and 0.75-1 metre wide at the wide end. The gear closely resembles large *jip*, (see 5 below) except that the net does not have the distinct funnel at the bottom that is found in *jip*. Many fishers with nets sometimes stand in line along the bank of a channel used by migrating fish. When a column of fish passes they scoop the nets simultaneously so that one fisher does not frighten off the fish before the others can make a catch.

This gear is used at the Khonc Falls in January-February (low water) to catch migrating cyprinids, and in April-June (rising water) for migrating pangasids. The gear is also used in the rainy season (July to September) in the Mekong River in southern Laos by fishers in a paddled boat. Usually one person maneuvers the boat from the back while another stands and uses the scoop net in the front. The gear is used by men.

### 3. CAST NETS

The use of cast nets is possibly even more widespread than that of *sadung* mentioned in Section 2. However Lao fishers have developed a number of different techniques for making them even more useful. Two (*soum he* and *kouat theo*) are described here. Cast nets serve many other purposes, from fencing off areas to trap fish, to scooping fish out of a trap.



#### 3.1 Cast Net

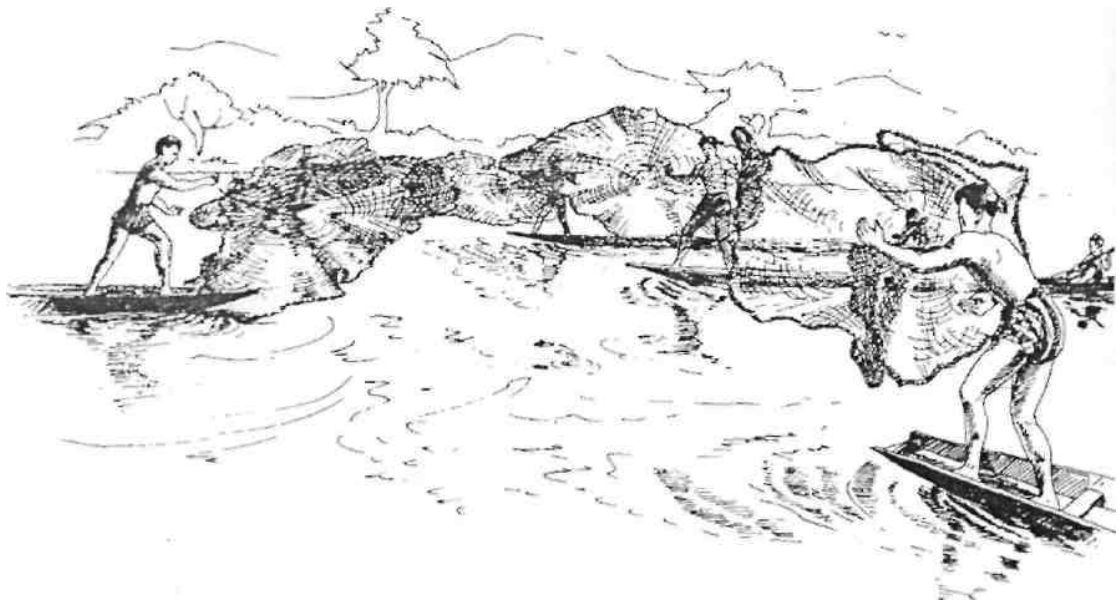
*he* [hae] (Lao Loum)  
*sum he* [soum hae] (Lao Loum)

The cast net is possibly the most common type of fishing gear in the Lao PDR, and is reputed by Lao fishers to be one of the oldest gears. It seems to be used from one end of the country to the other and in all seasons. A cast net takes the form of a circular net up to 10 metres in diameter, weighted at the edge with chain or lead weights. The net is slung across one arm and is cast with the other. It is used from the shore or a boat. While cast nets are probably most commonly used by individual fishers, they are also sometimes used in group situations. In some locations villagers have a tradition of fishing in large groups with cast nets from boats. Nets will be cast simultaneously into the same general area in a

technique known as *soum he*. This technique may be used when many fish are needed for a communal event such as a festival or wedding.

These days cast nets are generally made from cotton, or mono-filament or multi-filament nylon. They were previously made from the bark fibre of *Hibiscus* sp. (*theuang*), and for a time from imported jute fibre.

Cast nets may be used in all seasons, though in some places their use is seasonal, depending on the local conditions. They are generally used by men.



*sout he* - simultaneous casting of nets to trap a school of fish

### 3.2 Sweep Line and Cast Net

*kouat theo* [goat teow] (Lao Loum)

This is a variation on the use of a cast net. In this technique a line with fish-scaring attachments is swept in an arc and used to scare fish into a cast net hung over bamboo floats.

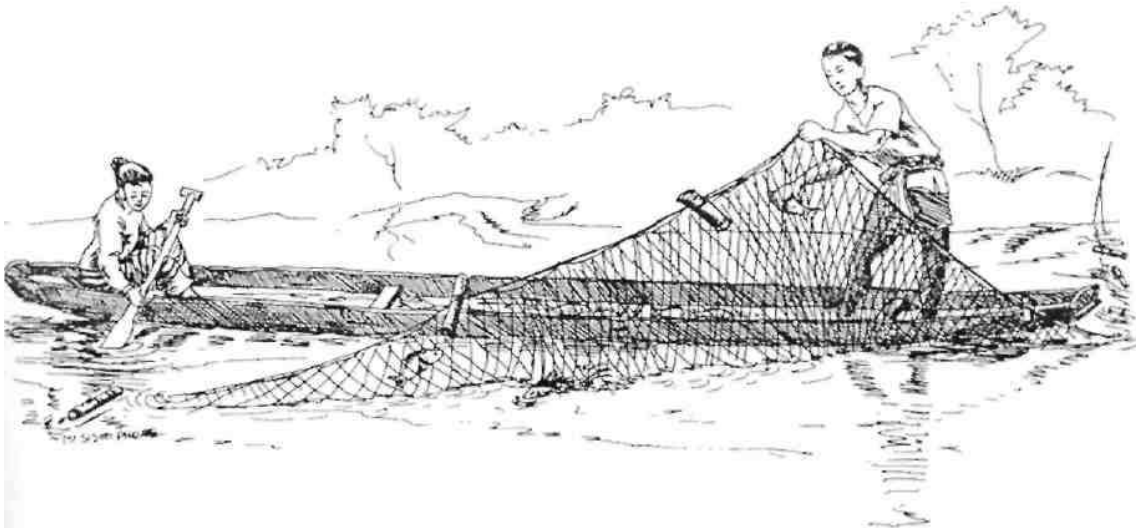
The equipment is used in shallow water up to 1.5 metres deep (but usually one metre or less) where the bottom is stony. A cast net is anchored to the bottom with stones around most of its circumference and the unanchored part of the margin is brought to the surface and draped over two floats made of three-segment lengths of thick bamboo. Two people stand in the water holding the end of each bamboo float away from the cast net. In their other hands they hold the ends of a rope traditionally made of fibres from *Hibiscus macrophyllus* bark, but now usually jute. Attached to the rope are crossed short lengths of the shiny white inner surface of bamboo and stones (now sometimes replaced by tin cans filled with stones). The rope is run out in an arc and held by

two or more helpers. When the setup is ready the rope is agitated so that the stones bang on the bottom and the white bamboo crosses flash in the light. This has the effect of scaring fish into the suspended cast net. When those holding the bamboo floats feel fish hit the net they withdraw the floats so that the cast net drops to the bottom, trapping the fish.

This gear is often used as part of a fishing expedition by a group of people from a village who set up the gear in the morning and catch fish which are then cooked for a "picnic" lunch. Afterward the gear is used again to catch fish which will be taken back to the village. Up to 30 kg of fish is not an unusual catch for one setting of the gear, though 10-15 kg is perhaps the most common catch.

One of the authors (TS) has observed this gear in various locations in northern Laos (Nam Song and Nam Lik in the Nam Ngum area, Nam Ou near Louang Phabang, and Nam Ma and Nam Et in Houaphan Province).

## 4. LARGE NETS



checking the catch in a gill net

### 4.1 Gill Net

*mong* [mohng] (Lao Loum)

A rectangular net, usually of mono-filament or multi-filament nylon. It can be set in the water between two stakes or other anchor points (set gill net), moved through **the** water by people holding **the** ends, or allowed to drift on the current (drifting gill net). Gill nets are used in rivers and in overflow wetlands. They began to be in common use in southern Laos in the late 1960s and early 1970s. By the early 1980s they were probably in use throughout much of the country. Mesh sizes commonly in use are in the range 2 cm to 8 cm, though meshes of up to 30 cm are used during the wet season, and for catching large *Probarbus* sp. between November and early January. Mesh sizes of 2.5 cm to 4 cm are the most common.

Gill nets tend to become more frequently used (over used) when fisheries in Laos change from subsistence to market-based. Their overuse is clearly having a significant detrimental effect on fish stocks in most areas where they are used to support an expanding commercial fishery.

### 4.2 Beach Seine/Haul Seine

*kouat mong* [gooat mohng] (Lao Loum)  
*ke ouan* [gae oan] (Lao Loum)

Generally used only in **the** Mekong and larger tributaries in conditions of fairly slow current where the bottom is sandy. The net is shot from a boat and then hauled in by around 5-6 people on the shore. Various mesh sizes are used. Beach seines are generally used in December to June (low and rising water).

This gear has been made illegal by District or Province administrations in many parts of southern Laos because of the volume of fish that can be caught.

### 4.3 Bait Net/Shrimp Net

*gneng* [nyaeng] (Lao Loum)  
*dang gneng* [dang nyaeng] (Lao Loum)

A generally fine-meshed net about three metres long and 1.5 metres high, fixed to poles at each end and dragged through the water by two people.

They are often used in wetlands (*nong*) or at the confluences of streams and rivers. *Dang* is a general term for a fibre net, often made from the same material as cast

nets. *Dang* can be very large, but these have become uncommon, having largely been replaced by green plastic screen (*rnong khieu*).



dragging a *tong* - often several people will be required to drag the net

#### 4.4 Box Funnel Net

*tong* [dtong] (Lao Loum)

A bag-like cord net with a rectangular opening 3-5 metres wide and 1-2.5 metres high and narrowing to a funnel at the back. Has a catch bag with a smaller mesh at the pointed (funnel) end. The *tong* is dragged in flowing water by means of vertical poles at either side of the rectangular opening. It is usually used during the wet season, sometimes in deep pool areas. They catch many large fish (when these are available). Often four or five people will move toward the opening of the *tong* to chase fish into the net, which is closed by lifting the opening into the air.

A smaller version is used in the Mekong in northern Laos where a chain (originally a cord with attached stones) is dragged toward the *tong* opening. Typically 4-5 kg of fish are caught in each pass with this smaller version.

The gear is becoming less popular in central and southern Laos and is banned in many places because of the volume of large fish that can be caught. A single *tong* cost 3,300 Bant in Savannakhet Province in 1993.

#### 4.5 Hand Operated Drift Net

*nam* [nam] (Lao Loum)

A net 2-3 metres deep and about 4 metres long hung below a boat which then drifts downstream with the current. When the two fishers in the boat feel a fish hit the net it is abruptly pulled in.

The gear is generally used to catch large fish such as migrating *Pangasius* species in the Mekong in May and June. It is not much used now because of the reduced numbers of large fish and because the numbers of gill nets set in rivers where it was formerly used do not allow space for a boat to drift.

#### 4.6 Bag Net Across Stream Mouths

*man* [mun] (Lao Loum)

In southern Laos, and to a greater extent in northeastern Cambodia, this gear is used to block large streams as fish retreat with falling waters between late September and November to large rivers like the Mekong and Sckong (Xe Kong).

The gear consists of a large net (usually imported from Vietnam) with varying mesh sizes, from large near the opening to very small on the bag portion of the net. The two ends of the *mun* are positioned at either bank of a stream with the net blocking the channel from the surface to the stream bed and forming a 20-30 metre long funnel leading to the downstream bag end. Lifting the upstream part of the funnel periodically forces trapped fish down to the bag.

This gear is illegal in many parts of Laos because it is regarded as being heavily impacting on fish stocks - a single *mun* may catch many tonnes of fish in a season. Its use is almost exclusively for commercial fishing. In southern Laos local fishers are strongly opposed to use of this gear.

## 5. SCISSOR NETS

The fact that use of scissor nets is declining in most places because they no longer represent a good return on the time and effort involved is one of the many indications of declines in fish stocks in recent decades. It is a method that relies on patience, a detailed knowledge of fish migration times and routes, and reasonable numbers of fish to make it worthwhile.



### 5.1 Small Scissor Net

*jip* [tchip] (Lao Loum)  
*ja vo* [tcha wo] (name used in some areas)  
(Lao Loum)

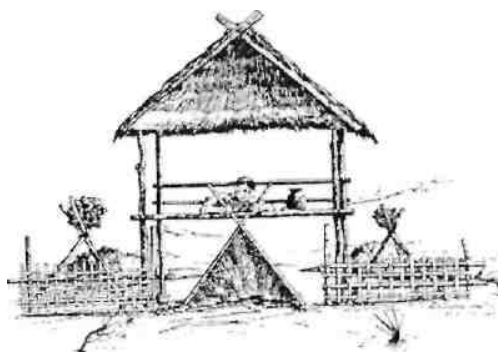
This gear is usually used by men. A net funnel attached to two sticks around 1.8 m long. The sticks are crossed near one end and the net is attached to the other end. The upright sticks are spread apart in flowing water so that the net bag is open. The gear is sometimes placed in a gap in a roughly constructed fence of sticks and leaves and sometimes in a small watercourse or ditch.

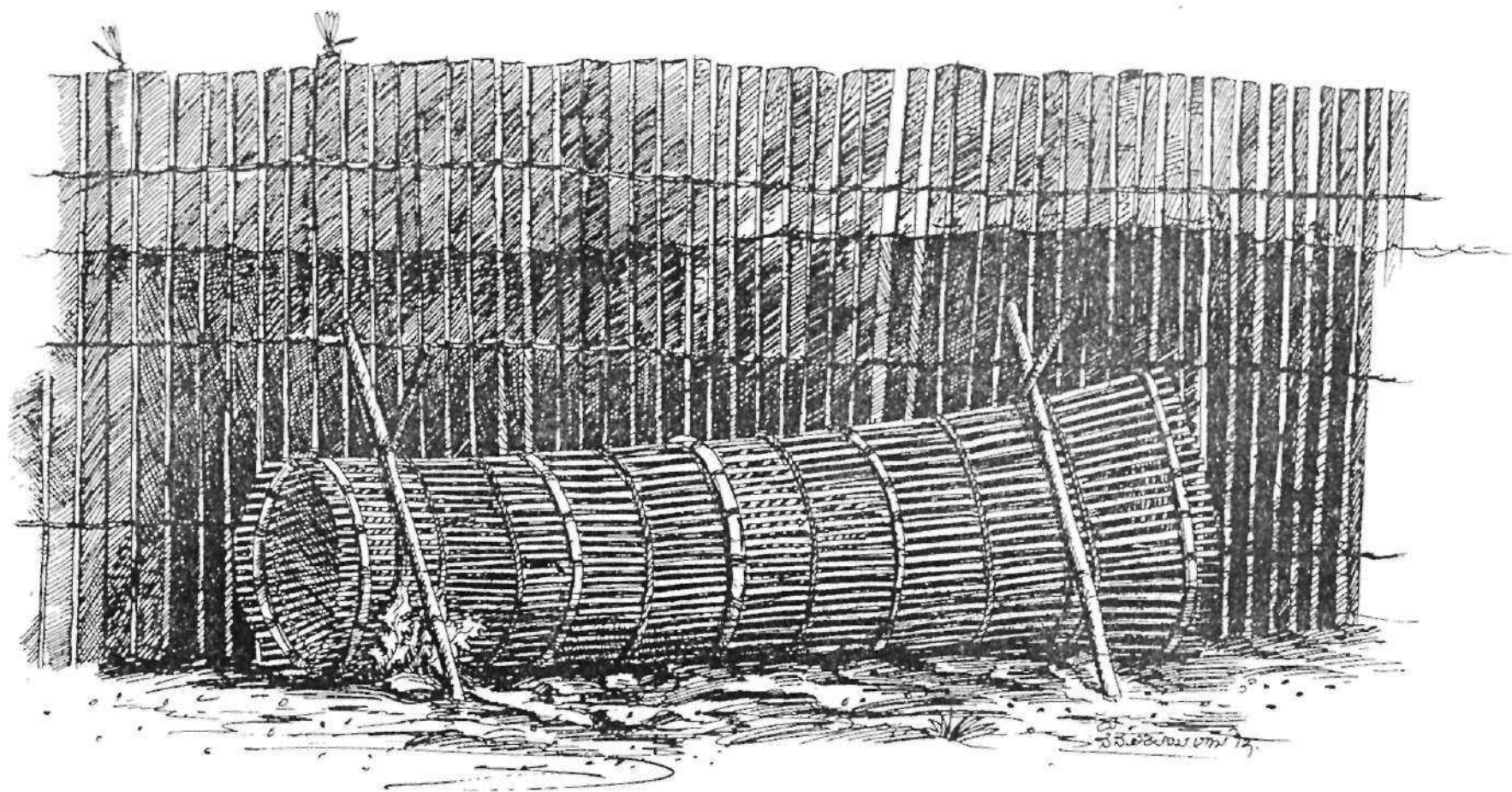
When the fisher sees or feels the fish move into the net he jerks the sticks upward and together, thus closing the funnel. Fish are removed from the net via a drawstring opening at the rear of the funnel. Larger *jip* are held from the side in a manner very similar to that shown for *sone* (see section 2.4) Commonly used during times of rising floods but also when water levels are falling.

### 5.2 Large Scissor Net

*jip* [tchip] (Lao Loum)  
*ja vo* [tcha waw] (name used in some areas) (Lao Loum)

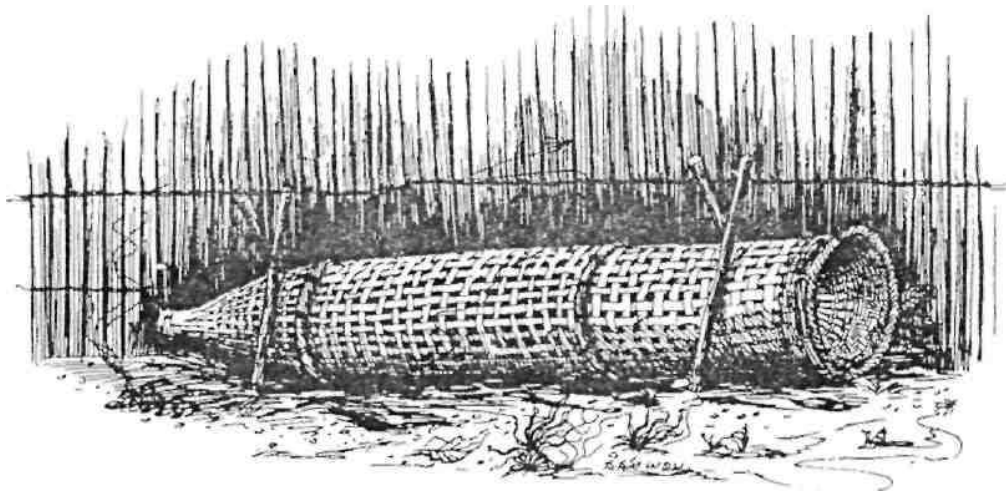
This is a larger version of the previous gear. The user lies on a platform above a gap in a fence constructed across the current (usually in a flooded area where water is rising, or, less commonly, falling. A roof over the platform provides shade for the fisher and also makes it more difficult for the fish to see him.





one method of setting the common form of *lop* - against a *pheuk* fence

## 6. HORIZONTAL CYLINDER TRAPS



form of *lop* used by the Lave ethnic group (Lao Theung) in Pouvong District of Attapeu Province

### 6.1 Horizontal Cylinder Trap

*lop* [lawp] (Lao Loum)

*sai lop* [sai lawp] (Lao Loum)

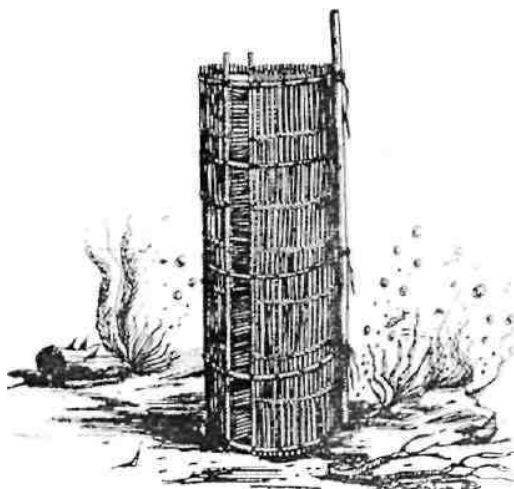
*lop gnai* [lawp nyai = large lawp] (Lao Loum)

A cylindrical cage trap, traditionally made from split bamboo. Modern types (see next page) use fibre or nylon netting over a bamboo frame. Typically 40-50 cm in diameter and 1.5 metres long, though smaller examples are often used, and larger *lop* are not uncommon. There are frequently two conical sets of inward facing bamboo spikes to allow fish to enter but not to leave, though in parts of southern Laos there is generally only one set of spikes. Larger forms (*lop gnai*), up to five metres long and 0.75 metres in diameter, sometimes have removable spike cones so as to allow the catch to be tipped out. Smaller forms are a general purpose trap used

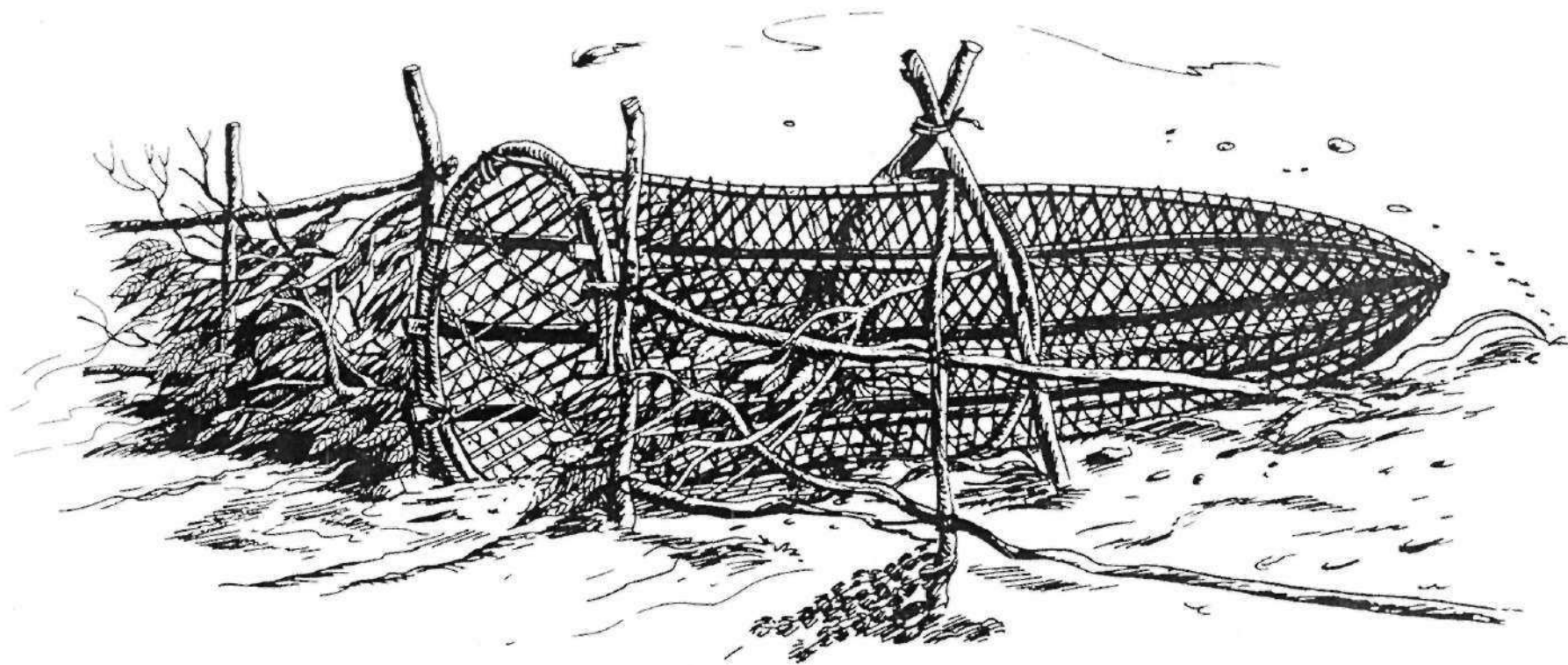
at most seasons. They are sometimes set on the bottom of *nong* alongside bamboo fences (*pheuak*). Large forms are used at times of rising and falling water to catch migrating fish.

A *lop tung* [lawp dtung] is a vertical cylindrical basket with a vertical slit along the side of the cylinder. Inward facing spikes prevent fish leaving the trap through the slit. *Lop tung* are commonly 1.3 metres high and 0.3 metres in diameter. They are used in the south of Laos to catch a range of migrating fish which utilise surface and bottom habitats near stream banks.

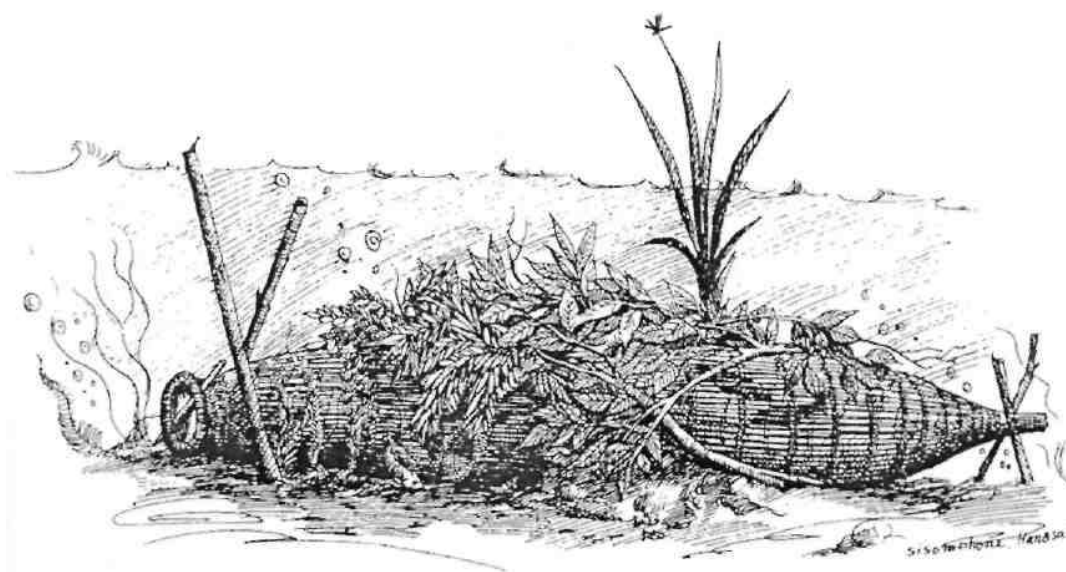
Although the name suggests that *lop tung* belongs to the general family of *lop* (horizontal cylinder traps), the vertical orientation makes them structurally similar to gear like *toum* [dtoum] (see 7. below) but with the entrance continued the whole length of the basket. It has only one set of spikes at the entrance (like *toum* and *sai*) but is never baited, whereas *toum* are always baited.



*lop tung*



a modern form of *sai* using netting over a bamboo frame



one of the methods of setting *sai*

## 6.2 Funnel Basket Trap

*sai* [sai (same as English "sigh")] (Lao Loum)

Bottle-shaped basket traps used in rice paddies and ponds, and sometimes near the banks of rivers. *Sai* are traditionally made from finely split bamboo. In more recent times a range of larger traps made from netting over a bamboo frame has come into use. These appear to be a modern variant on the traditional *sai* design, easier to make and maintain. However it is not certain that these are not derived from drop-door traps (*jun* - see section 10.) since the same enclosure with net over a bamboo frame is used in modern *jun*.

*Sai* are also used to catch frogs in the rainy season in southern Laos.

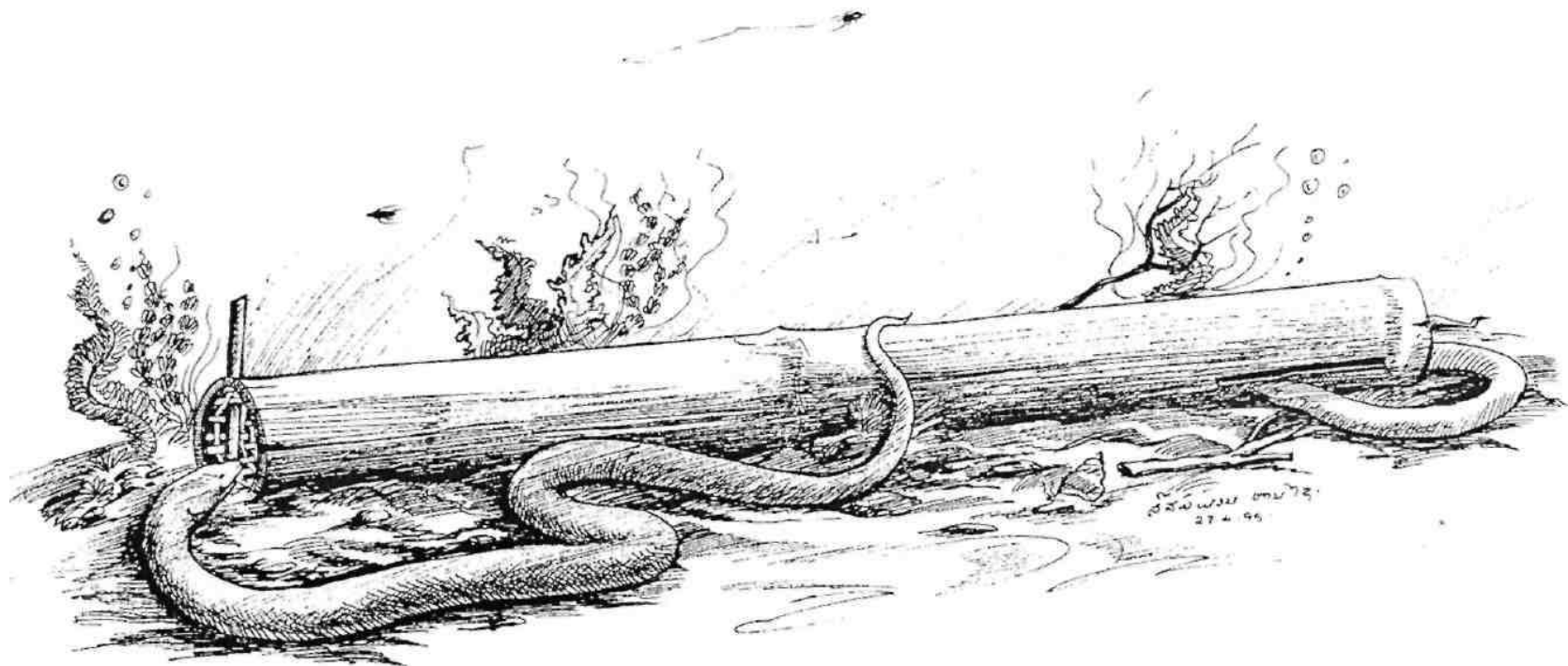
The distinction between *lop* and *sai* is not always clear. In general horizontal cylinder traps with two spike cones are *lop*, while those with only one spike cone or a side entrance are *sai*.

## 6.3 Conical Basket Trap

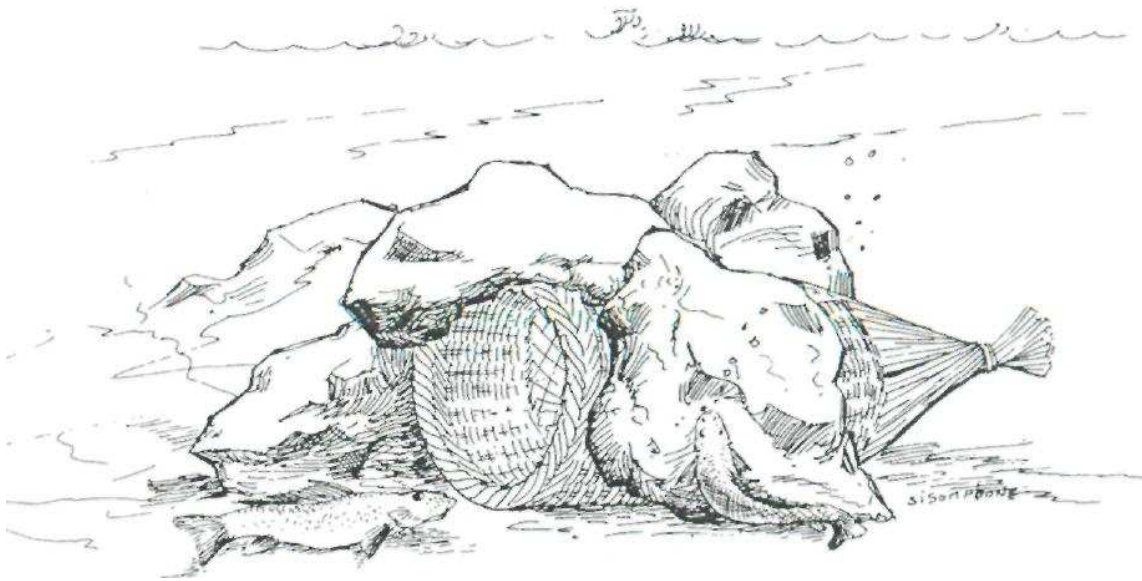
(see over page) *moi pa mut* [moi pa muht] (Lao Loum) {*moi* = watching and waiting}

This trap is similar to a *sai* or *lop* but is used to catch only one species of fish - *pa mut* - in the Nam Song in Vientiane Province. It has a single inward-facing cone of bamboo spikes at the large end of a conical woven basket about 40 cms long and 15 cms in diameter at the wide end. The apex is closed with a tie that can be released to remove the fish. *Pa mut* are found in rocky river bottoms. They feed on water weeds growing on the rocks. This trap is not baited, but is wedged under or between rocks where the target species is likely to hide.

Traps are set in the evening during the dry season (November to March) and are checked each morning. It is usual not to catch any fish for several days while the fish become accustomed to the trap. Traps are removed if the water becomes turbid after rain. This gear is used by men.



a bamboo tube eel trap - *Lan*



*moi pa mut* set in a river bed

#### 6.4 Bamboo Tube Eel Trap

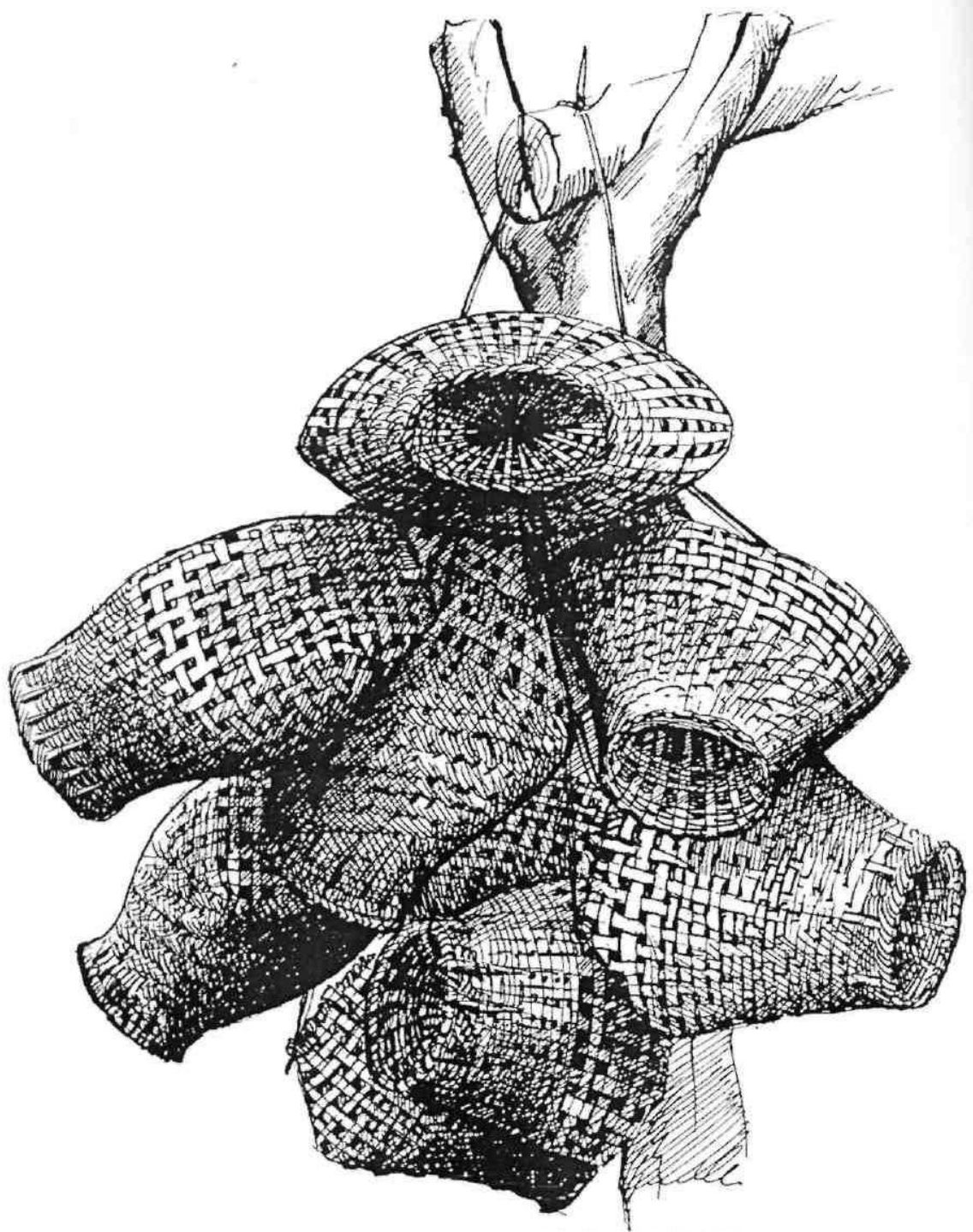
*Ian* [lun - very short "u" - the sound is like "lahn"  
said very quickly] (Lao Loum)

A bamboo tube with a spike funnel entrance inserted in one end and a narrow slit in the side near the other end, used to trap eels. There are frequently holes off-centre in the open end for a bamboo pin to fix the trap in position. Bait such as rotten fish is placed in the bamboo tube which is placed horizontally, usually in *nong*.

#### 6.5 Basket Frog Trap

*ngep* [nyep] (Lao Loum)

This is a woven bamboo basket trap for catching frogs. It has a round funnel opening with inward facing spikes into a flattened, purse-shaped basket. The basket is closed by a clip or string at the back, so that it can be opened to remove frogs. Frogs apparently enter the trap when they are seeking a safe resting place to spend the day.



basket frog traps - *ngep* - stored during the dry season

## 7. UPRIGHT BASKET TRAPS

Probably more than any other type of fishing gear, the design of upright basket traps reflects the cultural diversity of Laos. Different proportions and different weave patterns are often culturally based rather than being related to the different fish species which are targeted, though there is considerable subtlety in the modification of design to the species sought.



### 7.1 Upright Basket Trap

|                     |                            |
|---------------------|----------------------------|
| <i>toum</i>         | [dtoom] (Lao Laoum)        |
| <i>toum Ian</i>     | fdtoom lun] (Lao Laoum)    |
| <i>toum pa douk</i> | [dtoom pa douk] (Lao Loum) |
| <i>toum pa khao</i> | [dtoom pa khow] (Lao Loum) |

*Toum* are bottle-shaped basket traps placed upright tied to a pole set in the bottom. There is an entrance in the side near the base with an inward facing spike cone. This entrance is usually rectangular but may be square or round. There is an opening at the top for removing the catch. When in use this top opening is closed, usually by a woven cover. This gear is baited using a wide variety of materials. Termite larvae and rice bran are common baits. *Toum* are sometimes named for the species of fish intended to be caught with a particular design. Thus *toum pa douk* are for catching *Clarias* sp. (*pa douk*) and *toum pa khao* are for catching small white fish with scales (*pa khao*).

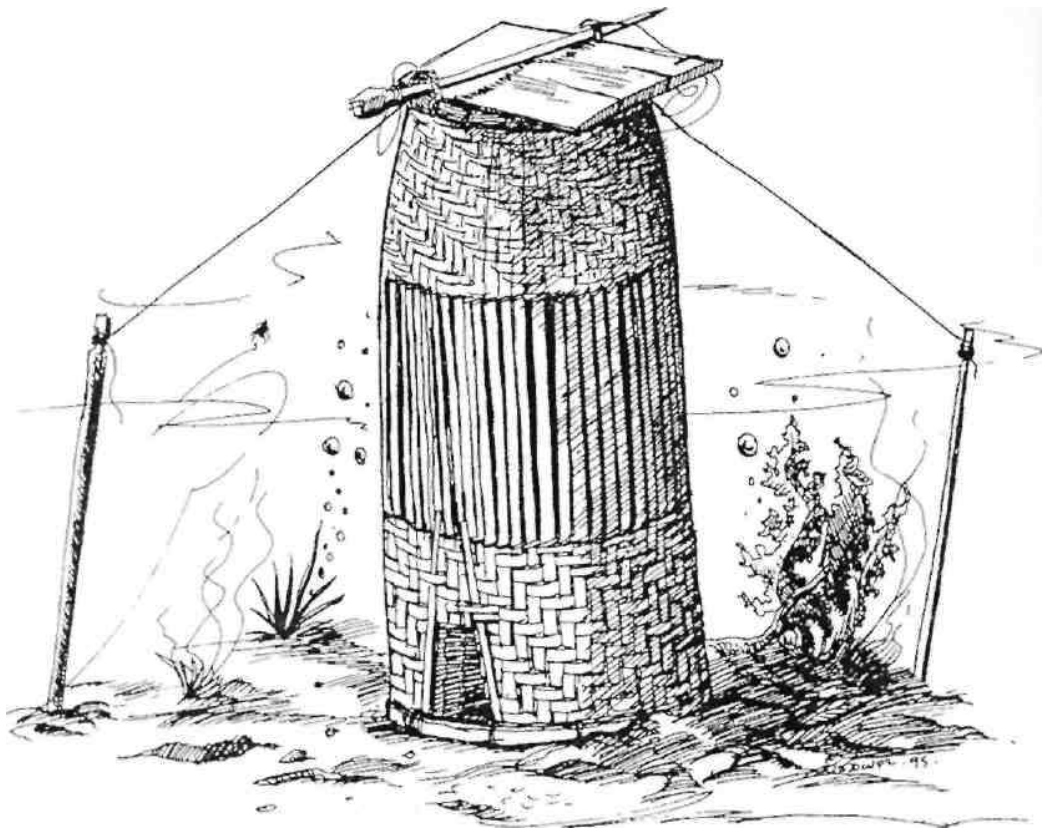
On the Nam Don in Khammouane Province *toum* are baited with small fish or crabs to catch frogs in October and November.



### 7.2 Basket Eel Trap

|                 |                         |
|-----------------|-------------------------|
| <i>toum ian</i> | [dtoom eean] (Lao Loum) |
|-----------------|-------------------------|

A *toum* for catching eels, with a circular entrance to the spike cone. *Toum ian* typically have a much longer neck than *toum* used for catching fish. Sometimes this gear also has a long conical basketwork bait-holder which fits in the neck.





### 7.3 Open-weave Upright Basket Traps

*loun laan* [dtoom laan] (Lao Loum) - this is the full name of the gear  
*laan* [laan] (Lao Loum) - a contracted form of the name, used in far southern Laos

*Toum laan* is a squat version of *town*, generally with a triangular or sub-triangular opening at the bottom with a spike funnel. They are typically closely woven near the base and most have a more open weave higher up the side, though there is considerable variation in the weave. The different designs sometimes have specific names. In southern Laos different forms are known as *Ian khong* and *Ian toum nok ka tha*. Three designs are shown opposite and above.

*Toum laan* are usually anchored with two cords to stakes in the bottom. Sometimes they are set by fishers who dive to place them in up to two metres of water. They are often baited with rice bran, and sometimes a mix of rice bran, termite larvae and clay. Seasonality of use and the target species vary as does depth of water in which they are used.

In Khone Falls they are used to catch small cyprinids in the late dry season (low water) March-April. In inland parts of southern Laos (i.e. away from the Mekong) *laan* are used in October/November to catch small cyprinids in streams. In Central Laos *toum laan* are used in the flood season.

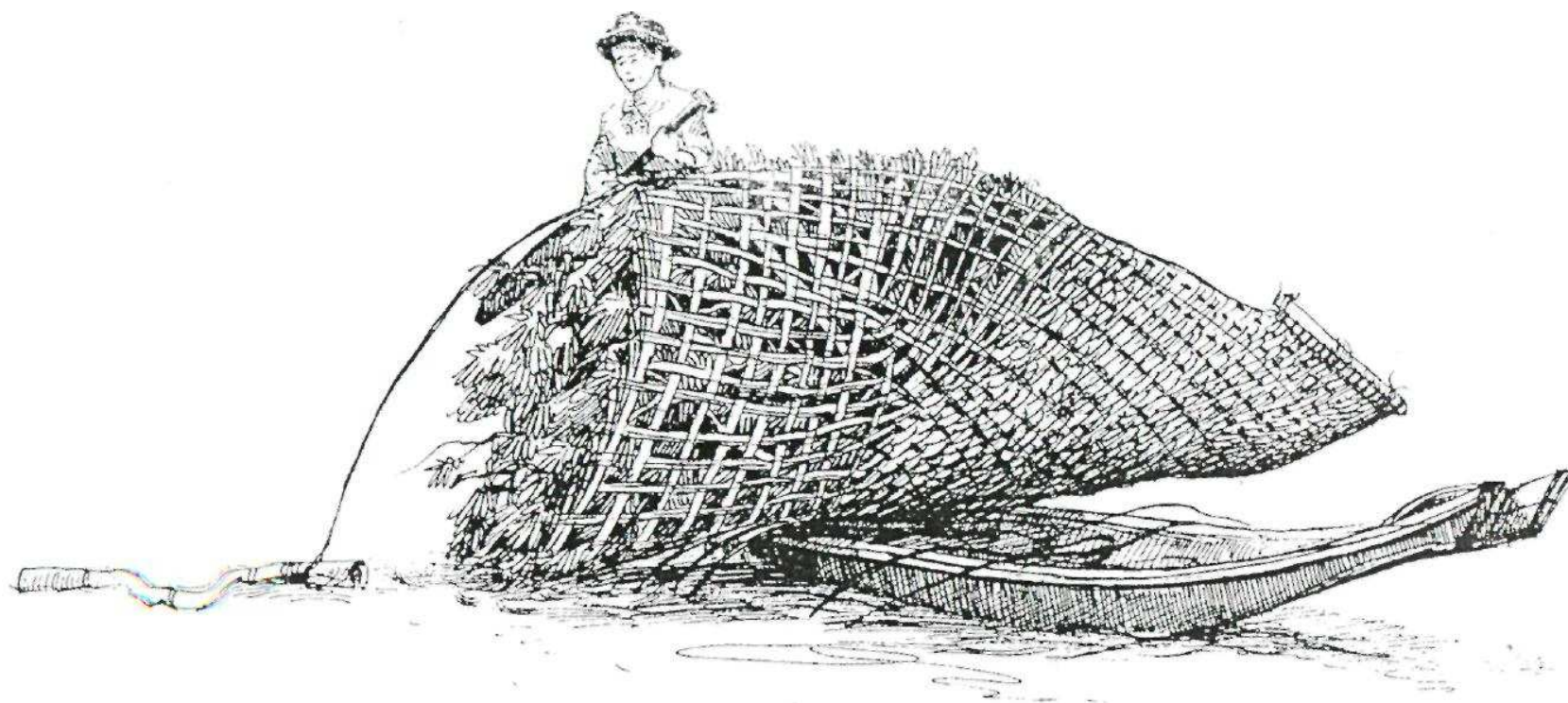
## 8. Plunge Basket



### 8. Plunge Basket

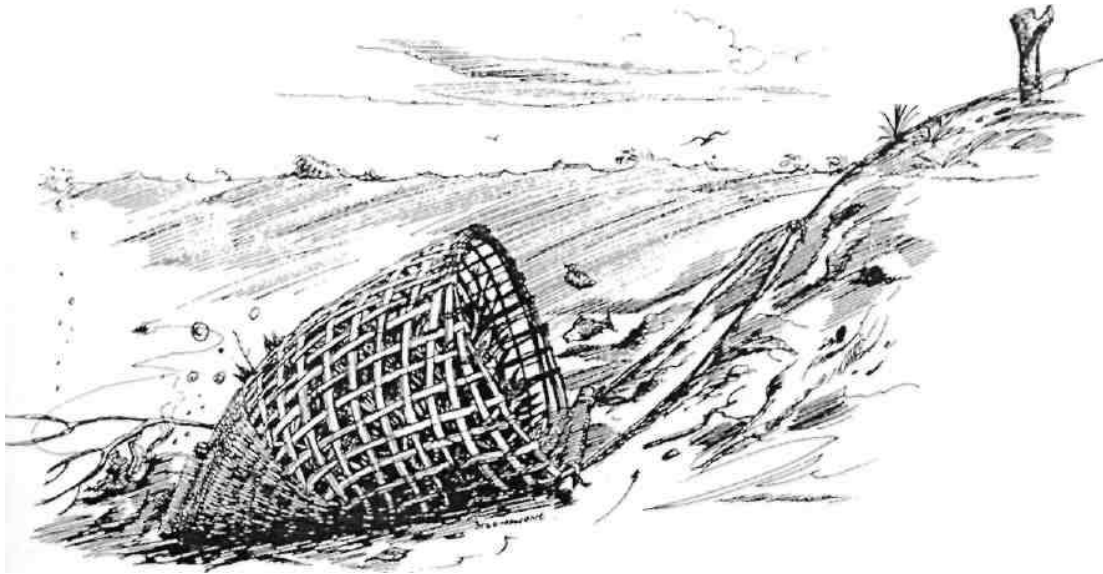
*soum* [soum - very short, like the last syllable  
in "blossorrT"] (Lao Loum) *sak sum* [sak  
soum - the action of using a *soum*]  
(Lao Loum)

A conical basket usually made of bamboo, with an opening for inserting the hand and arm at the apex and open at the bottom. The *soum* is plunged to the bottom of shallow water, such as in rice paddies, and the hand is inserted through the top to check for any trapped fish. *Soum* may be used by women, men and children.



moving a large *kha* into position with a boat

## 9. BRANCH-BUNDLE FISH-ATTRACTANT DEVICES



### 9.1 Fish-attractant Basket

*kha* [kha, kah] (Lao Loum)  
*khasanang* [kha sanang] (Lao Loum)  
*khaphouang* [kha phouang] (Lao Loum)  
*kha gno* [kha gnyo] (Lao Loum)

A large bamboo basket, sometimes rounded scoop-shaped (typically 70 cm wide by 100 cm long) (above), but frequently enclosed with a neck in the side (then typically 150 cm wide by 300 cm long) (opposite). In Khammouane Province Lao Theung groups use a large triangular scoop-shaped *kha* of woven bamboo matting with the closed end and the top edges reinforced with bamboo slats. This form is typically one metre wide across the mouth, one metre high and two metres long.

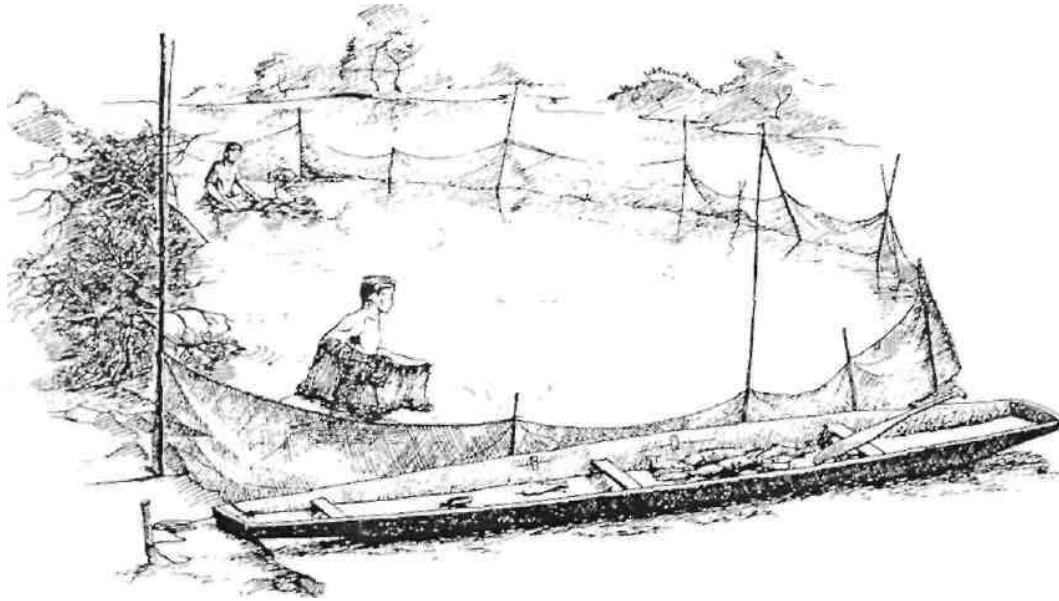
*Kha* are filled with a bundle of leafy bamboo and sticks which acts as a fish-attractant device. Fish are caught when the *kha* is lifted or dragged carefully from the water. *Kha* are usually fully submerged and attached to a rope and float, though the scoop-shaped variety are sometimes only partly submerged.

The open-topped, scoop-shaped form (above) is found throughout southern and central Laos.

It is used at the edges of rivers. It is used in the Khone Falls area in May-August (water rising) to catch small cyprinids. On the Mekong above the falls there are several variants on this design (e.g. *kha gno*, *kha sanang* and *kha phouang*) used between September and November mainly to catch fish entering the mainstream Mekong from smaller streams and rice paddies.

The closed form is used almost exclusively in the dry season/low water in central Laos (e.g. Nam Hinboun) - in deep pools to catch deep water species. Catch includes *Wall ago attu* and *IV. leerii*.

Fish-attractant baskets are usually left in place for a minimum of two weeks and up to one month to allow fish to become habituated to the new structure and to begin to use its shelter.



harvesting fish from a fenced fish-attractant branch bundle - the branches are moved up onto the bank

## 9.2 Fish-attractant with Fence

*sekat pa* [sekat pa] (Lao Loum)  
*kaat pa* [kaat pa] (Lao Loum)  
*houm* [hoom] (Lao Theung)  
*pok* [pok] (Lao Loum - general use) = the branch bundle  
*hum* [hoom] (Lao Loum - Vientiane) = the branch bundle *theup* [thoop] (Lao Loum - Champassak, Salavane, Xekong) = the branch bundle  
*poksoum* [pok soom] (Lao Loum) = the action of harvesting *tap sown* [tap soom] (Lao Loum) = the action of harvesting

Fish are attracted to a large pile of branches and shrubs placed in the water which are left there for at least one month. The branches are then surrounded by a fence (formerly *pheuak* or *dang* but now often nylon screen - *mong khieu*). The trapped fish are removed by hand and with various equipment, including cast nets, after the branches have been removed. Placing the net around the branches to catch the fish is (*se*)*kat pa*, or *kaat pa*. Branch bundles may be reused two or three times. Usually a riverside plant species that is eaten by migrating fish during floods must be included in the branches, and this must be renewed if the branch bundle is to be reused. The typical plant used is *ton khai*. This technique can catch up to 50-60 kg of fish at one time, and usually around 30

## 9.3 Coconut Frond Fish-attractant Device

(Lao name for this technique is not known)

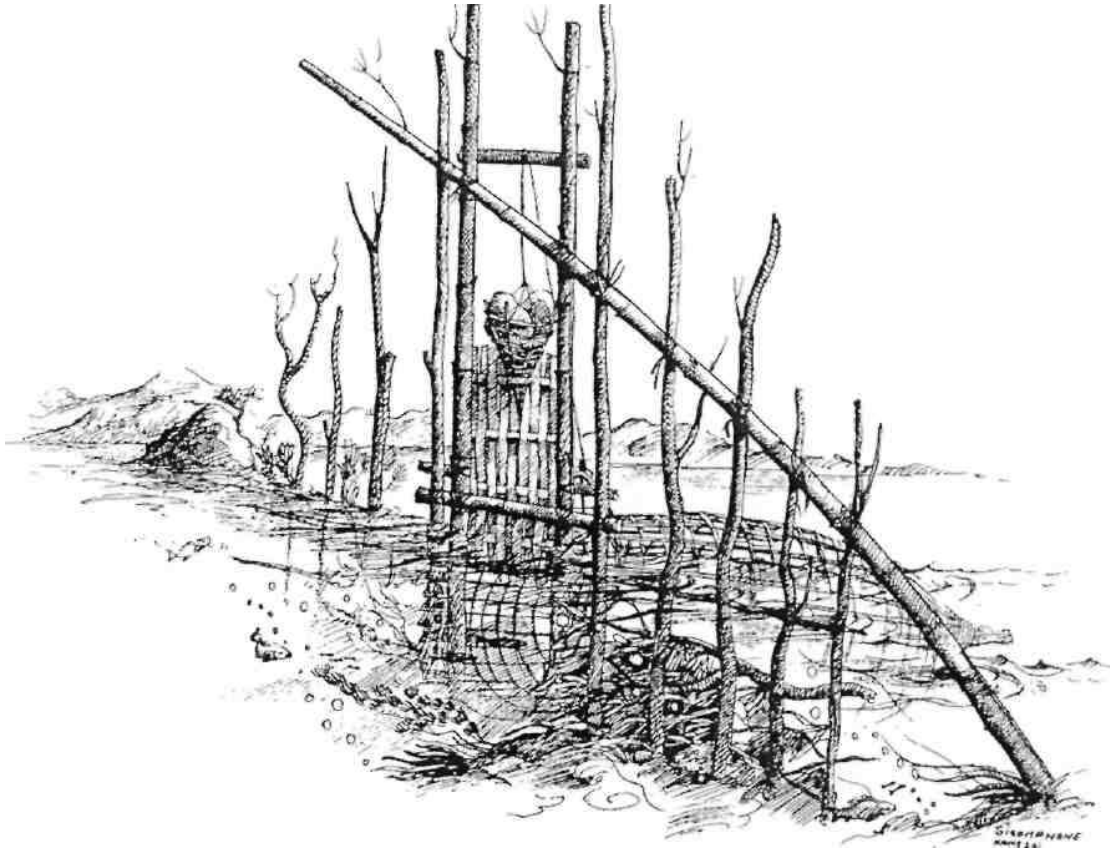
Coconut fronds or branches of other trees set in open water to attract fish. Other fishing equipment, often nets, is then used to catch the fish. This technique is used in Nong Bungva near Savannakhet. It is similar to the coconut frond fish attractant devices traditionally used by artisanal saltwater fishers on the southeast coast of Thailand.

## 9.4 Pit and Branch Bundle

*lum* [lum - like "luhm" but very short] (Lao Loum)

This technique is apparently a variant on the pit-traps described at section 14. A pit 1 -1.5 metres in diameter and around one metre deep is dug in shallow water near the edge of an overflow wetland. This is then filled with bamboo and other branches. A bund is constructed around the pit to above water level with a gap to allow fish to enter. After several days the gap in the bund is closed and the water bailed out, leaving any fish which had sheltered in the branches.

## 10. DROP-DOOR TRAPS



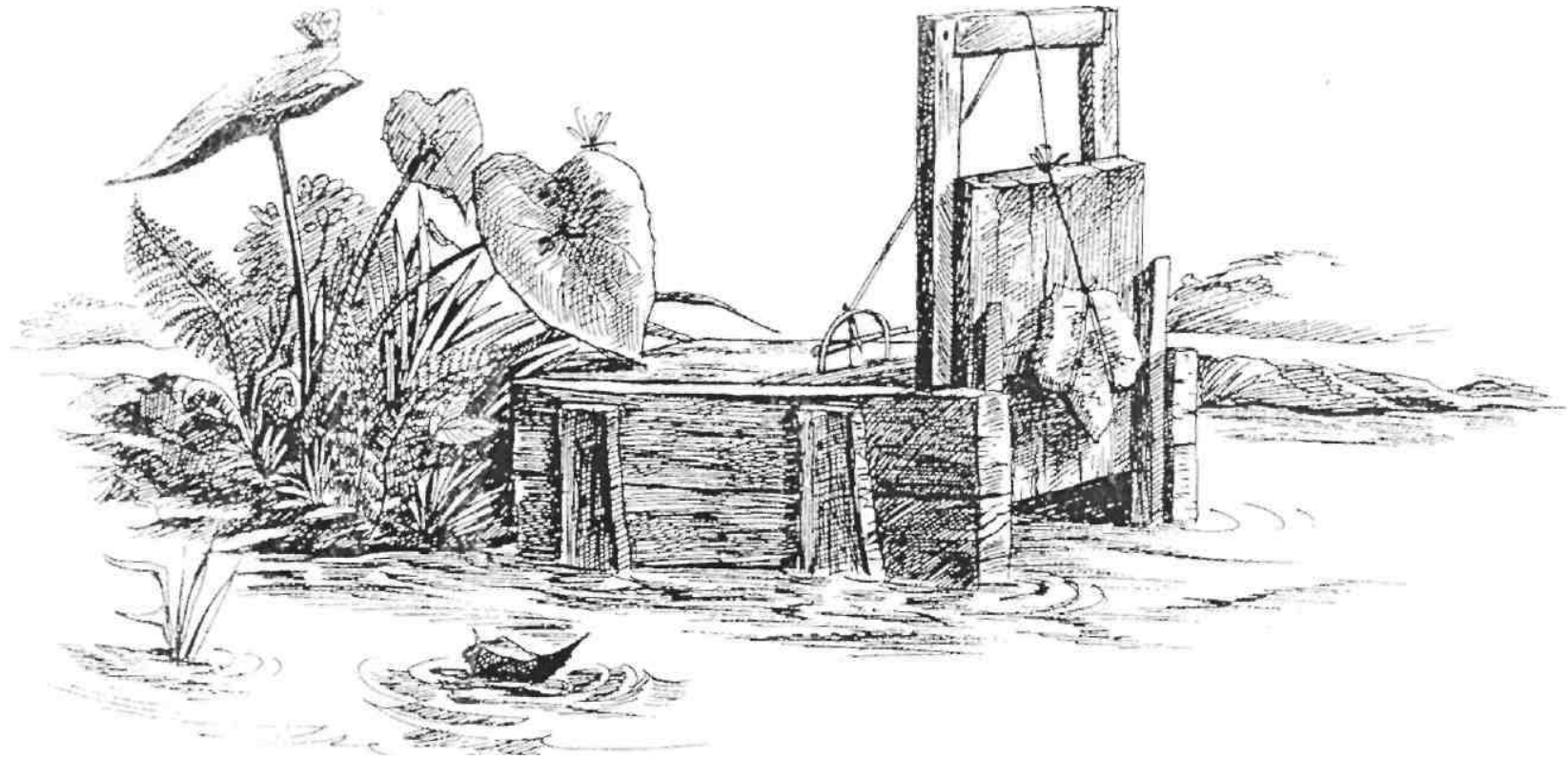
### 10.1 Drop-door Basket and Box Traps

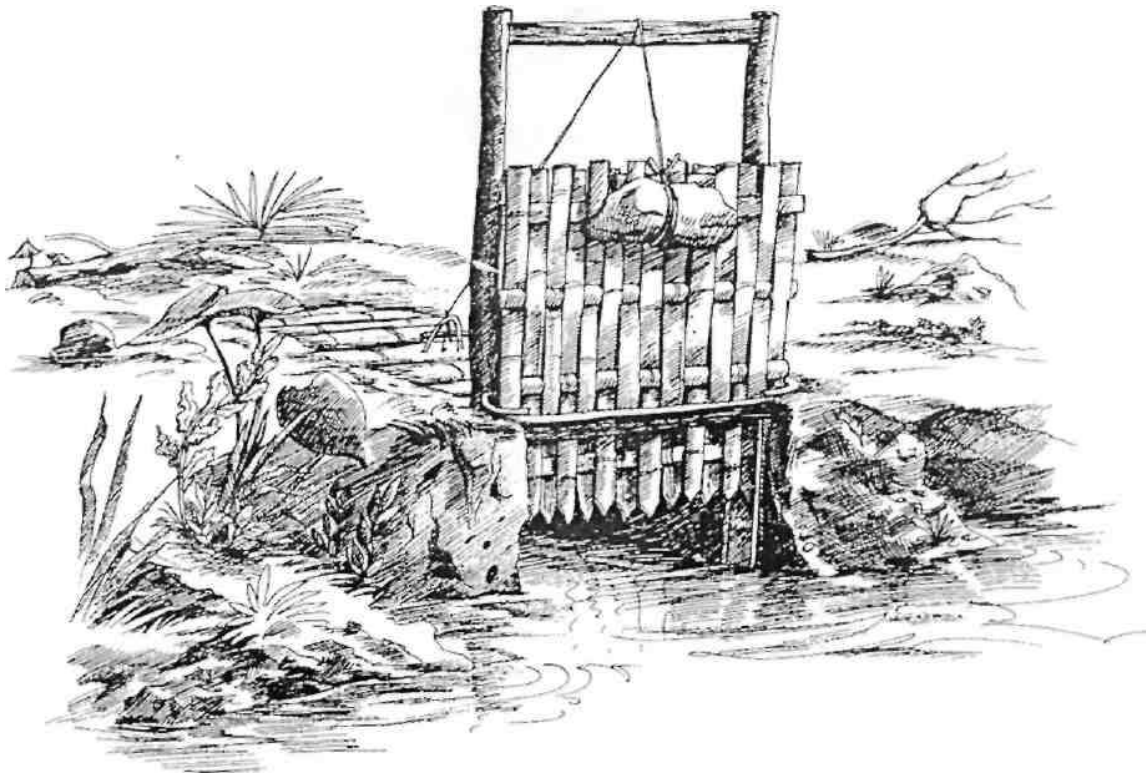
*jun* [tchan] (Lao Loum)

This gear is a drop-door trap with an enclosure for holding fish. It is triggered by the movement of fish inside the trap against strings passing vertically through the enclosure. The door is usually weighted with a stone. The enclosure may be a basket of woven bamboo (up to 1 m in diameter and 2 m long, or fibre net (this is the more modern variant, typically slightly smaller - 60 cm diameter and 1.3 m long). It may also be a box-shaped enclosure made of woven bamboo strips or wooden planks, usually more or less rectangular in section (typically of the order of 40 cm long, 20 cm wide and 20 cm high) - (see illustration over page).

Large basket *jun* are used widely in Laos, usually in rivers on rising floods when fish are likely to be seeking food and breeding places among the flooded bank vegetation. Plank and bamboo box *jun* are used in still water to catch fish which typically seek out holes under banks and in waterside vegetation, such as *Channa striata* and *Clarias sp.*. They are set into overhanging bank vegetation, among water plants, or a large amount of vegetation is put in front of the entrance to lure fish. Plank *jun* seem to be used in the southern part of the country from Khammouane Province south.

Though intended primarily for fish, large *jun* also catch soft-shelled turtles. Small *jun* sometimes catch birds such as rails and crakes instead of the target fish species.





## 10.2 Drop-door Ditch Trap

*jun khum* [tchan khoun] (Lao Loum)

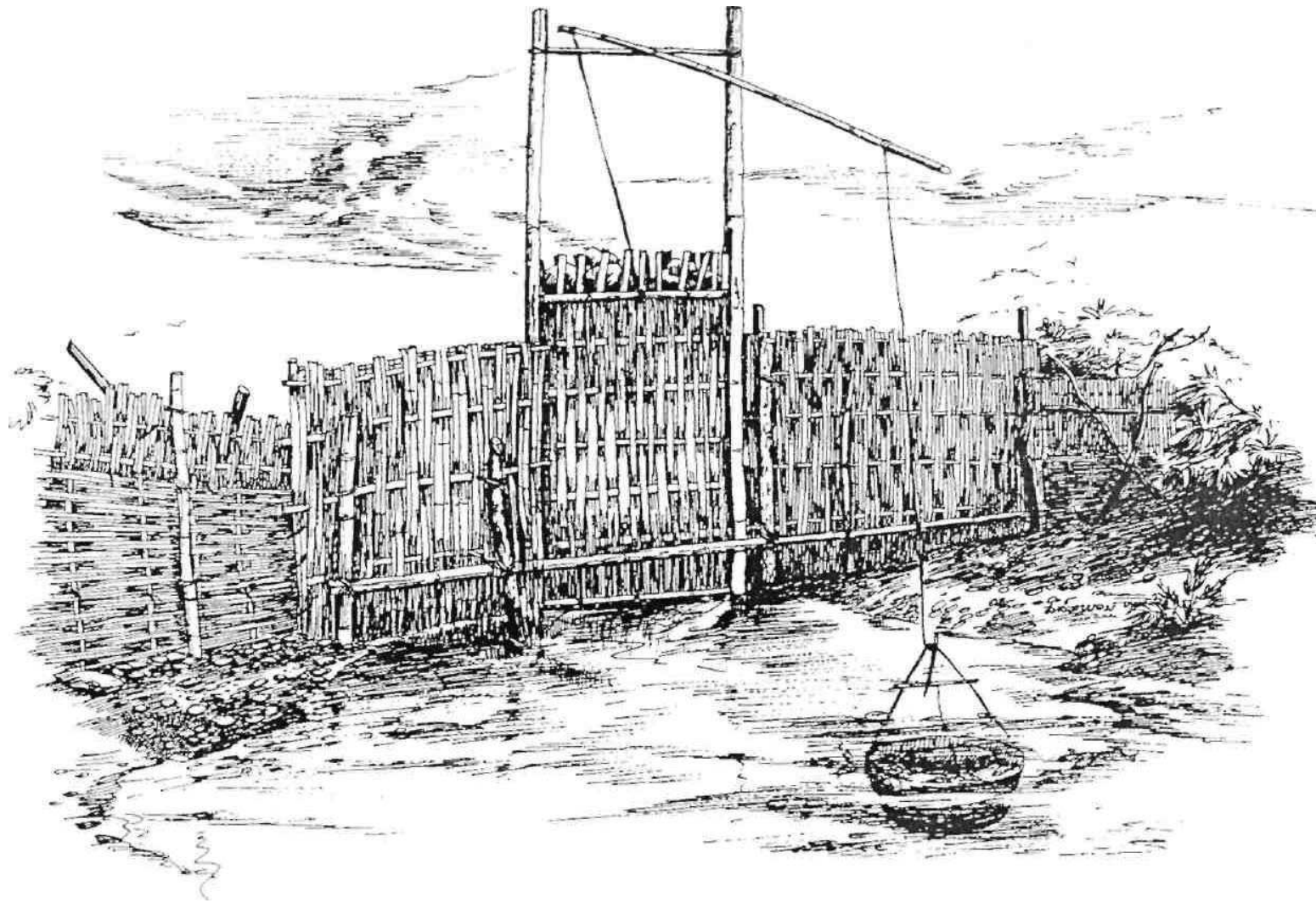
This is a type of *jun* constructed in a ditch which takes the place of the wooden or bamboo box in the normal small *jun*. The top of the ditch is closed off with bamboo or wooden sticks.

## 10.3 Drop-door Enclosure (illustration over page)

*bran* [brahn] (Lave ethnic group - Lao Theung)

In constructing a *bran* a fence, commonly of bamboo, is made across a natural re-entrant or gully mouth in a riverbank. An opening with a drop-door is set into this fence. The mechanism for triggering the door is a basket full of some fish food such as bran with a stone placed on top of the bait. The stone is connected by strings and a lever to the drop-door. When fish eat sufficient of the

bait the stone drops to a level where the closing mechanism is operated. Branches are piled around the outside of the door to attract fish which then emerge from this shelter to feed in the enclosure. This gear is used for about eight months of the year over the rainy season. It has been observed in use by the Lave group of the Lao Theung on the Xe Xou in Phouvong District, Attapeu Province.



the *bran* is a particularly ingenious device for trapping fish which come out of a branch-bundle shelter to eat the food provided

## 11. HOOK AND LINE GEAR

The most basic hook and line gear comprises a (usually barbed) hook on a line. Lines now are generally monofilament. This is regarded by some Lao as one of the oldest fishing gears in Laos. Hooks were previously handmade by the village blacksmith; now they are purchased ready made. There is a wide variety of ways in which hooks and lines are used. Baited hooks are occasionally set for frogs in the wet season, for example at Ban Phonetong in Khammouane Province.



11.1 Pole and Line Fishing

*bet teuk* [bet dteuk] (Lao Loum)

A long pole with a line tied to one end is used to cast the bait to a suitable spot. The hook end of the line is weighted with a sinker. Bait is typically earthworms, small fish, shrimp or water insect larvae. This gear is usually used by women and children and is a very commonly used fishing method in Laos.

11.2 Pole and Line "Fly Fishing"

*bet sit* [bet sit] (Lao Loum)

A long pole with a line tied to one end is handheld and the pole flicked backward and forward, much in the same motion as fly fishing. No sinker is used on the line. Bait is commonly grasshoppers or other insects, though termite and red ant eggs are used at times.



11.3 Set Pole and Line

*bet pak* [bet pbak, bet pak] (Lao Loum) (*pak* = stabbed, jabbed) *bet thote* [bet tawt] (Lao Loum) *bet khan* [bet khan - very short "a"] (Lao Loum) *bet kop* [bet gop] (Lao Loum)

A short, thin, springy pole is used, with a line attached to one end. The other end is pointed and is jabbed into the bank with the line trailing in the water. The most common bait is earthworm, but to catch *Channa striata* small live fish, frogs, shrimp and insects are also used. Fishers often use large numbers of this gear at one time (around 100 is common). The gear is commonly set in the evening and if a fisher is using a large number he will check them on the return trip. Usually the gear is left overnight then checked and removed in the morning. If fish are expected to be plentiful the gear might be checked many times in a night. *Bet pak* are mainly used by men and children.

In southern Laos set lines on poles are put out in rice fields at night during the rainy season to catch frogs (*kop*). The technique is known as *bet kop*. Hooks are usually baited with worms. Large quantities can be caught and in some villages in Khong District (Champassak Province) the technique has been banned because of over-exploitation of frog stocks.

#### 11.4 Set Pole with Live Bait

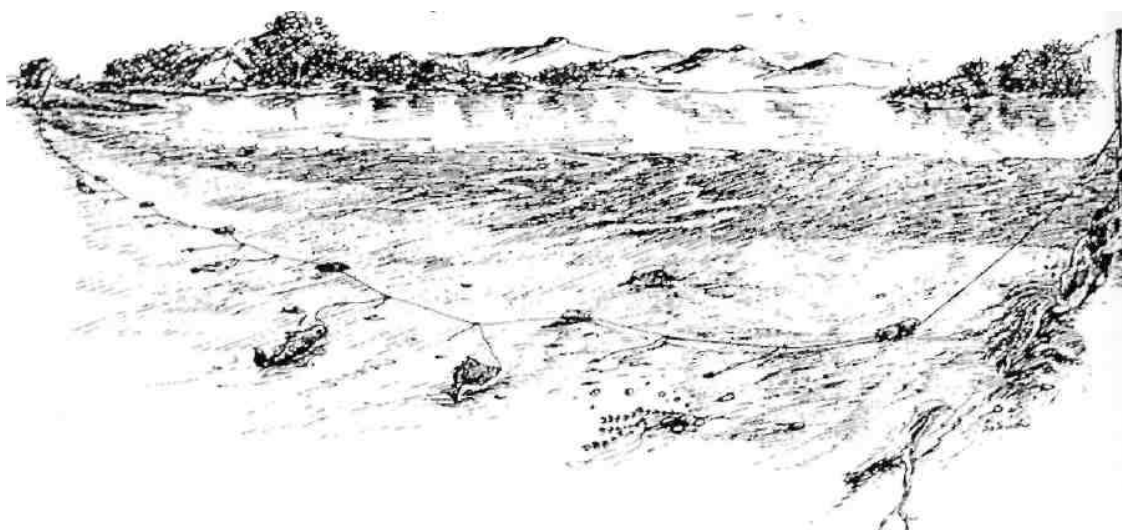
*bet khen* [bet khen] (Lao Loum)

A long fixed pole (commonly a whole bamboo complete with the springy tip) is fixed in the bank with a line and baited hook. Live fish, mole crickets, earthworms and frogs are used as bait. In southern Laos the flowers of the *ton khai* tree are put on hooks in the dry season to catch *Pangasius* fish species. The leaves of *ton koum*, as well as some forest fruits are used as bait in the rainy season to catch the same fish species.

#### 11.5 Fishing with a Lure

*bet leuam* [bet looam] (Lao Loum)

A silver, fish-shaped lure is used in place of bait. Traditionally this lure was probably made of tin. It is used on a pole, with the line being drawn in by hand, though sometimes now the line is drawn in by being wound around an empty tin can using a circular motion of one hand while the other holds the pole.



bottom longline (*bet phiak join*) set across a river

#### 11.6 Bottom Longline

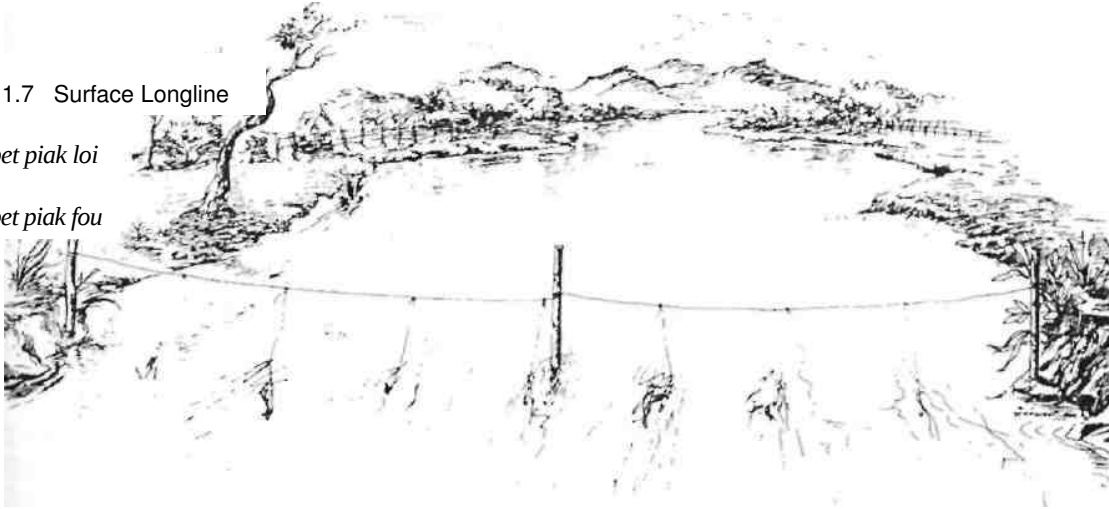
*bet piak join* [bet pecak tchom] (Lao Loum)  
(*join* = immersed)

A set line is strung between poles on the banks with multiple lines carrying hooks suspended from the horizontal set line. Stones are used as weights are used to keep the line on the bottom. Fish, worms, mole crickets and frogs are used as bait.

### 11.7 Surface Longline

*bet piak loi*

*bet piak fou*



[bet peeak loy] (Lao Loum) (*loi*  
= floating)

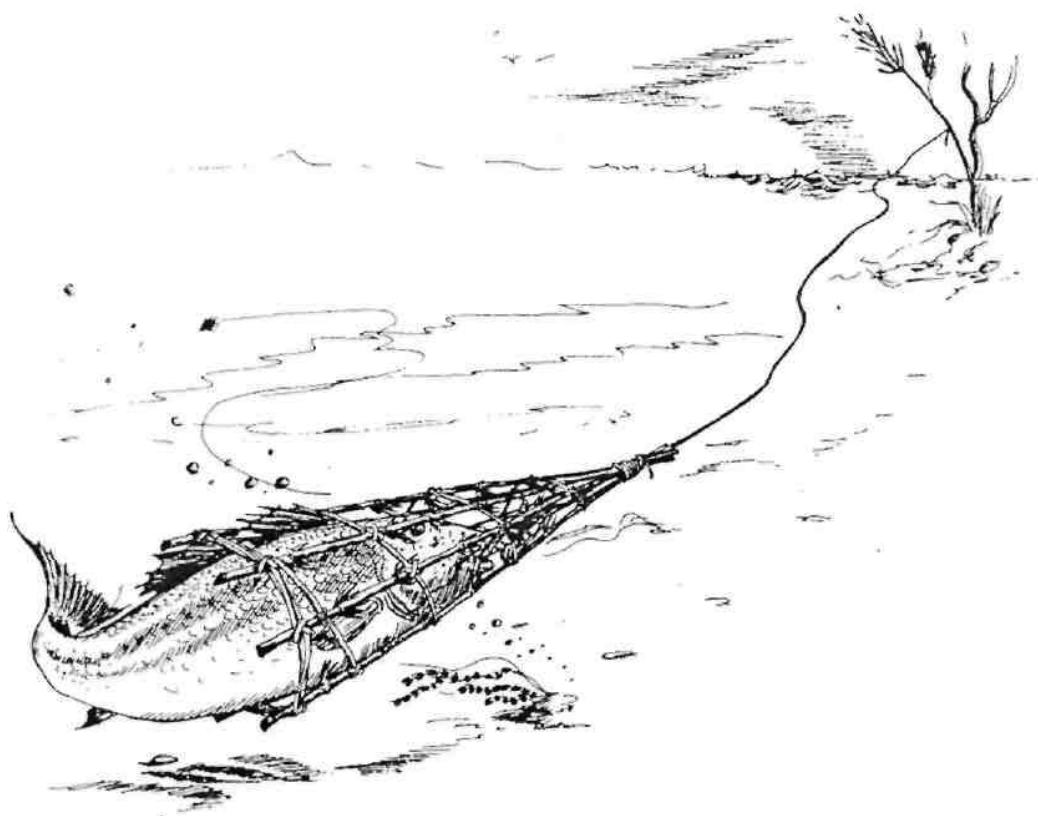
[bet peeak foo] (Lao Loum) (*fou*  
= near surface)

A horizontal line is strung between poles and multiple lines carrying hooks are suspended from this so that the hooks are near the surface of the water. No weights are used, so that the baited hook drifts at the surface, moved by the current. In southern Laos bait includes fish, forest fruits {*mak houn*, *niak tang nai*, *mak deua*, *mak kabao*}, worms, mole crickets, and frogs.

### 11.8 Eel Hooking

*bet ian* [bet eean] (Lao Loum)

A baited hook on a line is pushed into eel holes in the bank of a river until the eel takes the bait. The bait is commonly frogs leg, snail, earthworm or a piece of fish. The line is then tied to a whippy length of bamboo, either growing nearby or set into the bank, so that there is tension on the hook. The fisherman continues along the bank hooking other eels. Over time the continual tension on the line draws the eel out of the hole. One person can catch 10 kg of eels in an afternoon. Recorded in Ban Nongboua in the Nam Thon wetlands. This method is used in the late dry season (March/April) when **eels are** said to be particularly hungry.



#### 11.9 Barbed Rattan Cone

*sai naam* [sai naam] (Lao Loum)

This gear consists of a cone made from rattan tendrils with the barbs facing inward. The cone is typically 20 cms long and 10-15 cms in diameter at the open end. The point of the cone is fastened to a line which is tied to a stake or tree on the bank. The bait is placed inside the apex of the cone and fish which enter the cone to get the bait are caught on the barbs so that they cannot withdraw. Bait is either insects (often grasshoppers), earthworms tied in a bundle, or fruit (typically brightly coloured - usually red or yellow). The cone is either unweighted so that it floats near the surface on a fast flowing current, in which case fruit is the usual bait, or weighted with a stone to fish the bottom, in which case insects or earthworms are the preferred bait. The gear is often set overnight. *Sai naam* are used most in the rainy season when fish are moving

upstream and are said to be hungry and keen to **eat** anything. Medium or small diameter rattan vines are preferred because it is believed that their barbs do not break off easily. Such cones might last for two years. This gear is generally found north of Vientiane in hilly or mountainous areas and is usually used by men.

## 12. CURRENT FILTERING GEAR

### 12.1 Fence Filter Traps

*li* [lee] (Lao Loum)  
*lone* [dton] (Lao Loum)  
*tone sai on* [dton sai oo] (Lao Loum)

*Li* is commonly used as the generic term for equipment which involves guiding fish with fences of some type into a trap. *Li* can be small structures associated with rice field irrigation which direct water and fish into a funnel basket trap (sometimes along a bamboo channel), or might be very large structures erected in flowing water.

There is almost a whole separate class of current filtering gear used in the overflows from rice fields and many of these, such as *li long* and *li gip*, use fences. Many also have chutes to direct the fish to some type of container. Many gears of this type are local variations and this gear type probably gives more scope for the creativity of the fisher than any other used in Laos.

In the Rhone Falls *li* are traps using wing fences to guide fish onto chutes which effectively filter the fish from the flowing water (see next page). These are used in the period May to July when water is rising. The main targets are Cyprinids and Pangasids on migration. Their construction and operation is somewhat dangerous due to the strong flow in the rapids and waterfalls where they are located.



*loum kong* for attaching to a // to collect fish

In Khammouane (and probably other provinces) *li* very similar to those described for Khone Falls are set across streams and flood channels during rising and falling water seasons. In these traps the wing fences are commonly made of coarsely woven bamboo screens and the fish are washed up a chute and into the side of a large basket (*toum*) set on a stand in the flood water.

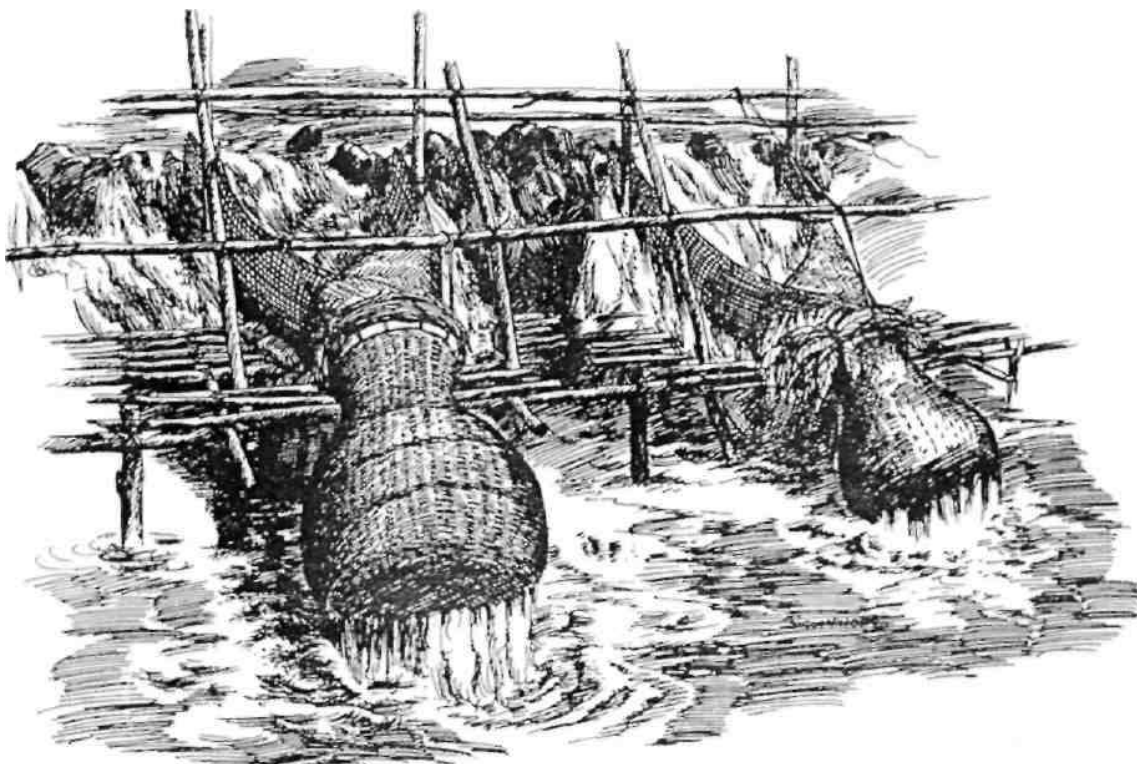
*Tone* are a very similar type of trap and the distinction between *li* and *tone* varies from place to place. In the far south *tone* are traps using weirs constructed across running water to funnel it through an opening where a chute, usually made from bamboo, separates out the fish. In this form they are commonly used in the period January to March to catch small migrating cyprinids. When the chute directs the fish into a basket the gear is referred to as *tone sai ou*. The distinction in this region between *li* and *tone* seems to rely on the use of rock weirs in *tone*.

In central Laos *tone* use fences similar to those described above for *li* in Khammouane Province. In some places *pheuak* fences are put across the stream. However no chute is used and three, four or more gaps (depending on the width of the stream) are left in the bottom of the fence. Large *sai*, 1-1.7 metres long, are placed in the gaps to catch fish. Sometimes the *sai* are replaced by nets such as *nyeng* or *tang*, or these days nylon screen (*rnong khieu*) might be used. The distinction between *li* and *tone* here depends on whether or not a chute is used. Sometimes, however, forms intermediate between the two are produced - see illustration over page.

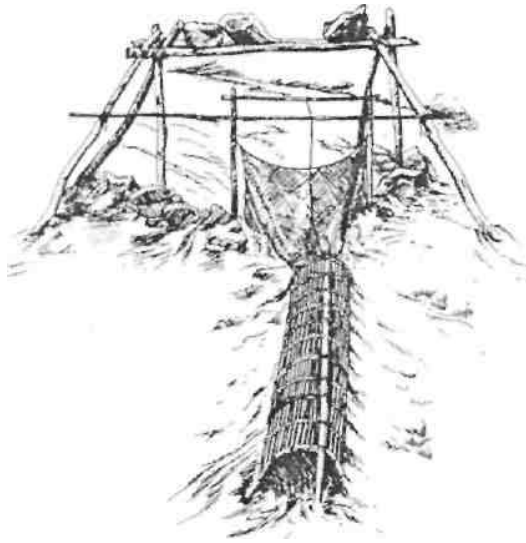
*Tone* are banned in some areas (e.g. Ban Phondou and Ban Na on the Nam Don in Khammouane Province) because of their effectiveness in catching a high proportion of migrating fish.



a form of trap with characteristics of *li* and *tone* from Khammouane Province a very similar trap is known as a *li long* in the far south of Laos



*tone sai ou* - form of *li* used in the far south on the Mekong



cylindrical current trap -*jip*

#### 12.2 Cylindrical Current Trap

*jip* [tchip] (Lao Loum)

A woven bamboo cylinder around 20 cm in diameter and 1.5 m long, open at one end, not unlike the more tubular forms of *ka sone* (see 12.5). It is used in southern Laos where it is placed in rapids with a funnel-shaped net upstream to guide fish into it and depends on the force of the current to prevent fish escaping back upstream. It is similar to the scissor net (10.1) in the use of this funnel-shaped net, but does not need to be attended at all times.

*Jip* are used in the Khone Falls area at low water (Jan-Feb) mainly for small cyprinids, at rising water (Apr-June) primarily for pangasids, and falling water (October) mainly for cyprinids and catfish.

This gear is usually used by men.

#### 12.3 Fall-back/Waterfall Chute

*on ten* [oo dten] (Lao Loum) (*ten* = jumping around)

This is a small funnel-like chute used in the Khone Falls area. It is set up near-vertically in waterfalls

to catch Fish temporarily dropping back during their movement upstream. It is used between January and March when small cyprinids migrate up the Mekong from Cambodia.

#### 12.4 Conical Filter Basket Trap

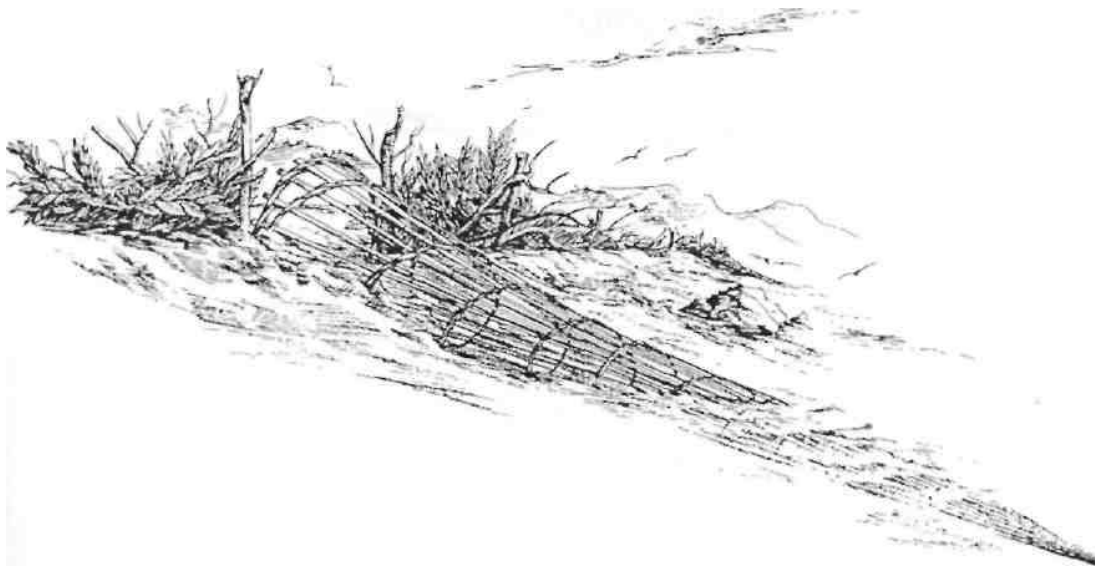
*long* [dtong] (Lao Loum) (= waiting to catch something) *sai son* [sai sohn] (Lao Loum)

A conical basket trap, usually much coarser than a *sai*, but sometimes finely woven and sometimes of net, placed under the discharge in the wall of a paddy field to filter out fish in the run-off water.

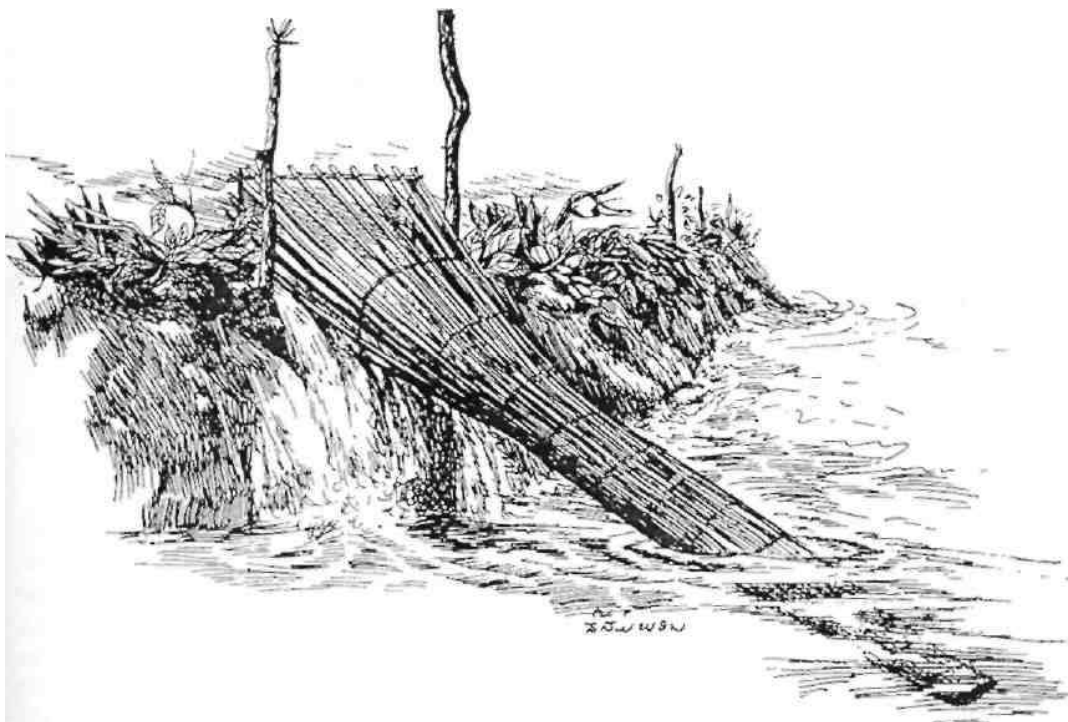
#### 12.5 Wedge Cone Trap

*souang* [sooang] (Lao Loum)

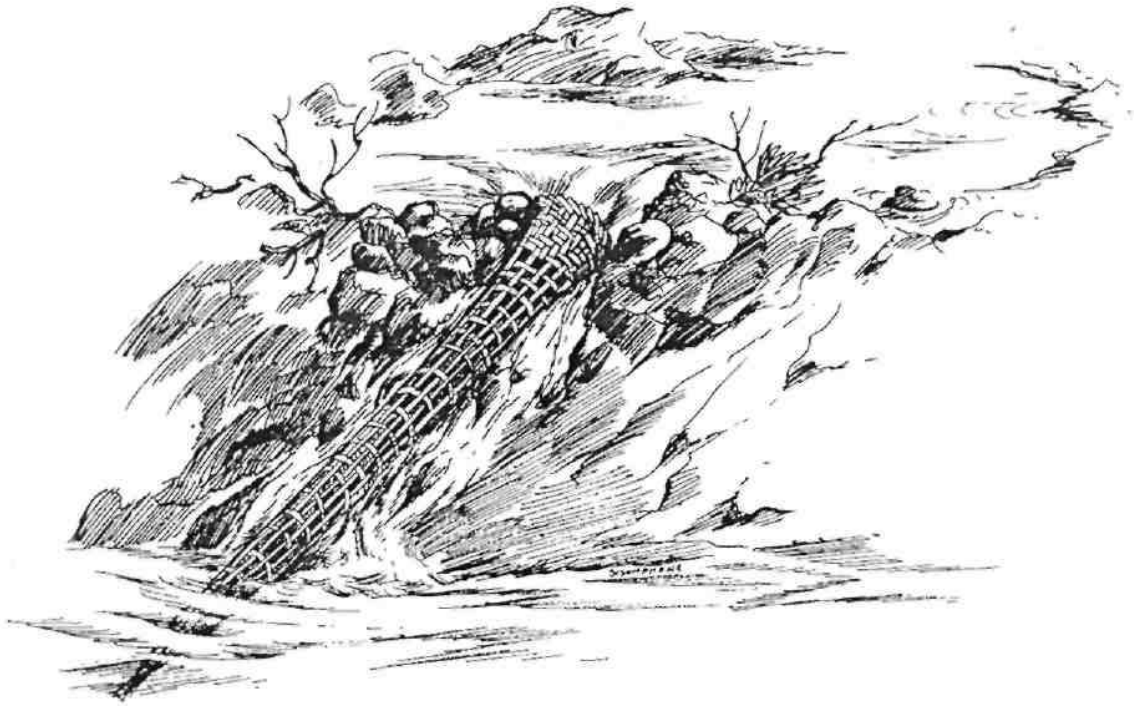
A coarse conical framework of rattan or bamboo with a diameter of around 50 cms at the broad end and a length of around 1.8-2.0 metres. The *souang* shown in the top Figure on the next page is used along the Nam Hinboun and other streams around the Khammouane limestone massif (*Phou Hinboun*). The framework has a spiral of twisted rattan fibre tied around the outside of the cone from the base to the apex. *Souang* are commonly placed in shallow flooding areas, often between two higher points which are not yet flooded. They are laid horizontally with the opening toward the current and are fixed in place by two bamboo stakes which are sometimes crossed over the cone or placed either side of the entrance. Sometimes *souang* will be placed side by side in a line parallel to each other, or separated by a simple fence of branches. At the Khone Falls *souang* are used in rapids. Fish move with the current into the cone until they are wedged in the framework. As the narrow end fills with small fish progressively larger fish are caught in the wider parts. Use of *souang* is being discontinued in some areas, reportedly because they are not efficient at the low fish populations which now exist. In the Khong District of Champassak Province the reason for no longer using the type of *souang* shown on the bottom of the next page was that it is "old fashioned".



Khammouanc style *souang* set in a flooding field with a branch fence to guide fish into the mouth



*souang* like this were used until recently in the Khong District near the Khone falls



#### 12.6 Woven Wedge Trap

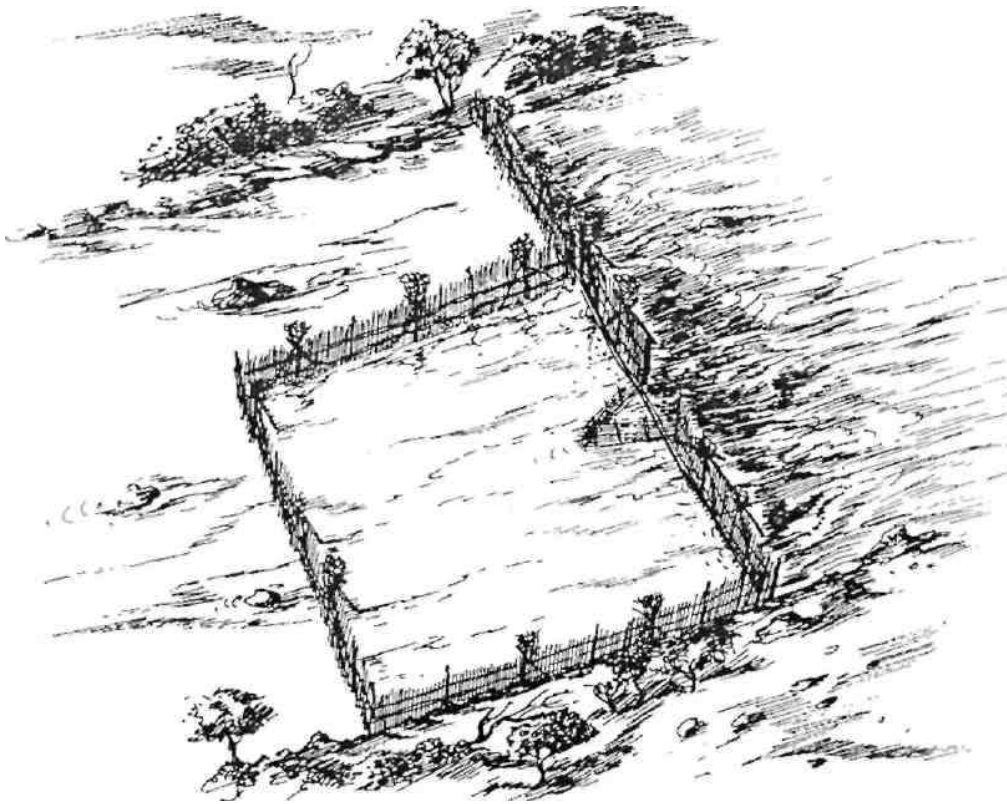
*ka sone* [ga saɯn] (Lao Loum)

Some *ka sone* operate on the same principle as the *souang*, being coarsely woven bamboo cones. Fish become wedged in the trap while moving with the current. Others are more of a simple current filtering device, being long narrow, almost tubular shapes (1-1.5 metres long and 10 cm in diameter) with woven bamboo walls. Some of the larger funnels can be up to 3.5 metres long and 0.30 metres in diameter.

The larger forms are used in strongly flowing currents. Small types are also used in the overflow from paddy field terraces. They are used just above the Khone Falls to catch *Mystus nemurus* when they migrate upstream in May/June. A large part of this catch is at night.

Smaller *ka sone* are often used by women and children.

## 13. BOX ENCLOSURES AND FENCES



### 13.1 Enclosed Fence Trap

|                    |                                                                   |
|--------------------|-------------------------------------------------------------------|
| <i>luang khang</i> | [looang kung] (Lao Loum)<br>(used in the south of the<br>country) |
| <i>tone</i>        | [dton] (Lao Loum) (used in the<br>north)                          |

This is a relatively new technique and is surprisingly similar to one used in Sumatra and the Malay Peninsula. Fish moving upstream are guided by fences or the fence sides of the trap enclosure to a funnel gate which leads into a large, often box-shaped trap. It is commonly used in May to July to catch migrating Pangasids. In some places, such as Khong District in the Khone Falls area where it was introduced around 1980, its use has been banned by local communities and Khong District authorities

### 13.2 Bamboo Fence

|                  |                                                         |
|------------------|---------------------------------------------------------|
| <i>pheuak</i>    | [peuak] (Lao Loum)                                      |
| <i>ti pheuak</i> | [tee peuak] (Lao Loum) ( <i>ti</i> =<br>hit repeatedly) |

*Pheuak* is a fence made of prefabricated sections of bamboo slats bound together so that they can be rolled up for transport and storage (see illustration at 6.1). In many places this is being replaced by nylon screen (*moung khieu* = green roll) which is easier to use, transport and store. *Pheuak* is often used together with various passive traps like *tone*, *li, jun*, *lop*, *sai*, etc.

*Pheuak* can be used to make an overlapping fence enclosure around a body of water. The fence sections are held by a group of people who slowly

decrease the size of the enclosure by kicking the *pheuak* gradually toward the centre. When the fish are well concentrated in a small area they are removed with dip nets, scoop baskets, etc. This technique is known as *ti pheuak*.

## 14. PIT TRAPS

### 14. Pit Traps

*lum* [lum] (Lao Loum)

At the end of the wet season (late October/November) holes around one metre in diameter and 0.5-1.0 metres deep are dug at particular places in the edges of overflow wetlands and river backwaters. A bund approximately 10 cm high is constructed around each hole and the water is bailed out to set the trap. Some species of migrating fish attempt to pass the barrier formed by the bund by jumping or wriggling over it and thus land in the hole. If

the water in the hole is sufficiently shallow the fish are unable to jump out. Siting of the holes so that fish will try to use them as a route to return to permanent water is crucial and depends on the local knowledge of the fishers.

This technique is frequently combined with *li* traps across streams. Fish which try to find ways around the *li* fence often jump over the bunds and into the holes.

## 15. SPEARING EQUIPMENT



### 15.1 Hand Spear

*lem* [laem] (Lao Loum)  
*lem ngiang pa* [laem ngyang pa] (Lao Loum)

A fish spear with a bamboo or wooden haft that may have a single point or multiple, barbed or non-barbed prongs. Spears are commonly more than two metres long. The single-pointed, lance like form is the traditional one. It is used for spearing fish under flooded vegetation. The technique used is a rapidly repeated stabbing motion with the spear directed through circled thumb and forefinger. The fish is not necessarily seen before being speared. Used for *Morulus* sp., *Hampala* sp., *Osphronemus exodon* etc.

The multi-pronged form (*lem ngiang pa*) is used in the day time or at night with lights. When used at

night the spear user stands in the bow of a boat with a battery operated light on a head band and spears fish seen swimming near the surface in the light beam.

Spears are usually used by men.

### 15.2 Harpoon

*sanong* [sanong] (Lao Loum)

This gear was previously used in southern Laos in the Khone Falls area. A fisher would stand on a rock in the waterfalls adjacent to a narrow, shallow channel and wait for large fish such as *Bagarius yarrelli*, *Mystus* sp. or *Pangasius* sp. to pass through. The harpoon was used to stab the fish, rather than being thrown. Once the metal head of the harpoon was lodged in the fish, a rope attached to the head would be used to haul it in.

This gear has not been used in the Khone Falls area for more than 20 years due to decreased numbers of very large Fish in the Mekong.



### 15.3 Spear Gun

*naa diit* [naa deet] (Lao Loum)

*peun sik* [poon sik] (Lao Loum)

This is a wooden version of the typical underwater rubber-powered spear gun. It appears to be widely used, though its use is not common and it is probably more of a novelty than a regular piece of Fishing equipment.

## 16. GUNS

### 16. Guns

*gning pa kap peun* [ying pa gup poon]  
(Lao Loum)

M-16s and AK-47s, rifles and muskets are often used in the dry season to shoot fish near the shore. Mostly *Channa* sp. and other air-breathing fish are targeted because they can be seen when they surface.

In Nam Ngum Reservoir north of Vientiane many fish of around 4-5 kg are shot from platforms in flooded trees, even though this fishing method is prohibited in the dam.



## 17. CATCHING BY HAND

### 17. Catching by Hand

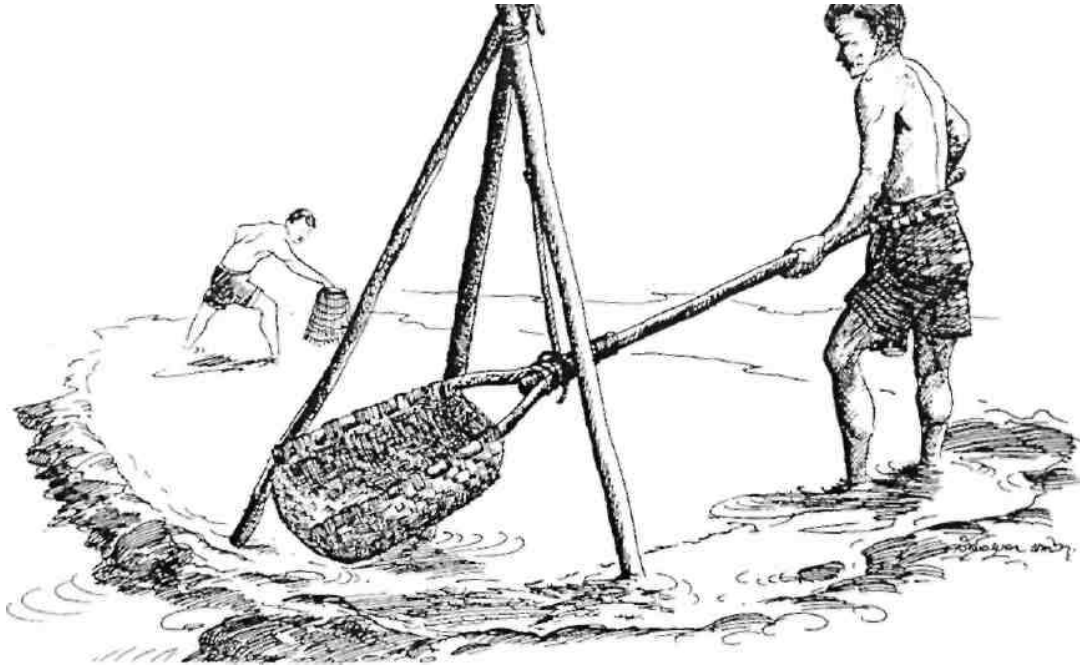
*jap pa kap meu* [tchap pa gup mer] (Lao Loum)

In some areas small fish are caught by hand in shallow overflow wetlands. Women walk through shallow water making footprints in the muddy bottom and then go back over the area feeling with their hands for small fish which have taken refuge in the footprints.

In the Khone Falls area small cyprinids are caught by hand in shallow water in the rapids during a short period in July or August (the rising water season).

In Huay Kaliang (Khong District, Champassak Province) spawning cyprinids are caught by hand in deep pools by men who either dive into the water or duck their heads under.

## 18. EMPTYING WETLANDS



### 18.1 Water Scoop

*kaso* [kaso] (Lao Loum)

Large, sling-shaped scoop (traditionally of bark but recently of leather or canvas) between two poles. It is often swung from a tripod or bipod and operates with a scooping, shovelling motion to move water from one area to another. Mostly used to move irrigation water, but also commonly used to empty small pools in order to catch all the fish. Sometimes parts of the edges of larger wetlands are bunded off and emptied using this method.

### 18.2 Using Mechanical Irrigation Pumps

*soup nam ok tchak nong* [soop nam awk tchak nawng] (Lao Loum)

In some places an irrigation pump is used to pump a small wetland dry so as to be able to catch all of the fish, shrimp, tortoises, etc. This is a recent introduction but one that has significant potential for impacts on fish populations and the wetland ecosystems generally.

## 19. POISONS

### 19.1 Use of Poisons Generally

*beua pa* [booah pa] (Lao Loum)

The use of poisons to catch fish seems to be rare in Laos, though there are occasional reports of the use of modern chemicals. In some parts of southern Laos agricultural pesticides are used for poisoning fish. This method is illegal in Laos.

Traditional poisons made from natural products such as the bark, fruit and leaves of certain trees are still used in some areas. Formerly this was more common, particularly for fishing deep pools which were less accessible to traditional gear types.

Berkmuller (pers.comm.) reports that the use of poisons occurs on the Xe Bang Nouan on the border

between Savannakhet and Salavan and one of the authors (GC) interviewed fishers who still use traditional poisons in Khammouane Province.

### 19.2 Hole Poisoning

*jouk hou* [tchouk hoo] (Lao Loum)

*beua pa* [booah pa] (Lao Loum) *sai*

*beua* [sai booah] (Lao Loum)

Fish hiding in holes in rocks are driven out using crushed fruit and leaves from a tree (*gneng douk*) and caught in the *sai* (a basket trap like a large *ngap* see 6.5). The technique is called *beua pa* (poison fish) or *jouk hou* (drive something out of a hole) and has been observed on the Nam Hinboun in Khammouane Province.

## 20. EXPLOSIVES

### 20. Explosives

*la beut pa* [la booet pa] (Lao Loum) (= bomb **fish**)

Fishing using explosives was formerly widespread. While the use of explosives was most common during and immediately after the Indochina war, in many areas it continued until the mid- to late-1980s or even to the present. In southern Laos, at least, fishing with explosives occurred prior to and during the Indochina war and on **the** Cambodian border there are plentiful supplies of explosives (often from land mines) which are used by Cambodian fishers. In the vicinity of major construction activities (such as on the Nakai Plateau) and mining operations (such as the Phontiou tin mines near Thakhek) explosives readily find their way to fishers and are

frequently used. This method of fishing is illegal in Laos.

There are persistent and widespread reports that **the** Lao military personnel commonly use hand grenades for fishing, both as a "recreational" activity (e.g. this is reported to be common outside Vientiane on weekends) or as a way of obtaining food while on journeys. Reports have been received of troops using explosives for obtaining fish from areas as far apart as Louang Prabang and Champassak Provinces.

## THE AUTHORS

### Gordon Claridge

Gordon is an environmental consultant specialising in multiple-use management of natural resources. In the last twenty years he has worked in most of the countries of Southeast Asia and Indochina as well as China, Russia, and his native Australia, covering environments as varied as the Great Barrier Reef and the swamps of far eastern Russia. However, fish and fishing gear were relatively new areas to him when he came to Laos in 1993 to start work on an inventory of the wetlands of Laos.

Three things soon became obvious in the course of preparing the inventory. First, more of the traditional fishing gear is still used in Laos than in any other country in the region. Second, the rural people of Laos, both in the lowlands and in the mountains, are highly dependent on fish and other aquatic products for their protein supply. And, third, unless urgent action is taken the fish stocks of the rivers and overflow wetlands of Laos will soon be destroyed under the combination of the pressure of overfishing and the impacts of hydropower dams.

Notes for this book have been collected during a variety of assignments in Laos over nearly four years. This book was conceived as a way of giving something back to the Lao people for their friendship and support during that time and, most importantly, as a way of drawing attention to the need to document, encourage and develop the indigenous aquatic resource management approaches that still exist in the country.

### Thanongsi Sorangkhoum

Thanongsi was born in Vang Vieng, north of Vientiane, more than fifty years ago. Like all Lao boys (and girls) of the time, much of his play focussed around fishing and he learned to make and use many of the traditional gears of the area. Fishing was especially popular among children after the New Year when there were so many fish in the streams that they could be caught just by stabbing a stick into the water.

In the course of a varied life (including nearly 20 years with the Department of Forestry) Thanongsi has travelled widely in Laos, visiting many provinces and observing many fishing techniques. He has become aware that the reliance on fish and other aquatic products for protein is a common factor in nearly all of the country. However his travels have also shown him that the fish stocks are decreasing rapidly in many areas. Simultaneously he has seen the decline of traditional fishing gears and feels strongly that these need to be recorded before they are entirely forgotten. If the story of the traditional fishing methods also makes people question what the new techniques are doing to the fish stocks then this book will have served a dual purpose for Thanongsi.

### Ian G. Baird

Ian is a Canadian who has lived in Laos and Thailand for most of the last ten years. He is the senior project advisor for the Lao Community Fisheries and Dolphin Protection Project. Since the project was founded in early 1993 Ian has lived in the Mekong River island fishing village of Ban Hang Khone in the Khone Falls area of Laos. He has conducted a number of studies of Mekong fish and fisheries in southern Laos and northeastern Cambodia over the last five years. In addition he is working with fishing communities and the Lao Government to promote community-based participatory planning and sustainable management of indigenous fish and other aquatic resources in the Mekong River basin.

As an active member of the international NGO community in Laos, Ian enjoys living with and learning from rural fishers. Speaking fluent Lao and Thai, he is especially interested in documenting traditional knowledge of local resources and their uses and management. Through his experience with local communities Ian has become convinced that community-based comanagement systems are the best option for managing aquatic resources in Laos and other countries in the region. He is also concerned about the potentially severe impacts large-scale development projects might have on the livelihoods of local people in the Mekong basin.

and the resources on which they depend. Even though Laos is a land-locked country, indigenous fish remain the most important source of protein in the country, and special attention is needed to safeguard this culturally and economically valuable resource.

## THE ARTIST

Sisomphone Hansai

Sisomphone Hansai was born twenty years ago in a small village on the banks of the Houay Ngam ("beautiful river") two kilometres south of Vang Vieng in Vientiane Province.

As a child he played on the banks of the river and used many types of fishing equipment. During his life he has become aware that modern fishing gear is replacing those that he knew as a child, while at

the same time the number of fish seems to be dropping.

He is currently a student at the Academy of Fine Arts in Vientiane, so when he was approached to illustrate this book he was delighted to have found an opportunity to share in preserving the knowledge of the traditional methods and drawing attention to developing problems.