SOCIO ECONOMIC CONDITIONS OF INLAND FISHERMEN IN SRI LANKA

A Pre-Project Study of Five Major Reservoirs in the Hambantota District

Research Study No. 73

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AGRARIAN RESEARCH AND TRAINING INSTITUTE,
114, Wijerama Mawatha, Colombo 7.

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J.K.M.D. Chandrasiri

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FOREWORD

The Natural Resources, Energy and Science Authority of Sri Lanka (NARESA) with financial support from Swedish Agency for Research Co-operation with Developing Countries (SAREC) initiated a research programme on Inland Fisheries in mid-1984. The objective of the research programme was to study the potentials for inland fisheries in the hill streams and perennial reservoirs in the Southern Province of Sri Lanka. The project was implemented by the Zoology Department of the Ruhunu University and the Fresh Water Resources Station in Drottiningholm, Sweden.

The Agrarian Research and Training Institute (ARTI) was commissioned by NARESA to study the "Socio-economic Impact of Improved Inland Fisheries Methods". The first study undertaken in terms of this assignment was a pre-project bench-mark survey of the socio-economic conditions of the fishermen in the five tanks coming within the purview of the project. This report gives the findings of this study.

The study reveals the general socio-economic status of inland fishermen and highlights issues like the share of income from fishing in the total household earnings, living conditions of the fishermen and the problems they face in marketing their catch. In addition, it focusses attention on the problems that arise in a situation of over-dependence on the tank fishery resources for a living and the fishermen's efforts to reduce the uncertainties in this vocation by finding alternative employment as 'chena' cultivators or as hired labourers in paddy cultivation.

This study was undertaken by Mr. J.K.M.D. Chandrasiri, Research and Training Officer of this Institute. In the initial stages Prof. A.B. Dissanayake of the Department of Agricultural Economics and Extension of the Ruhunu University functioned as an Associate Researcher for the study. After he left, Prof. A.D.V. de S. Indraratne, Director - Planning, University Grants Commission functioned as Consultant. My thanks are due to them for their valuable contribution. I hope this study would contribute towards better understanding of the intricate nature of the Inland Fishery Industry.

T.B. Subasinghe
Director

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The assistance, co-operation and help given by many individuals and organisations during the course of this study is gratefully acknowledged.

I extend my deepest gratitude to the two consultants who guided me during the study, namely Prof. A.B. Dissanayake, Former Head, Department of Agricultural Economics and Extension, Ruhuna University for his helpful suggestions during the field work and to Prof. A.V. de S. Indraratne, Secretary, University Grants Commission, for his valuable help during the writing stage.

Without the encouragement and guidance of Dr. R.D. Wanigaratne, the Head/Agricultural Planning & Evaluation Division of the ARTI, and Mr. T.B. Subasinghe, Director, ARTI, this study would not have been possible. My sincere thanks go to them.

I wish to thank Mr. A.D.S. Jayawardena and Mr. K.S.B. Tennakoon, both Heads of Fresh Water Fish Breeding & Experimental stations at Muruthawela and Udawalawa, respectively, and also to Mr. S.K.G. Sirisena and Mr. C. Balasooriya, Aquaculturists, Muruthawela Station, for supplying me the necessary technical and other information regarding inland fisheries. Mr. P. Rajapaksa, M.M. Jayatissa, K. Upali, D.M.K. Dissanayake and K.S. Prematillake assisted in the data collection work, while Miss Vijitha Perera performed the task of data tabulation. Mr. P. Piyaratne, Statistical Assistant and Mr. N.N. Ananda de Silva, Statistical Officer, both of ARTI assisted by drawing the maps and graphs. My sincere thanks go to them for a fine job of work. Finally I wish to thank Mrs. N. Dharshanie Fernando for the excellent job of typing the entire document.

To all the above named persons, I express my deepest gratitude for their respective contributions.

J.K.M.D.C.

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INTRODUCTION

1.1 Historical Background

Although inland fisheries clearly emerged as a distinct economic activity in and after the 1950s, it has always been part and parcel of the subsistence economy of Sri Lanka from early times. Ancient historical evidence such as the Periyankulam Inscription of the 2nd century A.D. and the Samanthapasadika of the 3rd century A.D., both record involvement of people in inland fishing activities. The Department of Fisheries (1958) notes that state intervention in the development of inland fisheries began around 1900 with the initiation of government programmes to introduce new fish species into inland water bodies. Ponds were constructed in Kalutara in 1908 for the raising of fresh water *Etroplus*, but the experiment failed. Attempts were made in 1928 and 1932 to transplant brackish water species in fresh water ponds, but the numbers involved were too small to be of significance.

The next step in the process of stocking with new varieties of imported fish started in 1951. In that year a shipment of 2500 *Tilapia mossambica* was imported from Malaya. After further breeding, they were introduced into all the reservoirs in the dry zone. After this, *Tilapia mossambica* became a common fish in all inland water bodies. Since its introduction fisheries in large tanks became established on a firmer footing, with migrant fishermen from the sea coast moving to tanks during slack sea-fishing seasons to exploit the rapidly expanding shoals of *Tilapia mossambica*.

Inland fish production increased rapidly with this stocking programme of the government. The production of fish at Parakrama Samudra had increased from 41 lb per acre per annum in 1957 to 117 lb per acre per annum in 1962 and at Minneriya Wewa from 11 lb per acre per annum in 1957 to 118 lb per acre per annum in 1962. *Tilapia mossambica* formed the chief constituent of the catch at both these tanks (Ceylon Fisheries Research Station, 1965).

Again some exotic varieties of fish, such as Gourami and Carp (Grass Carp and the Big Head Carp) were introduced in 1960s and in 1974. This stocking programme resulted in rapid increase in inland fish production.

The Government's attention towards inland fisheries was also intensified in the 1970s. Public sector investment in inland fisheries was started in 1972. Sum of Rs. 130,043 and Rs. 105,814 were allocated for investment in inland fisheries in 1972 and 1974 respectively.

A 3-year crash programme was undertaken in 1973 for the development of brackish and fresh water fisheries with a view to increasing the production of fish from these waters to 47,000 tons by 1976 from a 7000 ton average catch (People's Bank, 1977), Under this programme, nine inland fisheries stations were established and a fish breeding centre was established at Uda Walawe with Chinese Government aid.

The establishment of a separate Division for inland fisheries within the Ministry of Fisheries is a progressive step taken towards the development of this sector. It was created in July 1979. This new Division is responsible for providing fingerlings, stocking of fresh water bodies and for encouraging people to adopt greater harvesting efforts in the inland fishery (Marga Institute, 1980). Before this new Division was started, inland fishery activities were handled as a part of the fishery development activities of the Ministry.

The Master Plan for the Development of Fisheries in Sri Lanka (1979-83) has accorded high priority to this sub-sector in view of its vast development potential. In this Master Plan, it was expected to push coastal area marine fish production almost to its upper limit by 1983 and to ensure the major scope for expansion of domestic fish supply after 1983 from inland fisheries.

The Master Plan's production target out of inland fishing was 50,000 tons by the end of 1983. To attain this target it had allocated capital for increasing the present potential of inland reservoirs and seasonal tanks, for upgrading the existing breeding centres, and for promoting research, training, extension, marketing and processing. To promote production, fishermen were issued 90% subsidised boats under this programme. In addition, certain steps were taken to develop brackish water fishery and fish culture in the island. Because of recent programmes and activities, inland fish production had rapidly increased from 16,400 tons in 1978 to 35,500 tons in 1983 - an increase of 116.4% within five years.

No socio-economic studies have been undertaken so far on inland fisheries. However, in some socio-economic studies on marine fisheries of Sri Lanka some attention has been paid to this sector too. Since the 1950s, some technical research has been carried out by the Ceylon Fisheries Research Station in inland reservoirs like Parakrama Samudra and Minneriya. Most of these studies deal with scientific aspects of fishery: but they also contain some information on fishermen and allied matters. Some surveys on the production aspects are also found here. These studies reveal facts about fishermen, their mobility, fishing methods, fishing seasons and varieties of fish caught.

The above-mentioned technical studies indicate a good development potential for inland fishery in Sri Lanka as there is a large extent of inland water-bodies. As shown in Table 1, this extent is estimated to be above 700,000 acres.

Table 1

Acreage of Inland Water Bodies

Type of Water Body	Acreage
Major irrigation reservoirs	175,000
Medium-scale irrigation reservoirs	42,000
Minor irrigation reservoirs	97,000
Mahaweli area reservoirs	60,000
Hill-country reservoirs	20,000
Flood lakes and villus	10,000
Brackish Water-bodies	300,000
Total	704,000

Source : Economic Review Vol. 9, No. 3, June, 83.

Except for the acreage from Mahaweli and recent irrigation schemes the rest of the acreage had been there for centuries. However, they had been used solely for irrigation purposes. If there was any inland fishing at all, it would have been for local consumption only.

After the 1950s inland fishing has expanded with more people engaging in it. In many places of the North-Central Province, fishermen who have settled around the tanks engage in fishing throughout the year. In others, fishing is done for six to nine months of the year by fishermen who migrate annually to these areas from the coast when marine fishing is interrupted by monsoon weather. The number of migrants to these reservoirs has reduced during the past few years as a result of clashes between them and locals, who consider tanks as their personal properties (Marga Institute, 1980).

As for craft and gear used in fishing, canoes propelled with oars were mainly used in fishing operations upto the recent past in most areas. Types of gear were limited to hook and line, cast nets and gill nets, although small seine nets were also used in some tanks and lakes when the water level was low. Rod and line with baited hook was the principal method of fishing in rivers and streams. Upto 1980 inland fishing was

Wholly non-mechanical, and gill nets and cast nets were operated from indigenous craft. But after 1980, with 90% subsidised boats given to them, fishermen were able to use fibre boats and gill nets, and a large portion of country's inland fish came from these boats.

According to a survey conducted around 1962, fourteen species of indigenous fish and three species of introduced fish commonly used for food were present in Parakrama Samudra and Minneriya Wewa. But this situation has now completely changed with imported species predominating. According to "Fisheries Development Strategy" (Ministry of Fisheries, 1984), at present 80% of inland fish production consists of *Tilapia mossambica*. This is due to increased stocking of *Tilapia* in the inland tanks.

Inland fish production began to show a rapid increase since 1957. The estimated total production of fresh water fish for the whole island was one million pounds in 1957. By 1963 this had increased to 10 million pounds (Indrasena, 1965).

The following factors have contributed to this increase in production:-

a) Intensive stocking of edible fish in the inland waters;

b) Efficient methods of fishing adopted by commercial fishermen, eg. replacement of cotton gill nets with nylon gill nets around 1958 which almost quadrupled or quintupled the catch;

c) A rapid increase in the number of fishermen migrating to inland fresh water areas each year;

d) Large-scale processing of fish caught by commercial fishermen, such as drying, salting and smoking. This has helped, to a great extent, in the better utilisation of the catch.

The period after 1977 shows a still more rapid increase in production, because of the efforts made to modernise inland fishing with heavy investment and modern technology.

Unlike in the Northern regions, there are more wholesale traders or assemblers in the Southern regions and they take over the wet fish and transport the stocks in their own vehicles to the distribution centres (Marga Institute, 1980). As inland fishermen in the NOrth are mostly migrants they have no dealers and economical transport facilities as well as good markets. As much as 80% of their produce is converted into dry fish. Fresh water fish has a low demand and market value (People's Bank, 1977). So most fishermen have to convert their produce into dry fish when they cannot find a good market.

The historical backdrop given above helps to place in its proper perspective the analysis of socio-economic conditions of the fishermen in the project area covered by the present study, the background to which will be explained in the succeeding section.

1.2 The Background to the Present Study

NARESA with financial support from SAREC has planned to launch a research programme on inland fisheries in order to study the potential for inland fisheries in the hill-streams and perennial reservoirs of the southern province of Sri Lanka. This programme would be executed jointly by the Zoology Department of the University of Ruhuna and the Fresh Water Research Station, Drottningholm, Sweden.

The programme consists of two inter-related projects termed Project 1 and Project 2. Project 1 deals with feasibility studies on the commercial exploitation of minor cyprinid* fishery resources of perennial reservoirs. These feasibility studies are to be carried out in five perennial reservoirs, viz. Ridiyagama, Badagiriya, Weerawila, Tissa and Yodawewa in the Hambantota district.

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* Species indigenous to Sri Lanka.

The major components of Project 1 are :-

a) experimental fishing using different mesh-size gill nets.

b) experimental fishing using other types of gear;

c) collection of data on catch per unit effort, and biological features of fish such as feeding habits, maturity cycles, population structure and growth rates; and

d) the possible harmful effects on the current commercially exploited species.

On a request made by SAREC, NARESA has also agreed to conduct a socio-economic study on the impact of improved inland fisheries methods under Project 1. The ARTI has been commissioned by NARESA to undertake this socio-economic study (reported here) funded by SAREC.

1.3 Objectives of the Socio-Economic Study

The study attempts to examine the socio-economic conditions of the fishermen in the project area during the pre-project phase by gathering information on :

a) the incomes obtained by the fishermen through exploitation of inland reservoirs;

b) subsidiary occupations which supplement income from fishing.

c) the living conditions of the fishermen as indicated by the state of their houses and movable and immovable property owned by them;

d) savings and indebtedness of the fishermen;

e) nutritional conditions of the fishermen and their families;

f) their health and sanitary facilities;

g) the marketing system and problems in marketing;

h) other relevant issues such as aptitudes and aspirations related to the fishing industry as well as economic betterment of the family; and

i) possibilities of ameliorating their present conditions.

Chapter Two

METHODOLOGY

2.1 Sample Survey

This study consists of a sample survey carried out within the field area. The survey commenced on 27 December 1984 and ended on 25 January 1985, being of one month's duration. Five casual Investigators participated in data collection from the fisher families of each reservoir. They were directed and supervised by the researcher and the consultant. The sample survey was in two parts. One was of organised fishermen and the other of unorganised fishermen.

2.2 A Profile of Fishermen

2.2.1 Organised Fishermen

Organised fishermen are those who have formed themselves into a society within the tank area where they live and they are subject to the decisions of the society which regularly assembles to review the work and progress of its members.

2.2.2 Unorganised Fishermen

Unorganised fishermen are the others who fish in the tank, but are not members of the fishermen's society. They are also considered unauthorised, but can be prosecuted only if they do not follow such fishing practices as the use of particular types of nets, as prescribed for the organised fishermen.

2.3 Procedure in Selection of Sample

Both organised and unorganised fishermen from all five tanks were selected for the sample. When selecting the sample of organised fishermen, the membership list of each society was used. The number of selected fishermen from each tank area depended upon the size of each society. When members were few, all of them were included in the sample. When numbers were large, a limited number was selected using a table of random numbers. When the organised

fishermen of the sample were selected, care was taken to include almost equal numbers of "non-boat-owner" fishermen. Table 2 gives the details of the sample.

Table 2

The Membership of Each Society and Number selected for the Sample

	Ridiyagama	Badagiriya	Weerawila	Tissa	Yodawewa	All
No. of members	101	65	22	27	48	263
No. in sample	34	25	21	21	25	126

For the sample of unorganised fishermen, ten fishermen from each reservoir were selected making a total of 50. When selecting this sample, the purposive sampling method was used.

2.4 Procedure in Data Collection

Data were mainly collected from the sample fishermen families, by administering a questionnaire. For this purpose, five investigators were stationed, one at each tank. As the investigators lived within the fishing community itself during data collection, they were able to collect additional information through participant observation, and this information was very useful in either checking or reforming the information gathered from the questionnaires.

The other important source of data collection was the interviews with sample fishermen as well as the office-bearers of the five fishermen's societies. In addition to these, Fisheries Inspectors of the area and Aquaculturists of the Inland Fisheries Experimental and Breeding Centres at Murutawela and Udawalawe were interviewed. The official data collected from the Murutawela Fish Breeding Centre were also used as supplementary data for the study.

Chapter Three

OVERALL SETTING OF THE FISHING INDUSTRY IN THE PROJECT AREA

3.1 Traditional Conditions

Before 1980, the traditional inhabitants and settlers of villages close to these tanks had been fishing in them. Migrant fishermen also used to fish in these tanks. Some migrant fishermen came from places as far away as Negombo. Especially sea-fishermen used to migrate to these areas during monsoon periods when they were not able to engage in sea-fishing due to risky weather.

In the period before 1980, the main gear consisted of hook and line, throw nets and gill nets. The migrant fishermen from coastal areas also used madel or beach seine nets. The wooden canoe (oru) was the main craft and cast net mode of fishing was practised.

Except a few, the traditional local fishermen fished mainly for their own consumption. But migrant fishermen did it for commercial purposes. They used to dry the catch during a number of months. Their aim was to exploit the fishery resources to the maximum possible. However, before 1980, fishing in these reservoirs was not organised. Sometimes conflicts arose between traditional and migrant fishermen because the fishing methods used by latter were harmful to the fishery resources.

3.2 Present Conditions

In and after 1980, fishing in these tanks became an organised business. Under the Master Plan (1979-83) of Fisheries, steps were taken to organise and develop fishing in the Dry Zone reservoirs. At the same time fishing in the five tanks covered by this study was also organised with the setting-up of a fishermen's society for each reservoir. These tanks were connected with one another through the Fisheries Extension System of the Ministry of Fisheries, and Fisheries Inspectors were appointed for a certain number of contiguous tanks.

A newly set-up Regional Fisheries Experimental and Breeding Centre has been stocking these reservoirs with new varieties of fish for developing the potential catch from these tanks. Fishermen of each society have been encouraged to harvest more fish by providing them with new boats and nets at subsidised prices as well as necessary instructions on the use of fishing gear.

Each fishermen's society has a chairman, a secretary, a treasurer and a committee, and all these posts are held by the fishermen themselves. These posts are held for only one year and an election is held at the annual meeting to elect a new set of office-bearers. These societies assemble every month at the society buildings built with fishermen's subscriptions or elsewhere. At these meetings members discuss problems and constraints relevant to their occupation along with Fisheries Inspectors who play the role of instructors at these meetings. Fisheries Inspectors follow up on the decisions taken at these meetings in order to find solutions to fishermen's problems.

3.3 Fishing Community

The organised fishermen are inhabitants around these tanks. The majority of them live as encroachers on lands around the tanks which are really reserved for forest cover. At each tank most of the houses are situated fairly close to each other within the same village. There may be, however, a few houses which spill into the adjoining village. As for Badagiriya and Ridiyagama, the majority of fishermen are members of the second generation of first settlers of those colonisation schemes. At Ridiyagama, there is a problem of lack of land and the inhabitants whose livelihood is fishing live on encroached land. At Badagiriya, except for a few, most of them come to fish in the tank while staying at colony houses or on their own lands.

However, about 6/8th of all organised fishermen of the five reservoirs live within a 1/4 mile radius of the tank bund. About 7/8th of them live within one mile, only 1/8th live outside one mile. The organised fishermen consider the tanks as their own property and they always try to restrict the exploitation of the tanks to themselves. Therefore, membership of the society is not open to persons who live far away from the tank. Only a few such people, who have been fishing in these tanks for a long time even before these societies were formed, have been given membership. On the other hand, a considerable number of unorganised fishermen live around or close to the village of each tank. These tanks have some unorganised fishermen too, who come from outside areas. Ridiyagama is the best example. A considerable number of unorganised fishermen who live in villages located about 3 to 5 miles away from Ridiyagama tank also come to fish there.

Organised fishermen do not like unorganised fishermen fishing in their tank because the latter are not subject to rules and regulations of the societies and use wasteful methods of fishing, which would unduly deplete fishery resources. Fishing by unorganised fishermen is considered even illegal. Therefore, all societies have decided that only society members and no others should be allowed to fish in their respective tanks. This is observed rigidly at the Ridiyagama tank. But in the Badagiriya tank although organised fishermen dislike it, a large number of their neighbouring "unorganised" fishermen do operate in the tank. Hence, there is some conflict between the two parties. Although unorganised fishermen from the neighbourhood fish in these tanks no migrant fishermen from the coast are allowed to do so.

The majority of the organised fishermen in all the five tanks have fishing as their major occupation. They also practise subsidiary occupations to supplement their income. The picture differs from tank to tank. Although the major occupation of almost all fishermen of Ridiyagama, Badagiriya and Weerawila is fishing, in the other two tanks, i.e. Tissa and Yodawewa it is not so. As seen in Table A-1, 58% of the organised fishermen have no occupation other than

fishing, while 21% practise cultivation, 12% do casual labour and 10% do other jobs as their subsidiary occupation. More than 21% of Ridiyagama, 44% of Badagiriya and 19% of Weerawila fishermen have no other occupation. But in Tissa 76% and in Yodawewa 60% of fishermen have subsidiary occupations.

Some unorganised fishermen engage in fishing merely for their daily meal as they have other occupation. Some, of course, do it as their major occupation (see Table A-2). In the sample of unorganised fishermen, 21 or 42% have fishing as their major occupation; 29 or 58% do it as a subsidiary occupation or as a normal activity for obtaining fish for their own consumption or as both. Some unorganised fishermen also do it as a part-time or seasonal occupation while otherwise, employed, by way of hiring one's labour or engaged in cultivation. As much as 20 of the unorganised fishermen's sample work as labourers with fishing as a part-time or seasonal job. According to the sample of unorganised fishermen, all fishermen in Badagiriya and seven fishermen in Ridiyagama do fishing as their major occupation, but in Weerawila and Yodawewa all do it as a subsidiary occupation or for sustenance.

Taken together, most of the organised and unorganised fishermen are young or middle-aged (see Table A-3). As much as 47% of the organised and 51% of the unorganised sample belong to the age group of 15-29 years. Likewise 88% of the organised and 97% of the unorganised sample are in the age group of 15-44 years. Some of the organised fishermen have become so only after the establishment of fishermen's societies. There are traditional unorganised fishermen older than what the sample shows, who have not come in to our sample.

3.4 Eco-System, Agriculture and Fishing

The eco-system, agriculture and fishing are interconnected. For example, the eco-system affects fishing as well as agriculture, and likewise, agriculture affects fishing. The Hambantota district falls within the dry and arid zones of Sri Lanka. The tanks in this district are affected by its zonal climatic conditions. This district gets its highest rainfall from both the inter and North-east monsoon and much of it falls during October to January. During this rainy season tanks get filled but from March to September, the district generally gets little rain and the water level decreases gradually with the issue of water for paddy cultivation. Especially in August, a very dry month, the water level of tanks goes down to almost drying-point.

This weather pattern affects the production of fish. When the water level in the tank is low it is easy to catch fish; therefore, production during the dry months is high. This season lasts from March to September (see the graphs). Especially, with the heavy drought in August and when the water level is at its lowest, tanks are fully exploited with maximum catches. After August there is hardly any fish in these tanks. With the heavy rains in September and later months, tanks become full and the few fish that still remain spread everywhere thus making it not so easy to catch them during these rainy months. Because of the scarcity of fish and the likely uneconomical catch, fishermen are reluctant to engage in fishing in this period. This pattern continues until March. The other factors that prevent fishermen from fishing in this period is the risk of bad weather over the tanks and the relative immobility of fish in the cold months of December-January. During this slack season, most fishermen engage in other activities such as chena cultivation or vegetable-growing with only occasional fishing.

Tissa, Yodawewa and Weerawila are more affected by heavy drought than the other two tanks. In some years, these three tanks dry up completely making water-holes in the middle of tanks. During the dry season these tanks are so fully exploited that there is hardly any fishing in them for four to five months. Especially, in Tissa and Yodawewa tanks, most fishermen refrain from fishing from around October to February when they are full. This is the period during which most of them are engaged in chena cultivation, working as hired labour, or marine fishing or some other activity. However, the Ridiyagama and Badagiriya fishermen do not stop fishing completely even though the production is low, because they do not have sufficient alternative sources of income. Some Ridiyagama fishermen engage in vegetable cultivation on their own lands while doing some fishing. Badagiriya fishermen do not have cultivable land or other alternative occupations and are therefore compelled to eke out a living solely through fishing. Since Badagiriya is the tank richest in fish, even in the slack season, its production is relatively higher.

The involvement of unorganised fishermen in fishing is affected mostly by seasonal agricultural activities like cultivating and harvesting. A large number of unorganised fishermen who come to the Ridiyagama tank from distant villages are agricultural workers or peasant farmers. They do not come to fish during cultivating seasons and harvesting periods. They come continuously to fish in the months immediately after sowing of paddy fields. It is same with some of the unorganised fishermen in other tanks.

3.5 Production Features

3.5.1 Craft and gear

The craft and methods of fishing among organised fishermen vary from those used by unorganised fishermen. The organised fishermen's main craft is the fibre-boat (*oru*) issued at subsidised prices by the Ministry of Fisheries. But some tanks have one or two organised fishermen who use wooden craft. The nylon gill nets (lay-out nets) that are provided with the boats are the main and accepted gear used by organised fishermen. These nets are spread out in the tank, from their canoes (*oru*).

The unorganised fishermen's main fishing method is the hook and line. More than 75% of the unorganised fishermen in the study area use this method. The next popular method among them is the throw net, made of nylon. About 20% in the area use this method. The remaining fishermen use other methods, both new and traditional, such as small gill nets, traps and emptying water-holes.

Although unorganised fishermen usually make use of traditional methods, a large group of unorganised fishermen belonging to the Muslim community at Badagiriya tank use fairly newer methods, in comparison with unorganised fishermen of other tanks. As fishing is their major occupation, almost all of them have throw nets (with a few using gill nets).

The fibre-boats referred to above have been issued to each fishermen's society, the number depending on the size of membership and the capacity of the tank concerned (see Table 3). The fishermen have been given a 90% subsidy on these boats and the cost to each fishermen has, therefore, been only Rs. 475/- for a boat worth Rs. 4750/- and Rs.675/- for a boat worth Rs. 6750/-.

Table 3

Issue of Boats to Each Society

Society	Ridiyagama	Badagiriya	Weerawila	Tissa	Yodawewa	All tanks
No. issued	42	43	14	24	31	154

Six nets of different mesh size, as shown in Table 4, have also been given to each fishermen with a boat and one such net is 30 feet long.

Table 4

Issue of Different mesh-size nets to each fishermen

Mesh size	No. Issued
3½ inches	1
4 inches	2
4½ inches	2
5 inches	1
Total No. issued	6

3.5.2 Habits and Practices of the Fisher-folk

Organised fishermen do fishing mostly at nights and continue till the following morning or for about 11 hours on the average. Some Ridiyagama fishermen make it a habit to go to the tank at 7.00 p.m., return after laying out nets and then go out again in the following morning to fetch the catch. The Badagiriya fishermen set out for fishing around 3.00 p.m. but they are used to staying the whole night out at the tank. This is to prevent the fish caught in nets from being harmed by eels and crocodiles abundantly present in this tank than elsewhere. Early morning all boats return to one of the two harbours of these tanks.

After selling the fish to the traders who come to the harbour early in the morning, fishermen return home for rest. This pattern changes only once a week at Badagiriya where fishermen fish by day, because on that day the mudalalis come in the evening to collect the fish for fair in the following day, which is located far away.

It is the normal practice to have two fishermen in each boat; one is the owner while the other works as the regular partner on an income-sharing basis. This partner has also to be a member of the society. Before distributing the proceeds between the boat owner and his partner, a certain proportion is set apart as rent of the boat and the nets. At Ridiyagama, the portion kept aside for the boat and gear is 1/3rd of the whole income, while in the other tanks it is

1/5th. But if the nets belong to the partner and the production happens to be small a separate share is not set apart. Both parties also set aside enough fish for their own consumption.

Usually, the fishermen abstain from fishing on religious days. All Buddhist fishermen do not go fishing on the full-moon poya day; some fishermen do not even go on the other three poya days. All Muslim fishermen abstain from fishing on Fridays.

The unorganised fishermen fish only by day. As most of them catch fish for their consumption, they do so only during their leisure after completing the other jobs or activities. This type of person does fishing only a few hours, staying on the bund of the tank or sitting on a log in the tank. The unorganised fishermen who fish for commercial purposes, however, engage themselves in it for a longer time. For example, in Ridiyagama unorganised fishermen who come in the morning from distant villages fish the whole day; they bring their lunch also along with them.

3.6 Varieties of Fish

The varieties of fish commenly found in these tanks are *Japan Korali, Pethiya, Wewu Korali, Cheena, Weligowwa, Kiri Kanaya, Anguluwa, Anda, Teppili, Madaru, Marundo, Thanakola Kapaya, Valapotta, Lula and Kiri Dandiya.*

Table 5

New Varieties of fish by their local and technical names

Local term		Technical term	
Japan Korali	=	*Tilapia mossambica*	1. *Saro theodon mossambicus* 2. *Tilapia melanopleura* 3. *Tilapia nilotica*
Cheena or Cheennu	=	Chinese Carp	1. Big Head Carp 2. Grass Carp 3. Common Carp
Wewu Korali *Mal Korali* *Tith Korali*	=	*Etroplus*	
Kiri Kanaya	=	*Hiri Kanaya*	*Labeo dussumeiri*

Most of the catch consists of *Tilapia mossambica*, known among fishermen and local people as *Japan Korali*. This variety makes up more than 90% of their catch. Next in importance is *Wewu Korali* and *Petiya*.

3.7 Fish Production

It is very difficult to give an accurate picture of fish production due to the non-availability of correct production data. However, production records taken from Muruthawela Fish Breeding and Experimental Station indicate three features: firstly there has been a rapid increase in the volume of annual production since the organisation of inland fishing with the provision of subsidised boats; secondly there is a significant difference in the level of production from tank to tank; thirdly the production levels of all tanks fluctuate from month to month.

In 1981, the first year in which catches were recorded after the issue of new boats and the establishment of new societies, the production was low. It averaged only 11.75 metric tons per tank per month. This gradually increased in 1982 to 12.4 and in 1983 to 18.83 metric tons. Then it rapidly increased to a monthly average of 42.66 metric tons (see Graph 1).

The second main feature is the difference of the production level from tank to tank (see Graph 2). The Badagiriya tank has been recorded as having the highest production of the five tanks under reference as well as of all the tanks in the Hambantota District. Its average annual production during the last four years (from 1981 to 1984) has been recorded as 62.33 metric tons. This can be attributed to biological factors and also to the proper use of fishery resources by the fishermen. According to the production records of the Fish Breeding and Experimental Station, Tissa and Ridiyagama come next with 17.25 and 16.08 metric tons respectively. But according to our findings their position is reversed, Ridiyagama coming second and Tissa third. The different order of the official records might have been due to the particular way in which the Fisheries Inspectors calculate the fish production.

When one looks at the production from month to month, a clear fluctuation of the monthly production levels can be seen (see Graphs 3 and 4). This fluctuation is common to every tank and is affected by the climatic and ecological factors as discussed in an earlier section. Normally, mid-months of the year (March to September) record a higher production compared with other months. During October to February production levels are very low. In 1984, the monthly average in the six-month period, March to August, has been recorded as 307.5 metric tons for the Badagiriya tank. Then, for the next four months (September to December) this has come down to 60 metric tons. In January and February there was no production at all, as fishing in the tank had ceased. Of the five tanks, Ridiyagama was the only one in which there was some fishing during these two months. The suspension of fishing for a few months is practised to allow the fish to breed and grow so that the next catch can be relatively big. This phenomenon is well illustrated by the production figures for 1984 for Badagiriya (vide Table No. B-6 and Graphs 3 and 4).

The above details of production, based on the production records taken from Muruthawela Fisheries Experimental Station, are subject to some limitations because of the formula the Fisheries Inspectors use for their estimates. Their formula is as follows:-
They should go to the fisheries harbour of each tank twice a month and count the catch of several sample fishermen and adjust this for the number of boats that have gone fishing on these two days. This then is adjusted for the month. We gathered, in the course of our investigations, that these Inspectors instead of going to the harbour twice a month and getting the information from the sample fishermen themselves, obtain these figures from them at the society's monthly meeting. Invariably the figures given by the fishermen at such meetings are not accurate. It may well happen that the fishermen who have actually not gone out fishing may give false figures in order to justify their retaining the subsidised boats. Hence, the estimates of the Fisheries Inspectors will include a catch for every fishermen who has a subsidised boat, although in

actual practice some fishermen might not have gone fishing. On the other hand, we made our estimate from a sample of fishermen whom we interviewed at the harbour and our figures for January 1985 are given in Table 6.

Table 6

Fish Production in the Tanks in January 1985

	Figures of our study (Met. Tons)	Figures of Fishery Inspectors (Met. Tons)
Tissa	0.528	5.328
Weerawila	0.972	2.145
Yodawewa	2.718	5.491
Badagiriya	28.658	44.85
Ridiyagama	7.527	52.68
All areas	40.403	110.498

Our figures, as may be seen from Table 6, are relatively low but they closely resemble the actual figures rather than those of the Fisheries Inspectors.

As far as the average fish production per boat is concerned, our findings show that it changes from tank to tank and from month to month. For example, in the Badagiriya tank, the average daily production per boat is about 60 Kgs. In Ridiyagama, on the other hand, it is about 35 kg. while in Tissa, Yodawewa and Weerawila, they are respectively 10,15 and 15 kg.

3.8 By-Products

This sector has not developed within the fishing community. Since the fishermen need money for their daily subsistance, they cannot set aside any fish for processing; therefore, they sell their entire catch, in wet form, except what they keep for their own daily consumption. When fish is dried its weight is reduced; so the fishermen are reluctant to convert fish into dry form even when the price of wet fish is low. However, some fishermen dry a small amount fish for their own consumption.

Chapter Four

SOCIO-ECONOMIC FEATURES

4.1 Demographic and Family Characteristics

The majority of the fisher families in the study area are Sinhala Buddhists. The rest are Muslim, Malays or Moors.

The nuclear family system is characteristic of the fisher community in the area, but the extended family system is also present.

The average number in a household is 5.68 in the organised sector and 5.06 in the unorganised sector.

In the sample of the organised fishermen, the masculinity ratio (the number of males per 100 females) is 114. This is higher than the national rate which is 104 according to the census of 1981. When the five tanks are considered separately, in some areas like Ridiyagama and Badagiriya the masculinity ratio is higher than the above-mentioned rate, e.g. Ridiyagama 127, Badagiriya 126. However, the increase is the result mainly of migration of the unmarried fishermen and male child-helpers into the fishing communities. In the sample of the unorganised fishermen the masculinity ratio is lower, at 99.

As shown in Tables No. A-4 and A-5, a pyramid type age structure is noticed in the population of the fisher families. About 40% of the population of the organised sector and 49% of the population of the unorganised sector are in the age ranges of 14 years and below. The percentage of the population that belongs to the age group 0-29 years is 76% in the organised sector, while it is 78% in the unorganised sector. The specific demographic feature of these families is that 90% of the organised and 94% of the unorganised sector fisher population are 44 years and below. This age group is higher than the corresponding national group. According to the 1981 census,

the percentage of the population in this age group is only 82.8%. Most of the fishermen are young persons and when they migrate into tank areas from their parents' homes they are accompanied mostly by their wives and children only. This has been the main reason for the above-mentioned age structure.

The age dependency ratio is 75 in the organised sector (see Table No. A-4) and 102 in the unorganised sector (see Table No. A-5). This is again higher than the national rate of 65.6 as estimated in the 1981 census. The principal reason for this has been the large number of low-age dependants resulting from a high birth rate.

4.2 Housing Conditions

It is very difficult to determine the ownership of houses and lands of fishermen on account of the complexity in the types of residence places of the fishermen in each tank (see Table 7). However, a large number of the fisher families in the study area are living in houses built on encroached lands belonging to the government. So they have no legal right to these lands. Table Nos. A-6 and A-7 show the distribution of the houses according to various characteristics. According to these tables, 43% of the organised sector and 48% of the unorganised sector fisher families live on encroached lands. The number of families living on this type of land is higher in Ridiyagama, Tissa, and Yodawewa areas than in the other two areas. Respectivley 65%, 43% and 60% of the organised sector and 30%, 80% and 70% of the unorganised sector families of these three tanks live on this type of land.

Although they live on encroached lands, their responses show as if they live in their own houses because they have built them. As much as 78% of the organised fishermen and 76% of the unorganised fishermen responded so. However, 52% of the organised and 30% of the unorganised fishermen in the Badagiriya tank responded to the question of ownership of the house with the category "other". This response came from those living, not on their own, but with parents

Table 7

Classification of Fishermen by Residence

Residence Type	Ridiyagama		Badagiriya		Weerawila		Tissa		Yodawewa	
	O	U	O	U	O	U	O	U	O	U
1. Settlers residing in allotments	+	+	++	++	-	-	+	-	-	-
2.* Settlers residing in encroached lands within scheme	++	+	+	+	-	-	-	-	-	-
3. Non-settler encroachers residing in settlement lands	+	+	-	-	-	-	-	-	-	-
4. Non-settler encroachers residing outside settlement lands	-	+	-	-	++	++	++	++	++	++
5. Non-settlers permanently residing in their own lands outside the scheme	+	++	+	+	-	+	+	+	+	+

++ The category to which the majority of fishermen belong

O - Organised fishermen
U - Unorganised fishermen

* include encroached lands, tank, bund, channel, and reservation within a scheme.

or another member of the family in a colony house given over by the government, but is owned by the family.

The condition of the houses is poor and a considerable number of them have been constructed temporarily. Most houses have walls made of clay/wattle and daub and roofs thatched with kadjan/palm leaf and floors prepared with mud/cowdung. As the sample of the organised fishermen shows (see Table No. A-6), the number of houses with clay/wattle and daub walls is 68% while 79% is with cadjan/palm leaf roofs and 78% with mud/cowdung floors. According to the sample of the unorganised fishermen, 70% of the houses are clay/wattle and daub made, 76% cadjan/palm leaf thatched and 82% prepared with mud/cowdung floors.

The condition of the houses in which the fishermen of the Badagiriya tank live is rather better than that of the houses of other tanks as most of the houses here have been distributed by the government. In the Badagiriya tank, 76% houses in the organised sector have brick/cabook walls, 67% tile/asbestos roofs and 48% cement floors. These features are found in 70%, 60% and 50% of the houses in the unorganised sector in that order.

Fishermen's houses are very small and have a room or two; in the organised sector the average number of rooms in a house is 2.81 (with the parlour); in the unorganised sector it is 2.58. The average number of square feet of a house is 290 in the organised sector and 253 in the unorganised sector. According to Tables A-4 and A-5 the average number of persons per room is 2. But this number increases when the parlour is excluded. It is, therefore, obvious that their is severe overcrowding in houses.

Only 87% of the houses of the organised fishermen are accessible by vehicle and this rate is 77% in the case of the unorganised sector. About 1.59% of the houses of the organised sector have electricity, but none of the unorganised sector has this facility.

4.3 Property Ownership

Reference has already been made in the course of the discussion on house ownership to the fact that the majority of the fishermen have no land of their own. Only 3% of the organised fishermen and 4% of the unorganised fishermen have their own land under single ownership (see Tables A-6 and A-7). However, they enjoy the tenure of cultivation of the land on which they have encroached, as their own. According to Table No. A-8 which shows high land ownership, 62% of the organised fisher families have one or less acre in extent. But in the unorganised sector 70% of the families have four acres or more. Since a considerable number of the latter are farmers, they own larger extents.

With regard to the ownership of lowland, the position seems to be worse. Except for one fishermen from the organised sector (0-0.25 acres) and another from the unorganised sector (2-3 acres) others have no lowland at all.

Because these fisher families live in poor economic conditions, they do not possess many durable household goods. In some houses we did not find such rather common articles as a radio, a sewing machine, a petromax lamp or a bicycle (see Table A-9). Of the organised fishermen, only 69% have radios, while 80% and 22% respectively have sewing machines and petromax lamps. A large percentage, i.e. 80% households, however, have bicycles. This position, regarding the ownership of durable household goods, does not vary from tank to tank. Regarding household goods, the unorganised sector is a little worse off than the organised sector. While only 60% of them have radios 6%, 12% and 54% of them have sewing machines, petromax lamps and bicycles respectively.

4.4 Sources of Water and State of Health

Table No. A-10 shows the sources of water for bathing and drinking. Only 52% of the households in the organised sector get water from their own or neighbour's wells for drinking, while 33% of them get water from the tank and canals. In Ridiyagama tank a higher percentage, namely 50% of the households, use water from the tank and canals for drinking. As shown in the table, the percentage of families that get water from "other" sources has gone up to 13% because some fisher families coming within the Tissa tank who have been settled under the Kirindi Oya settlement project (Lunugam Wehera Project), use water distributed by tractors for drinking. In the unorganised sector too, 52% of the households use their own or neighbour's wells while 36% draw water for drinking from the tank and canals.

Both the organised and unorganised sector household members use tanks and canals for bathing. The percentage of the households doing so in the organised sector is 100% and in the unorganised sector 94%. Since a large number of the households have no wells, tanks and canals have become the chief source of drinking water. Tank or canal water is good neither for drinking nor for bathing, because a large number of families have no lavatories and resort to forests. Thus tanks and canals are polluted by the surface water washed away from these forests.

The state of the health of fisher families is also poor. According to Table A-11, 38% of the organised sector households and 36% of the unorganised sector households have no lavatories. When each tank is considered separately, this percentage is higher for Yodawewa than for other tanks. The percentage of those not having lavatories is 60% in the organized sector in the Yodawewa tank.

Most houses which have lavatories were found to have pit-lavatories. The percentage of pit lavatories is 88% in the organised sector and 94% in the unorganised sector in the whole area.

4.5 Educational Attainments

Statistical information about the educational conditions of the population of these fisher families is presented in Table Nos. A-12 and A-13. According to this information, the literacy rate in the organised as well as the unorganised sector is about 87% of the population. This is similar to the national levels. According to the 1981 census, the literacy rate was 86.5% for the whole country. The higher achievements in education have been a direct result of the liberalised education programmes supported by the government. This situation varies slightly from tank to tank. In the organised sector the literacy rate is lower at 80% in the Tissa Wewa and highest at 97% in the Ridiyagama tank. The higher literacy rate in Ridiyagama results from the fact that most fishermen and their spouses in that tank are young persons who had migrated to this area from a nearby colony after having attained a certain level of education in their own colony.

The educational levels of the people are not generally high. The main feature is that most people stop schooling in the lower grades. The percentage of the population that has not proceeded beyond grade 5 and are studying in the primary grades is more than 50%. In the organised sector the rate is 51% and in the unorganised sector it is 52%. The percentage of those who have passed the G.C.E. (O/L) examination is very low. It is only 2% in the organised sector and 3% in the unorganised sector. Not more than 1% from both sectors have passed the G.C.E. (A/L) examination, and no one in the whole sample has proceeded beyond that level.

The educational levels and attainments vary from tank to tank; Tissa and Yodawewa tanks show less progress because of the lower income levels and greater economic difficulties of the fisher families of these two tanks. Males have acquired a higher level of education than females; yet the difference is not very great.

At the time of our field survey, a considerable number of children of school going age (5-14 years) had stopped schooling. Among them 17 children from the organised sector and 5 children from the unorganised sector were recorded. Of these numbers relatively more came from the Ridiyagama tank area. The main reason for this was the absence of a school close to the fishing households. Interruption of schooling of the children in all tanks is a result of economic difficulties as well as parental disinterest. Parents who have received very little schooling do not appear to be keen to provide higher education for their children.

4.6 Food and Nutrition

A study of the general nutritional level of the fisher families should be done selecting a sample of children below five years; their heights and weights should be measured and compared with national standards. We were not in a position to do this owing to the limited time and resources at our disposal.

We can however, get some indication of this from the variety and quality of their daily meals which we examined. We found that fish was one main item in their daily meal. Fishermen as a habit, took at least one kilo of fish home after fishing. On several days of the week both lunch and dinner contained fish and sometimes even with breakfast fish was taken. It is clear that they get a considerable amount of protein through the consumption of fish. This alone, it must be admitted, does not indicate fully their nutritional levels and so, further studies become necessary.

4.7 Employment and Income

As for the elder members of the fisher households, a considerable number of them are engaged in farming, casual labour and animal-rearing, while some others are engaged in fishing. Government or private institution employees are rather rare in these families. A large number of the labourer category is unemployed (see Table 8).

Their overall percentage is 17 in the organised sector, but tank-to-tank variation is high; i.e. in Yodawewa the rate is as high as 28.95%, while in Badagiriya it is as low as 3.7%. In the unorganised sector the percentage unemployed is very low being only 6.4, with no unemployment recorded at all in some tanks.

In the organised sector the economic dependency ratio is 3.1, varying from 2.1 to 4.4, among the five tanks (see Table 8). The economic dependency ratio of the unorganised sector is lower at an average of 2.9.

Table 8

Unemployment and Economic Dependency Ratio of the Households

	Ridiyagama	Badagiriya	Weerawila	Tissa	Yodawewa	All tanks
			Organised Sector			
Unemployed	22.00%	3.70%	8.45%	21.54%	28.95%	17.36%
Economic Dependency ratio	3.8	2.2	2.1	2.9	4.4	3.1
			Unorganised Sector			
Unemployed	0.00%	0.00%	0.00%	13.04%	19.23%	6.40%
Economic Dependency ratio	3.8	2.6	3.4	2.2	3.0	2.9

Tables A-14 and A-15 shows the average annual household income of fisher families in each tank and the sources of their income. According to these tables, the average annual income per household in the organised sector is Rs. 15,386. Here too, there is much variation from tank to tank. It stands at Rs. 25,105 in Badagiriya (highest income level), and at Rs. 7,200 in Yodawewa (the lowest). In the unorganised sector, the average annual income of households is Rs. 9,770, but the variations among the tanks is not so large.

Fisher households in the two sectors have several sources of income and their relative importance changes from tank to tank. In the organised sector, a large part, 73% (Rs. 11,287) of the household income is derived from fishing. At Ridiyagama and Badagiriya, the percentage and the amount of income derived from fishing is higher, namely 88% (Rs. 15,776) and 87% (Rs. 21,792) respectively. In these two tanks, the main employment of the households is fishing. Because the fishermen of Tissa and Yodawewa have not paid full attention to the fishing industry and are also involved in other activities, the percentage and the amount of income derived from fishing is comparatively lower. In Tissa and Yodawewa, the respective percentages are 45% (Rs. 5,167) and 41% (Rs. 2,936). In the unorganised sector, 45% (Rs. 4,435) of income comes from fishing. Even here there is a marked tank-to-tank variation. It is 70% (Rs. 9,350) in Badagiriya, as the unorganised fishermen at this tank are involved in fishing as their main occupation.

Other important sources of income of fisher households are working as hired labour and farming. The percentage of income derived from these two sources by the organised sector is 9% and 7% respectively. As the fishermen of Wirawila, Tissa and Yodawewa tanks pay greater attention to these occupations the percentages of income derived from them show an upward trend. The percentages of incomes earned from working as hired labour and farming by the unorganised sector are greater than in the organised sector. The respective percentages recorded are 24% and 14% from these two sources. Many fisher families have availed themselves of subsidised food stamps distributed by the government. The value of the free ration forms a considerable part of their income.

Regarding the income levels, the organised sector shows a large spread (see Table A-16). About 25% of the households in that sector enjoy annual income levels between Rs. 3001 - 9000 while 28% earn between Rs. 9001 - 15000. The percentage of households between Rs. 15,001 - 21,000 is 33% while 13% households earn more than Rs. 21,001. The distribution for each tank gives a different picture. For example, in Yodawewa, almost 100% of the households belong to the Rs. 15,000 to 0 category, while in the Ridiyagama tank, 97% of the households belong to the category, of Rs. 12,001 to 24,000.

In the unorganised sector, households fall within income levels lower than those of the organised sector (see Table A-17). As much as 92% of the households in this sector belong to income levels between Rs. 3001 - 18000. Even within these limits there is much variation among tanks. In Yodawewa, 90% of the households earn below Rs. 6000 while in Badagiriya, 90% of the households earn over Rs. 6000.

4.8 Savings and Indebtedness

Because the income levels of the fisher families are not very high and a large part of their income is drawn for day to day consumption, not many have been able to save. Except for a very few, they have not cultivated the habit of thrift and saving.

Many fisher families are used to taking loans often for various purposes. They go to private money lenders for loans rather than to financial institutions like state banks. This situation results from reasons such as the non-availability of banks in the area, difficulty of finding suitable guarantors and delays arising from bank procedures involved. Except for 32% of borrowers in the organised sector and 17% in the unorganised sector, all have taken their loans from private money lenders.

Usually private money lenders demand higher interest rates than state banks. According to Table A-18, 66% of the loans obtained by the organised sector from private money lenders, and 90% by the unorganised sector have been taken at annual interest rates of more than 100%.

According to Table A-19, of the loans taken by the organised sector, 36% were utilized for farming and 19% for construction of houses. Of the loans taken by the unorganised sector, 29% were utilized for construction of houses and 25% for medical expenses. However, in both sectors, the greater part of loans had been taken for less important and unproductive purposes.

Chapter Five

MARKETING

5.1 General Patterns

Fish marketing patterns differ from tank to tank. The organisation, trading pattern, the price structure, the number and type of traders vary from place to place. The majority of fishermen in the tanks under review sell their catch to the traders who come to the harbour early in the morning. Traders on push bicycles and motor bicycles and big *mudalalis* who transport fish in their lorries are among the buyers. Some fishermen sell their catch themselves, at nearby fairs and towns.

Marketing conditions are not so favourable because in the study area there isn't a good demand for fresh water fish. The sea is not more than five miles away from the study area (vide map 1). So there is sufficient fresh marine fish also available in markets and fairs close to these tanks. Therefore, the fresh water fish is taken by fish vendors to rural areas located around and some distance away from the tanks, and by big *mudalalis* to the rural fairs situated at Weeraketiya and Walasmulla (more than 30 miles away from the study area) where there a better demand exists for inland fish (vide map 2).

Although a good quantity of fish is taken to remote areas and sold at reasonably higher prices, the fishermen of the study area benefit very little from such higher prices. The reason is the monopsonic or oligopsonic buying of fish. One or two *mudalalis* visit the fisheries harbour early in the morning when the catch is brought to the river bank and the fish is bought at a predetermined price per fish. Even if the market price is higher due to a poor supply of fish, the price paid to the producers does not vary. It was Rs. 3.50 per kilo or 0.60 per fish at the time of the survey.

Fish marketing channels do not exhibit an elongated process. But the exploitation by the traders is very high. As far as marketing channels are concerned, (see Table 9) channel one is most popular in the study area, and the bulk of the fish is sold through it.

Table 9

Types of marketing channels

1.	Fishermen	--	Trader	--	Consumer
2.	Fishermen	--	Consumer		
3.	Fishermen	--	Trader/Whole saler Retailer	--	Consumer
4.	Fishermen	--	Hotel/Boutique	--	Consumer

However, as the product has to reach the consumer quickly because of its perishable nature, the traders are mainly from the surrounding area. Hence they are able to dispose of the fish quickly.

The fishermen have perforce to sell to the same *mudalali* because of the temporary relief he sometimes affords in cash as well as the provision of fishing nets on credit. One or two *mudalalis* operating here also prevent new businessmen from entering the market.

5.2 Marketing system at each reservoir

In Ridiyagama the main purchasers are fish vendors (on bicycles), and each fishing boat has its own fish vendor. Ridiyagama has about 40 vendors in all. In addition to these traders on bicycles, there are three vendors on motor bicycles. In Badagiriya, the picture is completely different. There the marketing aspect almost entirely in the hands of two big *mudalalis* who transport the fish in their lorries. In addition to these two, there are only two vendors on motor bicycles and about six fish hawkers. The fish traders of these two tanks come daily, early in the morning, to the harbour of each tank where the fish sales commence around 5.00 a.m. and goes on till around 7.00 a.m. Each of these tanks has two markets located separately. Weerawila and Tissa tanks, on the other hand, have smaller markets with not more than two

vendors at each one of them. The bulk of the fish of these two tanks is sold by fishermen themselves at nearby junctions and fairs and the rest in the distant fairs. In Yodawewa, about half of the catch is bought by one big *mudalali* who transports his fish to far away fairs in his own lorry while the balance is taken by fishermen themselves to fairs or sold to small traders who in turn take them away in boxes to fairs by bus.

5.3 Mechanism of exploitation

The fish price in the area is decided by the traders. Especially at Badagiriya, it is controlled by two big *mudalalis* acting in collusion with each other. They exploit the fishermen by paying them very low prices. During the field work of this study (January, 1985) it was found that the buying price at Ridiyagama was Rs. 1/- and at Badagiriya 60 cts. per fish. In Ridiyagama, one kilo was Rs. 4.00 (here the fish are caught by using 3½" mesh size nets and four entities of fish weigh a kilo) while in Badagiriya it was Rs. 3.00 per kilo (here the fish is caught by using 3 1/4" nets and five fish weigh a kilo). *Mudalalis* sell them between Rs. 6.00 and 10.00 per kilo in remote areas and make a substantial profit.

Table 10

Marketing Cost and Margins
(Calculated per kilo)

Stages		Rs. per kg.	Share of the ultimate consumer's price at each level
Stage I	Producer's cost (fixed operational, including craft, gear and labour)	1.93	28%
	Producer's profit margin	1.57	22%
	Producer's selling price to the trader	3.50*	-
Stage II	Trader's cost (including collecting, packing, icying, transport and wastage)	0.90	13%
	Trader's profit margin	2.60	37%
	Trader's selling price to consumer	7.00	100%

*Producer's price as a percentage of consumer's price = 50%

Our investigations show that the average consumer price per kilo of inland fish is about Rs. 7/- and the price is equally shared (50% each) by both the producer and the trader. But this is not a fair distribution because the producer incurs 28% of the consumer price as his costs while the trader incurs 13% of it as marketing costs. Therefore the ultimate net profit of the producer is 22% which is much less compared to the price received by the trader. This share of the price received by the producer is not at all attractive - the larger share of the consumer's price is absorbed by the trader. This is clearly reflected when the fish prices go up to Rs. 10/- per kilo. The producer price increases by a very narrow margin, or not at all, while the trader's profits are enhanced. One can however argue that the instability of the inland fish market and the higher risk involved in the marketing activities, due to the quick perishability of the product has to rewarded by a larger profit margin.

The probability of acceptance of such risk is however very low because the traders convert the left-over fish into dry fish,in the event of the market situation being not known easily. Thus they can stockpile the dry fish till the demand reaches high levels. In the event of such losses, the producer accepts lower prices (prices even lower than the break-even situation). This affects the producer economically, but he has to accept it in a situation where no other competitive market channel is available. On the other hand the trader derivs large profits if assured of gains at a later date.

Unlike the channel one, when fish is sold through channel two, the marketing efficiency is high. The selling price will be lower (Rs. 6/- per kilo) but gives a profit of about 66% to the producer but here the producer bears all the risks regarding the sales and the lasting quality of the fish. In such instances, the producer tends to feel that the earlier method of having a 22% profit share from the consumer price is sufficient because there is no risk involved in his side.

As there is no competition between traders they are able to keep the price fixed for a long time. They would think of changing it only if all fishermen get together and demand a higher price. In Ridiyagama, there is a separate fish trader for each boat, which sells its fish only to him and there is no competition in buying. This hold is so strong that the fishermen refrain from going fishing when the trader is unable to turn up. In Badagiriya too, the conditions are similar. Here the two big *mudalalis* monopolize the two markets at the two landing sites. The fishermen of each landing site sell the fish to its *mudalali* only and he also generally does not buy fish from other fishermen. When one *mudalali* is unable to come to the market on a given day, the fishermen whose fish he normally buys, too keep away from fishing on that day. There is very little competition from the small itinerant traders; nor do the two monopolist *mudalalis* allow new entrepreneurs to enter the market.

In these fish markets, the fishermen's bargaining power has been severely restricted by their being confined to one or two traders and by their not having recourse to alternative ways of selling their fish. Ridiyagama and Badagiriya are so isolated (Ridiyagama is eight miles off Ambalantota town and Badagiriya is five miles off the Hambantota-Tissa road and 12 miles off Hambantota town) that the fishermen themselves cannot easily transport the fish to the markets. Even if there are transport facilities to take the fish to closeby towns, the close proximity of the sea reduces the demand for inland fish as against marine fish.

Even though a market can be found in nearby rural areas and fairs, these fishermen cannot engage themselves in selling their fish, during the day time, because they are too tired after the previous night's fishing. Therefore, they are compelled to sell their fish to whoever the trader that comes to them. These fishermen are also economically weak because of the dearth of alternative jobs and subsidiary occupations. This is particularly true of Badagiriya and Ridiyagama fishermen. Therefore, they wish to be assured of

some trader who would come to them regularly to buy their produce. Once, the fishermen at Badagiriya had organised a strike against their *mudalalis* by abstaining from fishing in order to force the price up. The strike did not last long. One or two days later, some fishermen had secretly agreed with the *mudalali* to give him fish at his former price. They were compelled to do so through fear that if the *mudalali* did not come, they would lose their occupation altogether.

There are other ways in which traders exploit the fishermen. One such trick is of not buying certain varieties of fish on the pretext that they cannot be sold. These varieties are *Cheena*, Eel and *Petiya*. It is true that these varieties are not preferred by the people of the tank area, but it is possible to sell them in areas where *mudalalis* do their sales. Invariably, a few of these varieties of fish are caught in their nets and given to traders free by the Ridiyagama fishermen. In Badagiriya, we found that the so-called unsaleable varieties are put in the baskets of the *mudalalis* without taking a count of them. Over and above their total purchase, the traders collect a considerable quantity of these varieties of fish which they are able to sell easily at their sales points. One big *mudalali* at Badagiriya mentioned to us that there was no variety of fish that was absolutely unsaleable. It may be that these varieties do not fetch as high a price as *Japan Korali*, but whatever the price they realize constitutes a clear profit as they are obtained free.

There is another method of exploitation at Badagiriya. There, some of the fish caught is often damaged by Eels sucking the blood of the gill of the fish. Pretending that such fish is not easily saleable, the traders buy it at half price. This type of fish is usually mixed with the good catch and is sold by the traders at the same price at their sales points.

Yet another way of exploiting is of not making payment to fishermen immediately on purchase of their produce. Usually, settlement for fish purchased is made on the following day or once a week. In Ridiyagama and Yodawewa, traders settle it on the following day, whereas at Badagiriya, big *mudalalis* do so once a week. When settlement is made on the following day, the Ridiyagama traders exploit the fishermen further by reducing the amount on account of unsold fish, which they bring back to the tank to show the fishermen. At Badagiriya where settlement is made once a week, a small advance is given to fishermen to meet their daily expenses. In this manner, fish *mudalalis* buy the fish without resource to the funds available which they invest in their other business activities or day-to-day needs.

What exists between the fishermen and the traders is not so much a buyer-seller relationship as that exists between a doctor and a patient. This is clearly seen between big *mudalalis* and the fishermen at Badagiriya and Yodawewa tanks. The two big *mudalalis* at Badagiriya tank are well known persons in that area and they reside only five miles away from the fishing village. Similarly, the Yodawewa big *mudalali* happens to be the wealthiest person living in that area. Being people of considerable wealth and influence, they keep the fishermen in their clutches in various ways. For example, when fishermen need nets, these big *mudalalis* buy them for the fishermen and deduct the cost in instalments from what they pay for the fish. The Yodawewa fish *mudalali* has paid the subsidised cost of about 10 boats with his own money when the boats were first issued. The fishermen who could not have afforded the purchase are naturally under obligation to him and reciprocate by selling their fish to him at whatever price he dictates.

Mudalalis also keep fishermen "tied" to them by giving credit without charging any interest. Such loans are recovered in easy instalments. They also help fishermen's families in many ways. For instance, the Badagiriya *mudalalis* oblige with their vehicles to transport patients to hospital. Such friendly relationships between the fishermen and the *mudalalis* bind them so close that invariably the fisherfolk are held in the *mudalalis* clutches, and exploitation continues with the fishermen selling their produce at the dictate of the *mudalalis*.

Chapter Six

PROBLEMS AND CONSTRAINTS

6.1 Institutional problems

There are certain institutional difficulties in the development of the fishing industry. The tanks which are used for inland fishing have been built for irrigation. Therefore, their ownership rests with the Department of Irrigation. So far, no clear instruction or delegation has been given to the Ministry of Fisheries, which is responsible for the development of the fishing industry, as to what could be done in these tanks to develop fishing. As a result, the planning of a proper physical environment for fisheries development has met with certain obstacles.

The ownership of boats given to organised fishermen on a 90% subsidy rests with the Ministry of Fisheries during the first two years. Until the expiry of this period, these boats cannot be sold, rented, mortgaged or their ownership transferred in any manner. Also, they cannot be moved away from the tanks. Nontheless some fishermen have violated these regulations and have either sold, mortgaged their boats or transferred them to the sea-coast or to another tank, (vide Table-11). In addition to this, especially at Tissa and Yodawewa tanks, some boats have been used to transport pilgrims or tourists. Since the subsidized boats had been given more than two years ago, their ownership should have been vested in the fishermen. Therefore, no legal action could be taken against the fishermen for such irregularities. However, it is possible that vesting of the ownership in the fishermen would only increase these irregularities. The solution seems to be to lengthen the period of the Ministry's ownership and to restrain fishermen from abusing their priviledges.

Table 11

The Current State of Boats Given at 90% Subsidy

	Ridiyagama	Badagiriya	Weerawila	Tissa	Yodawewa	Total
1. Sold/rented or mortgaged	-	2	1	6	6	15
2. Transferred to another tank	-	-	1	-	5	6
3. Lying idle	-	-	2	4	-	6
4. In disrepair	4	-	1	3	-	8
5. Stolen	-	-	-	1	-	1
6. Other	-	-	2	-	-	2
7. Properly used	38	41	7	10	20	116
TOTAL	42	43	14	24	31	154

Migrant fishermen are now not allowed to come to these tanks unlike before the fishery societies were established. Yet, they sometimes illicitly enter tanks like Ridiyagama; then, completely disregarding the rules, they use nets and boats of different sizes and types and fish in such a way that inhibits the breeding and growth of fish. No action has so far been taken to prevent these migrant fishermen from intruding.

6.2 Production problems

As revealed in the study, the basic problem of production relates to the fact that, especially in the tanks of Weerawila, Tissa and Yodawewa, the catch remains low and in all tanks, the catch fluctuates widely from time to time. This is the result of climatic conditions and biological factors. It is also due to the practice of laying nets which are of smaller mesh size than prescribed, disregarding the prospective growth of the fish. By August, the water level

of the tanks goes down very much. Sometimes, the tanks go almost dry. During this period a far too excessive catch may be made resulting in an unduly low catch in the succeeding month because of insufficient time for fish to breed and grow between these two periods. There is no doubt that the cause for the catch to fall to an unduly low level is the laying of nets of less than 3" mesh by fishermen of Tissa, Yodawewa and Weerawila tanks. These nets definetely affect the breeding of fish adversely.

Some of the fibre boats given on subsidy have collided with rotten logs in the tanks and are in a state of disrepair. This is a frequent occurrence, but there is no institutional arrangement to have them repaired; nor do the fishermen have any knowledge or training in repairs. Such damaged boats, out of use for a long time, are a common sight at these tanks.

Fishing nets are damaged by crocodiles trying to eat the fish caught in the nets and also by entanglement with the logs in the tanks. The number of crocodiles in these tanks is very high and the nets are damaged very frequently. Fishermen have no facilities either to purchase their fishing nets and other implements to replace the damaged ones or to obtain them at subsidized rates. According to the present conditions, nets are supplied by local fish traders as a means of "binding" the fishermen. Another complaint is that Eels damage fish in the nets. This happens frequently at the Badagiriya Tank which is infested with Eels. Here nearly 1/5th of the catch is subject to such damage. It is said that the Eels creep through the ventral fins of the fish caught in the nets and suck their blood. Cunning hawkers buy such fish at half the price paid for the undamaged ones, although they sell it at the normal price along with the good catch.

The majority of the organized fishermen are youths, and of them a considerable number have obtained boats through the subsidy

scheme. However, they do not posses much experience in fishing. Therefore, they are not quite able to lay the nets properly and to repair them when damaged.

6.3 Marketing Problems

Marketing is the major problem in the area under study. The basic cause is not so much the lack of facilities for marketing as of obtaining reasonable and adequate price. If the fishermen at Badagiriya tank could get a reasonable and higher price than at present for the fish they catch, their income level and the standard of living will improve substantially. The fish trade in this area is in the hands of a few traders who both exploit the fishermen in such ways as discussed earlier and also thereby prevent them enjoying fully the fruits of their labour.

The difficulties of marketing are mainly due to the proximity of these tanks to the sea. Fresh sea fish is available at populated closeby towns at a low price· the people also prefer sea fish to fresh water fish. Therefore, it is difficult to find a good market in the areas of inland fishing.

It is difficult to dispose of some varieties of fish. Among these are the newly-introduced varieties as well as some local varieties. It is especially difficult to get a market for recently-introduced "Chinese Carp" which fishermen call "Cheena". There are several kinds of "Carp" of whom, two kinds namely, "Big-head Carp" and "Grass Carp" are the worse affected. They are caught mostly at the Ridiyagama Tank. The other variety, the "Common Carp" found at Weerawila and Tissa tanks, however, finds a better market than for the others as the fat content in them is less. The fat content generally increases as they grow bigger and bigger. Therefore, the fishermen of Ridiyagama release the big-sized "Cheena" as there is no demand for them.

Similarly, the more recently introduced varieties are also not as popular with the people as *Tilapia mossambicus*. Among them is *Hirikanaya*. It may take some time before people develop a taste for the recently introduced varieties. Even a few of the indigenous varieties such as *Pethiya* are not very popular with the people. They are abundant in Yodawewa and the neighbouring inhabitants do not consider them as edible.

6.4 Subsistence Problems

Just as much as the problems related to their occupation, fishermen encounter problems in their day-to-day living too. The major problem here is landlessness. The majority of the organised fishermen lives on encroached government land around the tanks. This land, however, has been reserved for the protection of the tanks and should be set apart as forest cover. It may, therefore, be necessary to evict these fishermen from the land on which they live at present.

Already, about ten fishing families who had lived on encroached land near Tissa Wewa have been settled four miles away from the tank in a village called Berali Hela, a new village under the Lunugan Vehera Irrigation Scheme. The other families living near Tissa Wewa and Yoda Wewa have been given notice and will be evicted in order to plan the settlement of the land under the Lunugan Vehera Project (Kirindi Oya Irrigation and Settlement Project).

Although these fishing families have been newly settled as agricultural colonists, they have very little experience in agriculture. In discussions we had with them they informed us that they prefer their old occupation of fishing to agriculture. But having been settled far away from the tanks they face much inconvenience in getting to the tanks for fishing. Because of this, some families are of course reconciled to their changed environment and have given up fishing altogether after either selling or mortgaging

their boats. Some of them, however, occasionally come to fish in these tanks despite their homes being far away.

The housing conditions of these fishermen are also very poor. The houses consisting of one or two rooms and made of wattle and daub and thatched with cadjan are very small; with the families being large their houses are very crowded. This housing problem comes under discussion at their monthly meetings but no solution has so far been found. It is difficult to solve their housing problems until they are given land to settle down.

Fishermen are also subject to seasonal unemployment. In certain months of the year the catch is very low. Then the Fishermen's Society may decide to suspend fishing to allow for the fish to breed and grow. Fishermen find it very difficult to obtain temporary employment during such seasons. The fishermen of rather isolated Ridiyagama and Badagiriya especially face this problem.

Both because of the low level and fluctuating incomes, fishermen suffer from the lack of capital. They find it difficult even to purchase the very essential equipment for their work. So, both for their daily consumption and purchase of fishing gear they resort to credit. They are used to obtaining credit from private individuals rather than from banks. But the former charge exorbitant rates of interest. Therefore, their indebtedness has become acute.

Their low level of educational attainment also acts as a constraint to their betterment. The elders who have not had much schooling do not see the value of education. Therefore, they are not very enthusiastic about sending their children to school. Poverty also prevents them from keeping the children at school for long. Most children, therefore, have to suspend their education in mid-stream.

They also suffer from the lack of proper sanitary facilities and of good water. Many fisher families use tank or canal water for both bathing and drinking. They do not normally boil this water before drinking. The majority of the households do not have latrines of nay sort and use the woods instead. Therefore, the water in the tanks is polluted and is not suitable for human consumption.

Their recreational and community facilities also are minimal. Most of the families simply cannot afford radios or television. With low incomes and heavy indebtedness and bereft of many social amenities, many live a life engulfed by poverty and deprivity.

Chapter Seven

THE IMPORTANCE OF THE DEVELOPMENT OF INLAND FISHERIES

7.1 Scope

The large water area (see Table 12) coming within our study, which is now mainly used for supplying irrigation water for the development of agriculture, has great potential for developing the inland fishing industry. So if it is utilized properly it would provide an opportunity to solve to some extent a few problems such as unemployment and under-employment, the low level of living conditions and malnutrition, on a regional basis.

Table 12

The Extents of Water Bodies Studied

Water Body	Acreage
1. Ridiyagama Wewa	2,200
2. Weerawila Wewa	1,400
3. Yoda Wewa	1,200
4. Tissa Wewa	575
5. Badagiriya Wewa	105
Total	5,480

7.2 Employment Implications

Those who come into the work force have to be provided with employment opportunities through agricultural activities because no industrial development can be foreseen in these agricultural areas close to the tanks. However, because of the limited area of arable land available, employment cannot be provided solely through agriculture.

The problem has become more acute in respect of the second and later generations of the colony areas that have come within the study. The main reason for this is the nonavailability of new cultivable land. The same question will be faced by the second and later generation members of the farm families likely to be settled in the new lands under the Kirindi Oya Irrigation and Settlement Scheme which is going to cover a larger part of the study area. Therefore, new avenues of employment have to be found for a large number of people. In these circumstances, the use of the water bodies in the area for developing inland fishing would be most helpful.

Already this has happened in respect of two tanks. A large number of second generation members of Badagiriya and Ridiyagama colonization schemes who have no land are engaged in fishing in those tanks on a permanent basis. The unemployed persons living close to these tanks as well as the children of the persons presently engaged in fishing in these reservoirs may also be employed in fishing if the industry is further developed. It would be useful to make arrangements to prepare the children of the present fishermen for fishing straightaway as they would have no opportunity in other skilled employment due to their low level of education. When the opportunity is provided to a considerable number of persons to engage in fishing directly, a further considerable number would be able to find employment in various types of activity such as fish vending, fish-processing and supplying equipment etc. If the present capacity of these tanks is increased, the seasonal unemployment problem experienced by the agricultural workers and the farmers as well as the persons engaged in fishing in these tanks at present can be prevented. Farmers as well as agricultural workers have to go through a long period of seasonal unemployment between sowing and harvesting. Fishing may provide alternative employment for them during this period.

Under the present conditions when the fish catches become small fishing is completely stopped for a short period of 2 to 3 months as decided by the fishermen's societies. But improving the conditions and the fish population of these tanks would help avoid this temporary stoppage of fishing and also ensure security of continuous employment.

7.3 Quality of Life

The development of the industry would be one sure way of improving the living conditions of the families whose members are directly engaged in fishing as well as those indirectly engaged, i.e. in ancillary services for the fishermen. Those who live close to the tanks and are engaged in agriculture and allied activities or otherwise, would find fishing a means of supplementary income as well as a source of employment which would stand in good stead when the usual work fails them.

Several studies done in rural areas in Sri Lanka have pinpointed malnutrition as a severe problem prevailing in those areas. As much as 34.7% of the children in the country are suffering from chronic undernutrition. As pointed out in the study of the pre-project socio-economic conditions of the Kirindi Oya Irrigation and Settlement Project, carried out by the Agrarian Research and Training Institute, 18.8% of all children living within the project area are suffering from chronic undernutrition.

So far the poor economic conditions of the people have stood in the way of measures to reduce malnutrition. It would, however, provide a small measure of relief if action can be taken to make ample fish available at a reasonable price to the people, in this case the tank fisher community and others in the area. As the production cost of inland fish is not so high, it can be provided to the consumer at low prices.

Chapter Eight

SUMMARY AND RECOMMENDATIONS

8.1 Summary

The history of inland fisheries in Sri Lanka can be traced back to the second or third century A.D. although its development in the modern sense commenced only in the early nineteen fifties. It took nearly another two decades for the government to pay serious attention to its intensified development. A public sector investment programme was started in 1972 and a three-year crash programme was launched in the following year to increase the production several-fold. With the creation of a separate division in the Ministry for inland fisheries in 1979, a five-year Master Plan (1979-1983) for fisheries development was formulated with a production target of 50,000 tons by 1983 from this sector alone. With an area of around 700,000 acres of inland water bodies, the great potential for the development of inland fisheries in Sri Lanka has been well conceived.

So far, no direct socio-economic studies have been undertaken on inland fisheries. The ARTI was commissioned by NARESA to undertake the present socio-economic study as a sequel to a request made by SAREC. This study examines under several headings the socio-economic conditions of fishermen of five perennial reservoirs, viz. Ridiyagama, Badagiriya, Weerawila, Tissa and Yodawewa in the Hambantota District. The study is based mainly on a sample field survey of both organised (members of fisher societies) and unorganised fishermen.

In accordance with the Master Plan of 1979-1983, fishermen around these tanks have been organized under a fishermen's society; the Ministry has also issued them subsidized boats and nets; an Experimental and Breeding Centre has been established at Muratawela and Fishery Inspectors have been appointed to advise the fishermen. Since then, there has been a rapid increase in the average annual production from the five tanks although the level of production

differs significantly from tank to tank and the production level of each fluctuate from month to month.

The population of fishermen in this area is younger than the national population and has a higher dependency ratio with a household size of 5-6. Most of their houses are made of clay/wattle and daub walls with cadjan roofs and mud/cowdung floors. They are small with less than three rooms per house. The majority of the fishermen have no land although they enjoy the tenure of cultivation of encroached land as if their own. They also do not posses many durable goods such as radios, sewing machines and petromax lamps, a symbol of relative affluence in the rural areas. More than one third of the fisher families have no lavatories of any sort and obtain drinking water from tanks and canals. Almost all of them bathe in either tanks or canals. The levels of both literacy and education taken together of these fisher families do not match the national average.

The rate of unemployment among them is not higher than the national average but their average annual income of Rs. 10,000 - 15,000 is certainly higher than the per capita national income. The bulk of their income is derived from fishing which is their major occupation.

Marketing facilities are not plentiful or organised. The fishermen are exploited in various ways because of the monopsonic or oligopsonic market that operates for fish. This exploitation keeps their incomes low and the low incomes keep them in the clutches of *mudalalis* who in turn are able to exploit them. This vicious circle must be broken by a many-faceted development effort of the fishing industry.

There are institutional constraints to its development. These relate to the administration and management of tanks, the shortness of the period where the ownership of the subsidized boats rests with the Ministry of Fisheries, encroachment of land reservations round the tank and the lack of knowledge or training in boat repair and sometimes even in fishing itself (of particularly the youth). There are production problems such as illicit fishing by migrant fishermen coupled with the use of small-sized nets. Then there are marketing problems relating to the imperfection of the market as well as consumer resistance to several varieties of fish commonly caught in nets. These problems and constraints must be removed to develop the industry and thereby ameliorate the conditions of the inland fishermen. To this end certain recommendations are made in the concluding section below.

8.2 Recommendations for Action

In order to develop inland fisheries, a clear organised programme is a vital consideration. First of all, the institutional problems that prove a major obstacle in the development of the resources in tank fishery must be solved. To overcome this problem, it is necessary to hand over the management of these tanks legally to the Fisheries Ministry for the purpose of developing fishery resources. Thereafter, to improve the fishery resources in these tanks and overcome the acute seasonal fluctuations of the fishery resources, a careful programme where more fish are bred than at present, and more research on development of the fishery resources is undertaken, has to be implemented. This means that more facilities should be given to the Muruthawela Fresh Water Fish Breeding and Experimental Station which is responsible for developing the fishing activities in these tanks. At the same time, all obstacles that come in the way of breeding and growing of fish in these tanks should be removed. One step in this direction is the implementation of regulations that have been framed in respect of the size of nets.

The fishermen at Tissa, Weerawila and Yodawewa have been illegally laying out smaller nets on the sly, although the use of nets of less than 3 inch mesh size has been banned. The fishermen in Badagiriya and Ridiyagama tanks, however, have been laying out 3 1/4 and 3½ inch mesh size nets respectively according to the decisions taken by themselves at their society meeting for their own good. When these two tanks are compared with the other tanks studied, some definite features regarding fishing activities emerge: (1) fish production is at a high level; (2) the fish resources do not deplete over much throughout the year; and (3) fishing can be done for a longer period than in other tanks. These benefits have been gained by the fishermen in these two tanks because of their self-discipline. It would help the fishing industry in the other tanks too for the fishermen in those tanks to be encouraged towards more disciplined production. The reservoirs that come under the Kirindi Oya Irrigation and Settlement Project (all except Ridiyagama) scheduled to be completed in 1986 will be fed by the water of the new scheme. Hence, it can be hoped that the water level will not go down and eventually even drying up will no longer be a problem.

It is necessary to take legal steps to restrict the coastal fishermen coming into these tanks even occasionally, since their aim is to catch a large quantity of fish using various methods. Restriction of their entry may help not only the growth of fish but also solve the problem of scarcity of fish for the regular fishermen.

The number of boats already issued seems adequate for the present capacity of these tanks. But with increases of fish population the number of boats should be increased giving an opportunity to those fishermen who still have boats of their own and those who are unemployed but would like to engage in fishing to obtain subsidised boats.

There is rivalry between organised and unorganised fishermen. One reason for this is the use by the latter of much smaller mesh size nets without being subject to the control of fishermen's societies. This has badly affected the growth of fish. In developing inland fisheries, if it is hoped to have the aspirations of the people in these areas fulfilled, fishing should not be limited only to those who do it daily as a job but others who fish on a small scale for their own consumption or for supplementing their other income or both, should be allowed too. Fishing should be allowed only to those living in the area and not to the migrant fishermen. The former can be made members of the relevant fishermen's societies with the development of the fishery resources and subject to the decisions made by them.

The period of two years before vesting of the ownership of subsidised boats in the fishermen is not adequate and should be extended. However, the Fisheries Inspectors should exercise greater supervision of the boats and increase their fishing activities. They should also simultaneously pay attention to the solution of many problems faced by the fishing industry. It is necessary to train the fishermen in the art of repairing damaged fibre boats. Fishermen should be helped to obtain nets and other amenities at reasonable or subsidised prices. Likewise, proper training in weaving and repairing of nets and other activities connected with the fishing industry should be imparted to the fishermen. Meanwhile suitable steps should be taken against the damage that is now being caused to the fish by Eels and crocodiles.

Any increase of production is meaningless without facilities for marketing at reasonable prices. Therefore, any programme implemented for the development of the inland fishing industry should also have as an integral part, the proper marketing of fish. With reference to the study area, it may not be possible to ensure good nearby markets as the tanks are located close to the sea. A good market can only be found in areas where sea fish is not

readily available in addition to being located far away from these tanks. After a good market is found, the trade should not be allowed to remain in the hands of private traders as at present. It is necessary for the government or a statutory board to intervene directly in the market to ensure a fair price to the fishermen. If this is not possible, arrangements should be made to market the fish through the fishermen's society of each tank. For this, financial and transport facilities, and cold storage and other facilities may have to be provided to each society by the government or by some statutory body. In addition to this, further research should be carried out on making more palatable preparation from varieties of fish such as '*cheena*', '*pethiya*' and others that are newly introduced and not yet relished by the consumers.

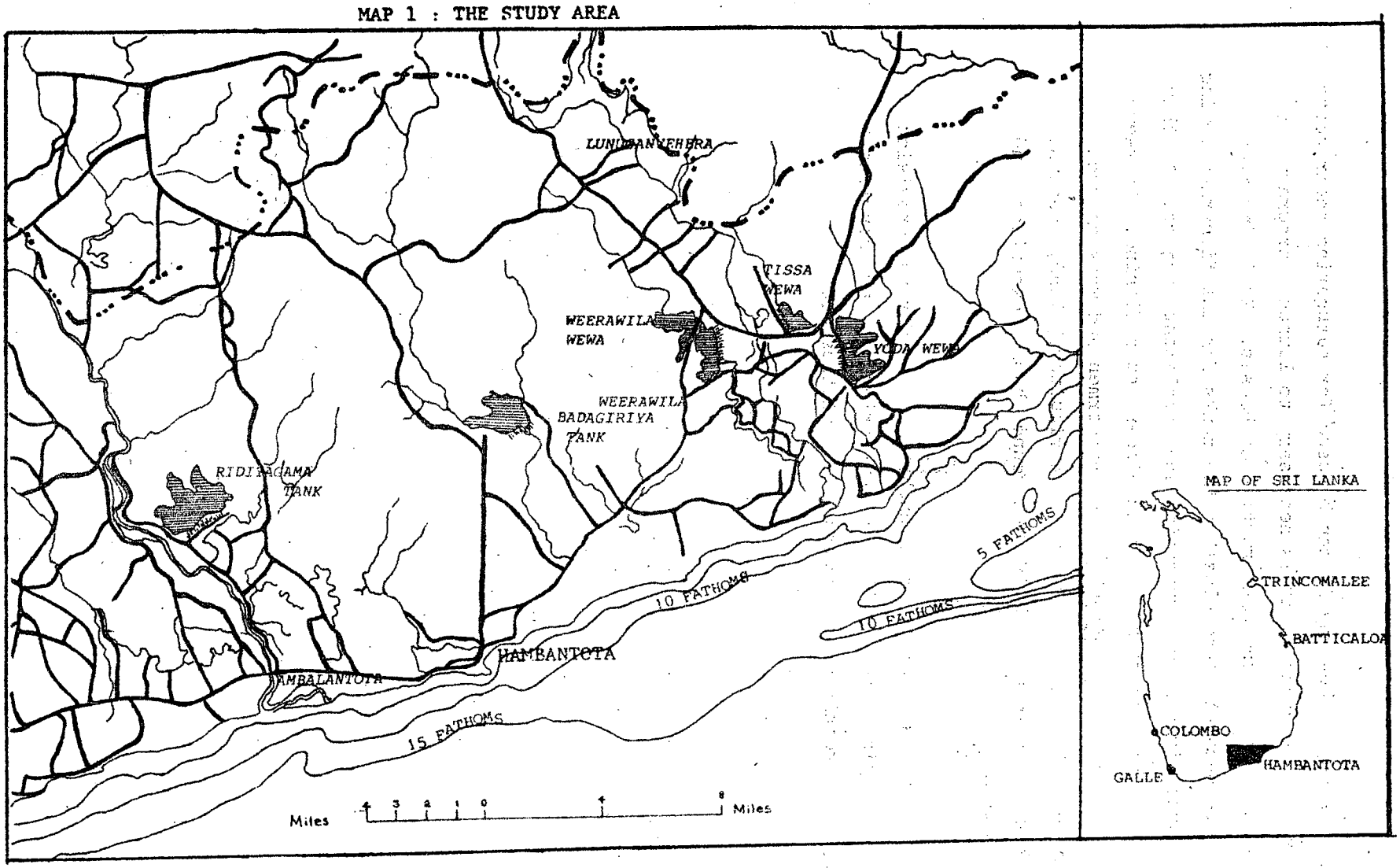
Attention should also be paid to the development of the fish processing industry. The fishermen will be able to earn a better income through this, especially in the season of excessive catches of marine fish resulting in a glut in the market for fresh water fish. Research should be directed, on a broad basis, to drying, salting, smoking and canning of fish and also preparing fish meal from inedible fish. In order to introduce fishermen to these activities and encourage them, they should be provided with the necessary equipment and other facilities as well as a good market for the produce.

Along with these steps for developing the fishing industry, suitable measures should be introduced to develop the social conditions of the fisher families. First, it is important to solve one of their major problems, that of land and housing. It would be necessary to move them from the land strips occupied at present, since they have to be used for forestation around the tanks. Fisher families should be given new land in places as close to the tanks as possible. The fishermen in the Weerawila tanks have indicated a suitable land for this. It is a stretch of government land of five acres in extent near the tank. They say it should be blocked out and distributed among them. Since this land borders

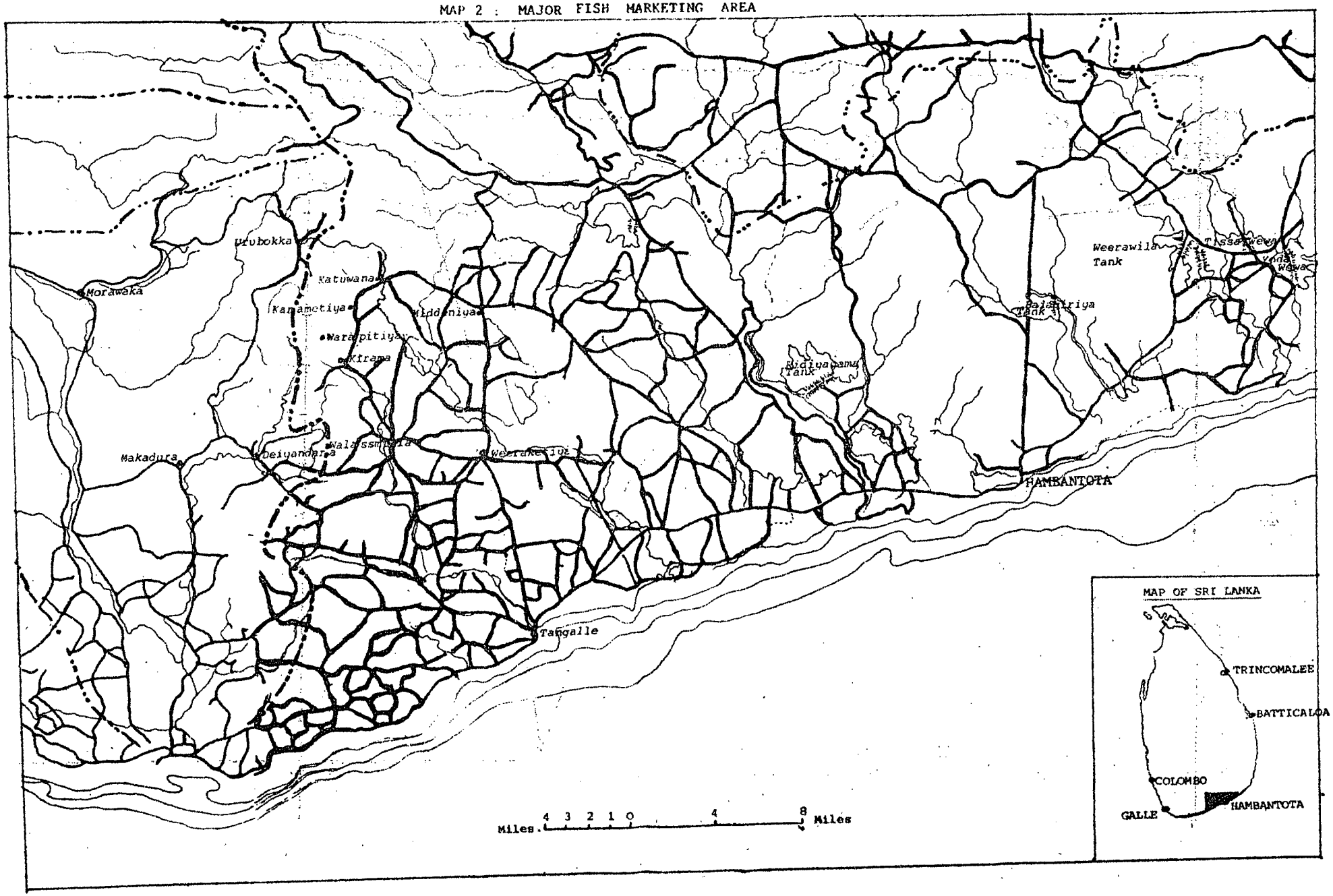
the tank bund, they say it can be used for harbouring their boats. After land is granted, it is necessary to launch a programme to give them aid for the construction of houses. It is important to allocate separate land close to the tanks for the fishermen coming under the Kirindi Oya Irrigation and Settlement Project. If they are away from the tanks it would hinder their fishing. It seems that they are more suitable to be fishermen and work as such than be settled as farmers in new agricultural land, because they are fishermen by their background, habit, experience and propensity.

Finally, it is important to launch a project for the provision of fresh drinking water, wells and lavatories, welfare services for health, recreational and community facilities etc.

MAP 1 : THE STUDY AREA

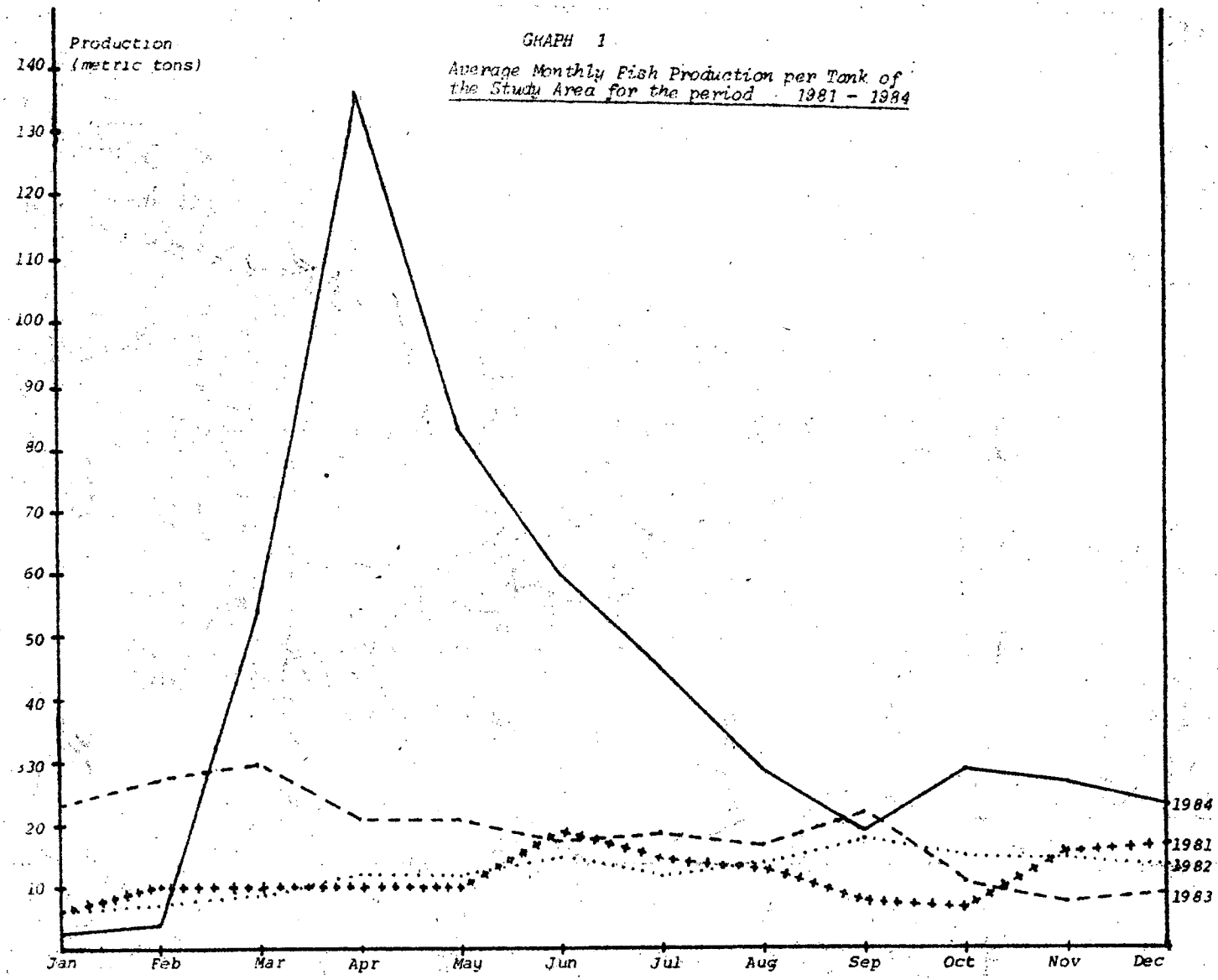


MAP 2 : MAJOR FISH MARKETING AREA



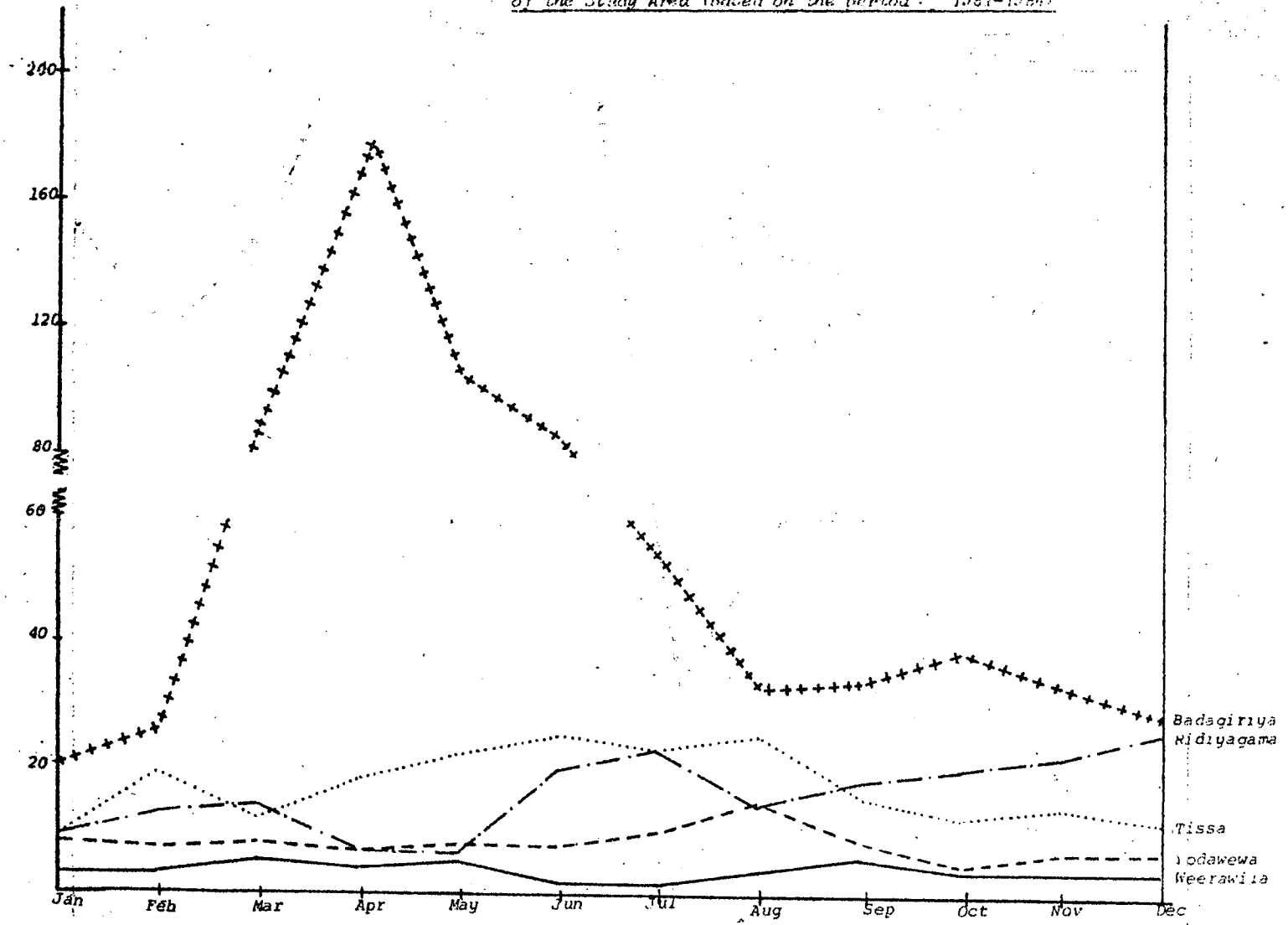
GRAPH 1

Average Monthly Fish Production per Tank of the Study Area for the period 1981 - 1984



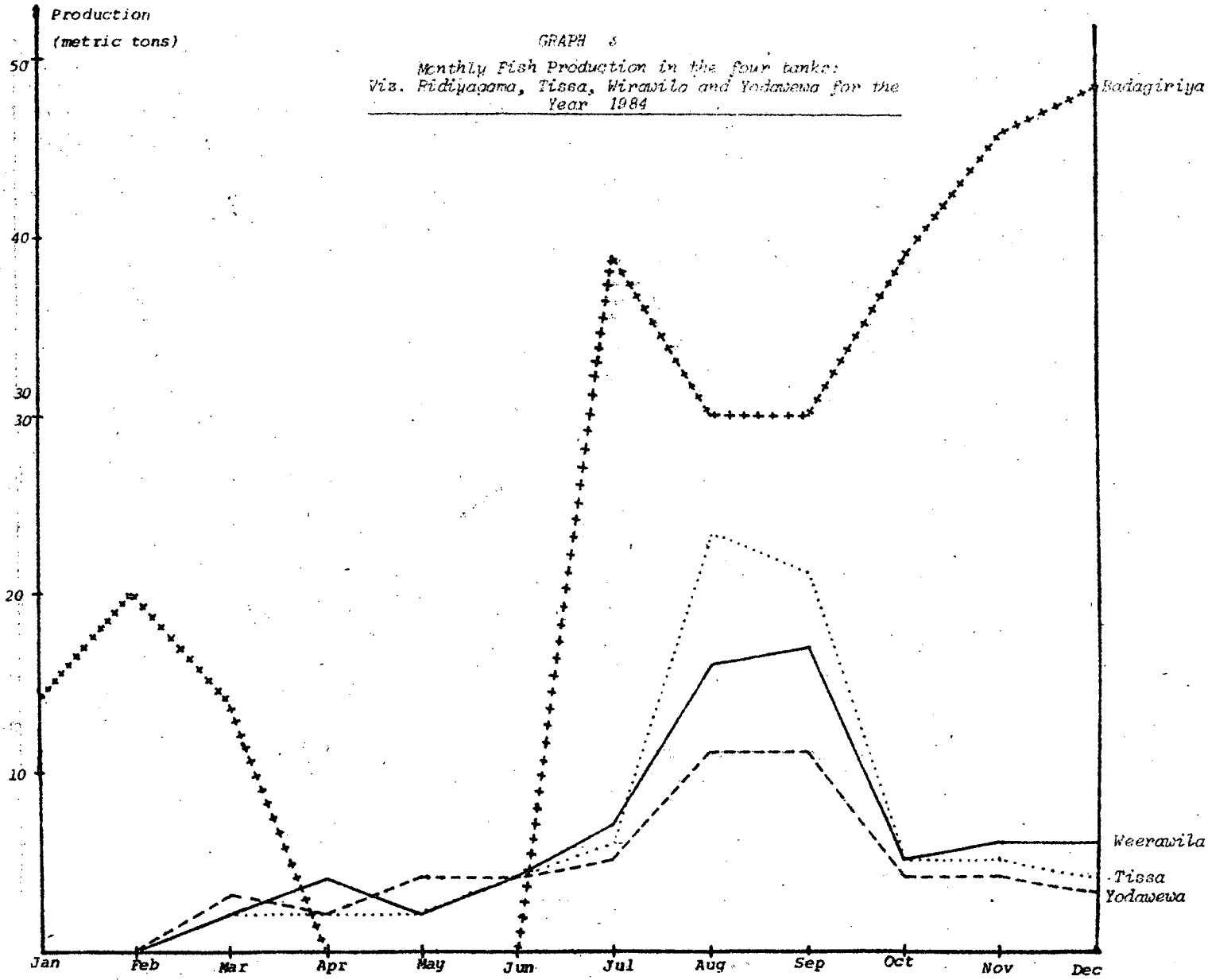
GRAPH 2

Average Monthly Fish Production in each tank of the Study Area (Based on the period - 1981-1984)



GRAPH 8

Monthly Fish Production in the four tanks: Viz. Bidiyagama, Tissa, Wirawila and Yodawewa for the Year 1984



GRAPH 4

Monthly Fish Production In Badagiriya Tank for the Year 1984

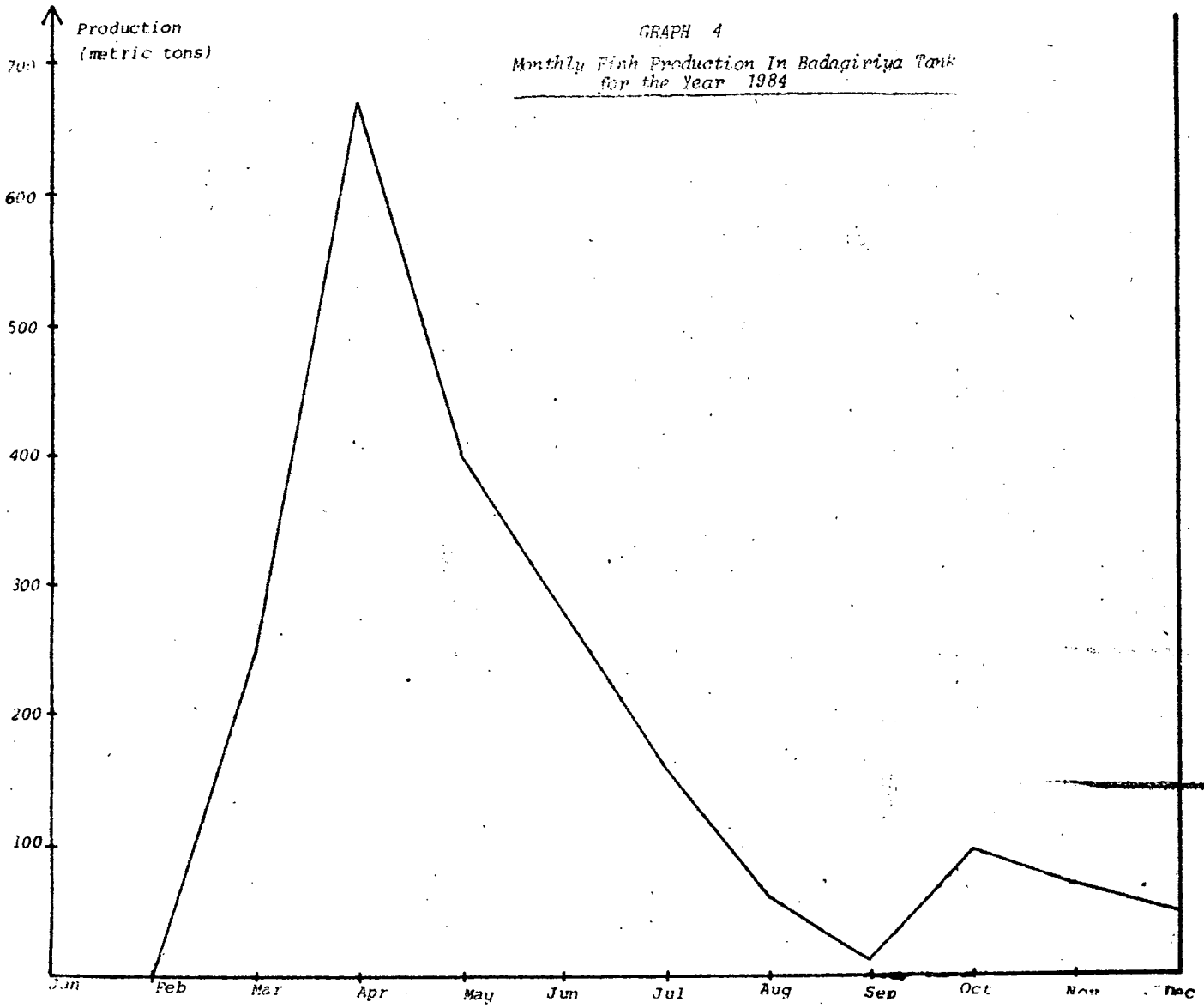


Table No. A-1

Subsidiary Occupations of the Organised Fishermen

Occupation	Ridiyagama		Badagiriya		Weerawila		Tissa		Yodawewa		All tanks	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Cultivator	5	14.71	8	32.00	0	0.00	7	33.33	7	28.00	27	21.42
Trader	0	0.00	0	0.00	3	14.29	0	0.00	3	12.00	6	4.76
Labourer	2	5.88	2	8.00	0	0.00	6	28.58	5	20.00	15	11.90
Other	0	0.00	1	4.00	I	4.76	3	14.28	0	0.00	5	3.96
No other Occupation	27	79.41	14	56.00	17	80.95	5	23.81	10	40.00	73	57.96
T O T A L	34	100.00	25	100.00	21	100.00	21	100.00	25	100.00	126	100.00

Table No. A-2

Main and Other Occupations of the Unorganised Sample Fishermen

Occupation	Ridiyagama		Badagiriya		Weerawila		Tissa		Yodawewa		All tanks	
	M	O	M	O	M	O	M	O	M	O	M	O
Fishing	7	3	10	-	-	10	4	6	-	10	21	29
Cultivation	-	-	-	-	2	-	-	-	1	-	3	0
Trader	-	-	-	-	-	-	-	-	-	-	-	-
Labourer	3	7	-	7	4	-	4	4	9	-	20	18
Other	-	-	-	3	4	-	2	-	-	-	6	3
T O T A L	10	10	10	10	10	10	10	10	10	10	50	50

M - Main Occupation

O - Other Occupation

Table No. A-3

Age Structure of Fishermen

Age Groups	Organised		Unorganised	
	No.	%	No.	%
0-14	0	0.00	0	0.00
15-29	60	47.62	20	51.28
30-44	51	40.48	18	46.15
45-64	15	11.90	1	2.56
Over 65	0	0.00	0	0.00
T O T A L	126	100.00	39	100.00

Table No. A-4

Age and Sex Distribution of Households
(Organised Sector)

Age Group	Ridiyagama				Badagiriya				Weerawila				Tissa				Yodawewa				All tanks			
	M	F	T	%	M	F	T	%	M	F	T	%	M	F	T	%	M	F	T	%	M	F	T	%
0 - 14	54	42	96	(45.07)	18	13	31	(25.83)	22	28	50	(40.65)	21	24	45	(40.91)	40	26	66	(44.00)	155	133	288	(40.22)
15 - 29	39	28	67	(31.46)	32	28	60	(50.00)	22	23	45	(36.59)	21	21	42	(38.18)	19	22	41	(27.33)	133	122	255	(35.61)
30 - 44	18	21	39	(18.31)	07	04	11	(09.17)	09	06	15	(12.20)	06	07	13	(11.82)	11	10	21	(14.00)	51	48	99	(13.83)
45 - 69	07	03	10	(4.60)	05	08	13	(10.83)	06	07	13	(10.57)	06	04	10	(9.09)	11	09	20	(13.33)	35	31	66	(9.22)
70 - 84	01	00	01	(0.47)	05	00	05	(4.17)	00	00	00	(0.00)	00	00	00	(0.00)	01	00	01	(0.67)	07	00	07	(0.98)
85 - 99	00	00	00	(0.00)	00	00	00	(0.00)	00	00	00	(0.00)	00	00	00	(0.00)	01	00	01	(0.67)	01	00	01	(0.14)
TOTAL	119	94	213	(100)	67	53	120	(100)	59	64	123	(100)	54	56	110	(100)	83	67	150	(100)	382	334	716	(100)
DEPENDENCY RATIO	0.83				0.48				0.73				0.64				0.97				0.75			
MASCULINITY RATIO	127				126				92				96				124				114			
AVERAGE SIZE OF HOUSEHOLD	6.26				4.80				5.86				5.24				6.00				5.68			

M = Male
F = Female
T = Total

Masculinity ratio = No. of males per 100 females
Dependency ratio = Here the workforce refers to the age group 15-60.

Table No. A-5

Age and Sex Distribution of Households
(Unorganised Sector)

Age Group	Ridiyagama				Badagiriya				Weerawila				Tissa				Yodawewa				All tanks			
	M	F	T	%	M	F	T	%	M	F	T	%	M	F	T	%	M	F	T	%	M	F	T	%
0 - 14	15	13	28	(58.33)	10	20	30	(49.18)	09	12	21	(43.75)	12	10	22	(45.83)	11	11	22	(45.83)	57	66	123	(48.62)
15 - 29	03	05	08	(16.67)	07	10	17	(27.87)	10	08	18	(37.50)	08	07	15	(31.25)	08	08	16	(33.33)	36	38	74	(29.25)
30 - 44	07	05	12	(25.00)	05	04	09	(14.75)	03	02	05	(10.42)	04	02	06	(12.50)	05	03	08	(16.67)	24	16	40	(15.81)
45 - 69	00	00	00	(0.00)	03	02	05	(8.20)	02	01	03	(6.25)	02	02	04	(8.33)	01	01	02	(4.17)	08	06	14	(5.53)
70 - 84	00	00	00	(0.00)	00	00	00	(0.00)	00	01	01	(2.08)	01	00	01	(2.08)	00	00	00	(0.00)	01	01	02	(0.79)
85 - 79	00	00	00	(0.00)	00	00	00	(0.00)	00	00	00	(0.00)	00	00	00	(0.00)	00	00	00	(0.00)	00	00	00	(0.00)
T O T A L	25	23	48	(100)	25	36	61	(100)	24	24	48	(100)	27	21	48	(100)	25	23	48	(100)	126	127	252	(100)
DEPENDENCY RATIO	1.4				1.03				0.85				1.08				0.85				1.02			
MASCULINITY RATIO	109				69				100				129				109				99			
AVERAGE SIZE OF HOUSEHOLD MEMBERSHIP	4.80				6.10				4.80				4.80				4.80				5.06			

M = Male
F = Female
T = Total

Masculinity ratio = No. of males per 100 females.
Dependency ratio = Here the workforce refers to the age group 15-60.

Table No. A-6

Distribution of houses according to various characteristics

(Organised Sector)

Characteristic	Sub Group	Ridiyagama		Badagiriya		Weerawila		Tissa		Yodawewa		All tanks	
		No.	%	No.	%	No.	%	No	%	No	%	No	%
Ownership of house	Owned	34	100.00	08	32.00	19	90.48	16	76.19	21	84.00	98	77.78
	Rented	0	0.00	0	0.00	1	4.76	1	4.76	0	0.00	2	1.59
	Govt. Owned	0	0.00	04	16.00	0	0.00	2	9.52	1	4.00	7	5.56
	Other	0	0.00	13	52.00	1	4.76	2	9.52	3	12.00	19	15.08
Ownership of homestead	Single Owner	4	11.76	2	8.00	0	0.00	1	4.76	3	12.00	10	7.94
	Joint Owner	7	20.59	7	28.00	0	0.00	1	4.76	3	12.00	18	14.29
	Govt. land (legal)	1	2.94	3	12.00	2	9.53	9	42.86	1	4.00	16	12.70
	Encroached land	22	64.71	3	12.00	4	19.05	9	42.86	15	60.00	53	42.06
	Others	0	00.00	1	4.00	0	0.00	0	0.00	3	12.00	4	3.17
	Not responded	0	0.00	9	36.00	15	71.42	1	4.76	0	0.00	25	19.84
Type of floor	Cement	2	5.88	12	48.00	6	28.57	2	9.52	4	16.00	26	20.63
	Mud/Cowdung	32	94.12	13	52.00	14	66.67	19	90.48	20	80.00	98	77.78
	Other	0	0.00	0	0.00	1	4.76	0	0.00	1	4.00	2	1.59
Type of Walls	Bricks/Kabook	2	5.88	19	76.00	8	38.10	3	14.29	4	16.00	36	28.57
	Mud/Wattle and daub	32	94.12	6	24.00	13	61.90	15	71.43	20	80.00	86	68.25
	Other	0	00.00	0	0.00	0	0.00	3	14.29	1	4.00	4	3.17
Type of roof	Tiles/Asbestos sheets	2	5.88	16	64.00	5	23.81	1	4.76	1	4.00	25	19.84
	Cadjan/Palm leaf	32	94.12	9	36.00	16	76.19	19	90.48	24	96.00	100	79.37
	Straw/Illuk	0	0.00	0	0.00	0	0.00	1	4.76	0	0.00	1	0.79
Average No. of rooms (per house)		2.76		3.12		2.71		2.86		2.64		2.31	
Average No. of square feet (per house)		206		398		260		353		270		290	
With Electricity		0	0.00	2	8.00	0	0.00	0	0.00	0	0.00	2	1.59
With access by vehicle		31	91.18	23	92.00	19	90.48	13	61.90	24	96.00	110	87.30
TOTAL		34	(100)	25	(100)	21	(100)	21	(100)	25	(100)	126	(100)

Table No. A-7

Distribution of Houses According to Various Characteristics

(Unorganised Sector)

Characteristic	Sub Group	Ridiyagama		Badagiriya		Weerawila		Tissa		Yodawewa		All tanks	
		No	%	No	%	No	%	No	%	No	%	No	%
Ownership of house	Owned	10	100.00	5	50.00	7	70.00	8	80.00	8	80.00	38	76.00
	Rented	0	0.00	0	0.00	2	20.00	1	10.00	0	0.00	3	6.00
	Govt. owned	0	0.00	2	20.00	0	0.00	0	0.00	0	0.00	2	4.00
	Other	0	0.00	3	30.00	1	10.00	1	10.00	2	20.00	7	14.00
Ownership of homestead	Single Owner	1	10.00	1	10.00	0	0.00	0	0.00	0	0.00	2	4.00
	Joint Owner	6	60.00	3	30.00	1	10.00	1	10.00	1	10.00	12	24.00
	Govt. land (legal)	0	0.00	0	0.00	0	0.00	0	0.00	1	10.00	1	2.00
	Encroached land	3	30.00	4	40.00	2	20.00	8	80.00	7	70.00	24	48.00
	Others	0	0.00	0	0.00	1	10.25	0	0.00	1	10.00	2	7.00
	Not responded	0	0.00	2	20.00	6	60.00	1	10.00	0	0.00	9	18.00
Type of floor	Cement	1	10.00	5	50.00	2	20.00	0	0.00	0	0.00	8	16.00
	Mud/Cowdung	9	90.00	5	50.00	8	80.00	9	90.00	10	100.00	41	82.00
	Other	0	0.00	0	0.00	0	0.00	1	10.00	0	0.00	1	2.00
Type of walls	Brick/Kabook	1	10.00	7	70.00	3	30.00	3	30.00	0	0.00	14	28.00
	Mud/Wattle and daub	9	90.00	3	30.00	7	70.00	6	60.00	10	100.00	35	70.00
	Other	0	0.00	0	0.00	0	0.00	1	10.00	0	0.00	1	2.00
Type of roof	Tiles/Asbestos sheets	1	10.00	6	60.00	3	30.00	1	10.00	0	0.00	11	22.00
	Cadjan/Palm leaf	9	90.00	4	40.00	7	70.00	8	80.00	10	100.00	38	76.00
	Straw/Illuk	0	0.00	0	0.00	0	0.00	1	10.00	0	0.00	1	2.00
Average No. of rooms (per house)		2.60		2.80		2.70		2.90		1.90		2.58	
Average No. of square feet (per house)		200		245		220		200		200		253	
With Electricity		0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
With access by vehicle		10	100.00	8	80.00	7	70.00	6	60.00	6	60.00	37	74.00
TOTAL		10	100.00	10	100.00	10	100.00	10	100.00	10	100.00	50	100.00

Table No. A-8

Ownership of Highland (Including Homestead)

Organised sector

Size (Acres)	Ridiyagama No.	Ridiyagama %	Badagiriya No.	Badagiriya %	Weerawila No.	Weerawila %	Tissa No.	Tissa %	Yodawewa No.	Yodawewa %	All tanks No.	All tanks %
0.00 - 0.25	4	11.76	1	4.00	5	25.00	1	4.76	3	12.00	14	11.20
0.25 - 1.00	12	35.29	3	12.00	13	65.00	18	85.71	18	72.00	64	51.20
1.00 - 2.00	17	50.00	21	84.00	2	10.00	1	4.76	3	12.00	44	35.20
2.00 - 3.00	01	2.94	0	0.00	0	0.00	0	0.00	11	4.00	2	1.60
3.00 - 4.00	00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Above 4.00	00	0.00	0	0.00	0	0.00	1	4.76	0	0.00	1	0.80
Total	34	100.00	25	100.00	20	100.00	21	100.00	25	100.00	125	100.00

Unorganised sector

0.00 - 0.25	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
0.25 - 1.00	0	0.00	0	0.00	1	10.00	1	10.00	1	10.00	3	6.00
1.00 - 2.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2.00 - 3.00	1	10.00	0	0.00	1	10.00	1	10.00	2	20.00	5	10.00
3.00 - 4.00	2	20.00	00	0.00	3	30.00	0	0.00	2	20.00	7	14.00
Above 4	7	70.00	10	100.00	5	50.00	8	80.00	5	50.00	35	70.00
Total	10	100.00	10	100.00	10	100.00	10	100.00	10	100.00	50	100.00

Table No. A-9

Possession of Household Goods

Organised Sector

Item	Ridiyagama		Badagiriya		Weerawila		Tissa		Yodawewa		All tanks	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Radio	28	82.35	15	60.00	15	71.43	16	76.19	13	52.00	87	69.05
Cassette Recorder	1	2.94	6	24.00	1	4.76	5	23.81	1	4.00	14	11.11
Television Set	0	0.00	1	4.00	0	0.00	0	0.00	0	0.00	1	0.79
Sewing Machine	1	2.94	3	12.00	2	9.53	1	4.76	3	12.00	10	7.94
Patromax lamp	4	11.76	7	28.00	7	33.33	8	38.10	2	8.00	28	22.22
Kerosene Cooker	0	0.00	0	0.00	0	0.00	0	0.00	1	4.00	1	0.79
Bicycle	28	82.35	20	80.00	16	76.19	19	90.48	18	72.00	101	80.16

Unorganised Sector

Radio	9	90.00	5	50.00	7	70.00	8	80.00	1	10.00	30	60.00
Cassette Recorder	0	0.00	0	0.00	2	20.00	1	10.00	1	10.00	4	80.00
Television Set	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Sewing Machine	0	0.00	1	10.00	1	10.00	1	10.00	0	0.00	3	6.00
Patromax lamp	0	0.00	3	30.00	2	20.00	1	10.00	0	0.00	6	12.00
Kerosene Cooker	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Bicycle	7	70.00	6	60.00	5	50.00	8	80.00	1	10.00	27	54.00

Table No. A-10

Sources of Water

Organised Sector

Source	Ridiyagama		Badagiriya		Weerawila		Tissa		Yodawewa		All tanks	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Drinking :												
Own Well	12	35.29	0	0.00	3	14.29	2	9.52	3	12.00	20	15.87
Neighbour's Well	2	5.88	19	76.00	9	42.86	2	9.52	13	52.00	45	35.71
Tank Pond	16	47.06	1	4.00	6	28.57	9	42.86	8	32.00	40	31.75
River/Stream	1	2.94	0	0.00	1	4.76	0	0.00	0	0.00	2	1.59
Tube well	1	2.94	0	0.00	0	0.00	0	0.00	1	4.00	2	1.59
Other	2	5.88	5	20.00	2	9.52	8	38.10	0	0.00	17	13.49
Total	34	100.00	25	100.00	21	100.00	21	100.00	25	100.00	126	100.00
Bathing :												
Own Well	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Tank/Pond	22	64.71	21	84.00	19	90.48	13	61.90	23	92.00	98	77.78
River/Stream	12	35.29	4	16.00	2	9.52	8	38.10	2	8.00	28	22.22
Other	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total	34	100.00	25	100.00	21	100.00	21	100.00	25	100.00	126	100.00

Unorganised Sector

Drinking :												
Own Well	5	50.00	0	0.00	3	30.00	2	20.00	0	0.00	10	20.00
Neighbour's Well	3	30.00	6	60.00	3	30.00	1	10.00	3	30.00	16	32.00
Tank/Pond	0	0.00	0	0.00	4	40.00	4	40.00	6	60.00	14	28.00
River/Stream	2	20.00	0	0.00	0	0.00	2	20.00	0	0.00	4	8.00
Tube Well	0	0.00	0	0.00	0	0.00	0	0.00	1	10.00	1	2.00
Other	0	0.00	4	40.00	0	0.00	1	10.00	0	0.00	5	10.00
Total	10	100.00	10	100.00	10	100.00	10	100.00	10	100.00	50	100.00
Bathing :												
Own Well	0	0.00	0	0.00	1	10.00	1	10.00	0	0.00	2	4.00
Tank/Pond	1	10.00	9	90.00	9	90.00	5	50.00	9	90.00	33	66.00
River/Stream	9	90.00	1	10.00	0	0.00	3	30.00	1	10.00	14	28.00
Other	0	0.00	0	0.00	0	0.00	1	10.00	0	0.00	1	2.00
Total	10	100.00	10	100.00	10	100.00	10	100.00	10	100.00	50	100.00

Table A-11

Availability and Type of Lavatories

Organised Sector

Description	Ridiyagama		Badagiriya		Weerawila		Tissa		Yodawewa		All tanks	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
No lavatories	11	32.35	11	44.00	3	14.29	8	38.10	15	60.00	48	38.10
Type : Pit latrine	22	64.71	12	48.00	16	76.19	11	52.38	8	32.00	69	54.76
Water-seal	0	0.00	2	8.00	2	9.52	1	4.76	2	8.00	7	5.56
Other	1	2.94	0	0.00	0	0.00	1	4.76	0	0.00	2	1.58
Total	34	100.00	25	100.00	21	100.00	21	100.00	25	100.00	126	100.00

Unorganised Sector

No lavatories	1	10.00	6	60.00	1	10.00	3	30.00	7	70.00	18	36.00
Type : Pit latrine	9	90.00	4	40.00	8	80.00	6	60.00	3	30.00	30	60.00
Water seal	0	0.00	0	0.00	1	10.00	0	0.00	0	0.00	1	2.00
Other	0	0.00	0	0.00	0	0.00	1	10.00	0	0.00	1	2.00
Total	10	100.00	10	100.00	10	100.00	10	100.00	10	100.00	50	100.00

Table No. A-12

Educational Level - Organised Sector
(Percentage of the Population)

	Ridiyagama			Badagiriya			Weerawila			Tissa			Ycdawewa			All tanks		
	F	% M	T	F	% M	T	F	% M	T	F	% M	T	F	% M	T	F	% M	T
Not attended school (illiterate)	7.32	4.12	5.59	17.78	3.23	9.35	12.50	17.39	14.71	21.74	18.18	20.00	25.93	13.04	18.70	15.90	9.78	12.64
*Not attended school (But literate)	7.32	3.09	5.03	4.44	0.00	1.87	3.57	4.35	3.92	6.52	11.36	8.89	12.96	11.59	12.20	7.07	5.65	6.32
School attended (Gr. 1-5)	53.66	61.86	58.10	42.22	66.13	56.07	48.21	36.96	43.14	58.70	52.27	55.56	25.93	52.17	40.65	46.29	55.65	51.24
School attended (Gr. 6-10)	31.71	29.90	30.73	33.33	25.81	28.97	23.21	34.78	28.43	13.04	18.18	15.56	35.19	20.29	26.83	27.92	26.10	26.95
School attended (Passed O/L)	0.00	1.08	0.56	2.22	3.23	2.80	5.36	6.52	5.88	0.00	0.00	0.00	0.00	1.45	0.81	1.41	2.20	1.83
School attended (Passed A/L)	0.00	0.00	0.00	0.00	1.61	0.93	7.14	0.00	3.92	0.00	0.00	0.00	0.00	1.45	0.81	1.41	0.62	1.00
T O T A L	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

F = Female
M = Male
T = Total

* Including those who had pirivena education.

Table No. A-13

Educational Level (Unorganised Sector)
(Percentage of the Population)

	Ridiyagama			Badagiriya			Weerawila			Tissa			Yodawewa			All tanks		
	F	M	T	F	M	T	F	M	T	F	M	T	F	M	T	F	M	T
		%			%			%			%			%			%	
Not attended school (illiterate)	5.88	0.00	2.94	6.25	9.52	7.55	5.56	5.26	5.41	18.75	38.89	29.41	37.50	10.53	22.86	13.13	12.76	12.95
*Not attended school (but literate)	11.76	17.65	14.71	3.13	4.76	3.77	5.56	5.26	5.41	31.25	16.67	23.53	6.25	5.26	5.71	10.10	9.57	9.84
School attended (Gr. 1 - 5)	58.82	82.35	70.59	59.38	66.67	62.26	44.44	26.32	35.14	50.00	38.89	44.12	31.25	57.89	45.71	50.51	54.26	52.33
School attended (Gr. 6 - 10)	23.53	0.00	11.76	25.00	14.29	20.75	27.78	57.89	43.24	0.00	5.56	2.94	25.00	26.32	25.71	21.21	21.28	21.24
School attended (Passed O/L)	0.00	0.00	0.00	6.25	4.76	5.66	5.56	5.26	5.41	0.00	0.00	0.00	0.00	0.00	0.00	3.03	2.13	2.60
School attended (Passed A/L)	0.00	0.00	0.00	0.00	0.00	0.00	11.11	0.00	5.41	0.00	0.00	0.00	0.00	0.00	0.00	2.02	0.00	1.04
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

F = Female
M = Male
T = Total

* Including those who had pirivena education

Table No. A-14

Composition of the Average Annual Household Income

(Organised Sector)

Sources of Income	Ridiyagama		Badagiriya		Weerawila		Tissa		Yodawewa		All tanks	
	Av. Income (Rs.)	%	Av. Income (Rs.)	%	Av. Income (Rs.)	%	Av. Income (Rs.)	%	Av. Income (Rs)	%	Av. Income (Rs.)	%
Fishing	15,776	88.24	21,792	86.80	7,571	55.92	5,167	45.44	2,936	40.78	11,287	73.3
Agriculture	624	3.49	1,524	6.07	295	2.18	1,843	16.21	988	13.72	1,023	6.6
Animal Rearing	50	0.28	12	0.05	-	-	19	0.17	128	1.78	44	0.2
Vlaue of Food Stamps	1,355	7.58	497	1.98	721	5.32	839	7.38	736	10.23	870	5.6
Pension and Aids/Grants	-	-	-	-	38	0.28	1,637	14.40	140	1.94	307	2.0
Trade	-	-	-	-	1,081	7.98	286	2.51	600	8.33	347	2.2
Hiring Equipment	-	-	-	-	-	-	-	0.00	180	2.50	36	0.2
Hiring of Vehicles	-	-	-	-	-	-	114	1.01	-	-	19	0.1
Other Self-employments	-	-	-	-	-	-	167	1.47	-	-	28	0.1
Hiring of Labour and other means	74	0.41	1,280	5.10	3,834	28.32	1,298	11.42	1,492	20.72	1,425	9.2
Average from all sources	17,879	100.00	25,105	100.00	13,540	100.00	11,370	100.00	7,200	100.00	15,386	100.00

Table No. A-15

Composition of the Average Annual Household Income

(Unorganised Sector)

Source of Income	Ridiyagama		Badagiriya		Weerawila		Tissa		Yodawewa		All tanks	
	Av. Income (Rs)	%	Av. Income (Rs)	%	Av. Income (Rs)	%	Av. Income (Rs)	%	Av. Income (Rs)	%	Av. Income (Rs)	%
Fishing	4,150	45.60	9,350	70.30	4,222	53.44	2,391	26.42	2,964	31.20	4,435	45.39
Agriculture	518	5.70	2,913	21.90	125	1.58	1,657	18.31	2,035	21.42	1,346	13.78
Animal Rearing	-	-	-	-	902	11.42	-	-	-	-	223	2.28
Value of Food Stamps	1,245	13.68	332	2 50	555	7.03	1,287	14.23	1,140	12.0	966	9.89
Pension and Aids/Grants	-	-	-	-	-	-	-	-	-	-	-	-
Trade	-	-	-	-	-	-	-	-	-	-	-	-
Hiring of Equipment	-	-	-	-	-	-	-	-	-	-	-	-
Hiring of Vehicles	-	-	-	-	-	-	-	-	-	-	-	-
Other Self employment	-	-	-	-	1,796	22.74	-	-	-	-	445	4.55
Hiring of Labour and other means	3,187	35.02	705	5.30	299	3.79	3,714	41.04	3,361	35.38	2,355	24.11
Average from all sources	9,180	100.00	13,300	100.00	7,900	100.00	9,050	100.00	9,500	100.00	9,770	100.00

Table No. A-16

Annual Household Income

(Organised Sector)

Income	Ridiyagama		Badagiriya		Weerawila		Tissa		Yodawewa		All tanks	
	No. of house-holds	%	No. of house-holds	%	No. of house-holds	%	No. of house-holds	%	No. of house-holds	%	No. of house-holds	%
3000 & below	0	0.00	0	0.00	0	0.00	0	0.00	1	4.0)	1	0.79
3001 - 6000	0	0.00	0	0.00	0	0.00	0	0.00	10	40.0)	10	7.93
6001 - 9000	0	0.00	2	8.00	5	23.80	6	28.57	8	32.0)	21	16.66
9001 -12000	1	2.94	2	8.00	6	28.57	8	38.09	3	12.0)	20	15.87
12001 -15000	6	17.64	1	4.00	1	4.76	4	19.04	3	12.0)	15	11.90
15001 -18000	8	23.52	2	8.00	5	23.80	2	9.52	0	0.0)	17	13.49
18001 -21000	13	38.23	8	32.00	3	14.28	1	4.76	0	0.0)	25	19.84
21001 -24000	6	17.64	1	4.00	0	0.00	0	0.00	0	0.0)	7	5.55
24001 -27000	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0)	0	0.00
27001 -30000	0	0.00	9	36.00	1	4.76	0	0.00	0	0.0)	10	7.93

Table No. A-17

Annual Household Income
(Unorganised Sector)

Income Rs.	Ridiyagama		Badagiriya		Weerawila		Tissa		Yodawewa		All tanks	
	No. of house-holds	%	No. of house-holds	%	No. of house-holds	%	No. of house-holds	%	No. of house-holds	%	No. of house-holds	%
3000 &below	0	0.00	0	0.00	0	0.00	0	0.00	2	20.00	2	4.00
3001 - 6000	0	0.00	1	10.00	4	40.00	2	20.00	7	70.00	14	28.00
6001 - 9000	2	20.00	2	20.00	1	10.00	4	40.00	1	10.00	10	20.00
9001 -12000	6	60.00	2	20.00	4	40.00	0	0.00	0	00.00	12	24.00
12001 -15000	2	20.00	3	30.00	0	0.00	3	30.00	0	0.00	8	16.00
15001 -18000	0	0.00	0	0.00	1	10.00	1	10.00	0	0.00	2	4.00
18001 -21000	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
21001 -24000	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
24001 -27000	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
27001 -30000	0	0.00	2	20.00	0	0.00	0	0.00	0	0.00	2	4.00

Table No. A-18

Interest Rates
All Tank Areas

Interest Rate	ORGANISED				UNORGANISED			
	Financial Org.		Private		Financial Org.		Private	
	No.	N = 15 %	No.	N=32 %	No.	N = 4 %	No.	N = 19 %
Below 10	3	20.00	10	31.25	0	0.00	1	5.26
10 - 14	2	13.33	0	0.00	0	0.00	1	5.26
15 - 19	6	40.00	1	3.13	3	75.00	0	0.00
20 - 39	4	26.67	0	0.00	1	25.00	0	0.00
40 - 99	0	0.00	0	0.00	0	0.00	0	0.00
100 - 200	0	0.00	11	34.38	0	0.00	11	57.89
200 & above	0	0.00	10	31.25	0	0.00	6	31.58
TOTAL	15	100.00	32	100.00	4	100.00	19	100.00

Table No. A-19

Purpose of Loans

All Tank Areas

Reason	ORGANISED			UNORGANISED		
	No. of families	Amount Rs	%	No. of families	Amount Rs.	%
To obtain medical facilities	7	13,200	16.57	6	5,950	25.22
For cultivation	14	28,671	36.00.	8	4,345	18.41
To build the house	1	15,000	18.83	1	6,800	28.82
To buy fishing-gear	3	2,800	3.52	0	0	0.00
For consumption	9	7,875	9.89	6	3,500	14.83
For funerals and other ceremonies	9	6,450	8.10	1	2,000	8.48
For day-to-day expenses	1	1,500	1.88	1	1,000	4.24
Others	3	4,150	5.21	0	0	0.00
TOTAL	40	79,646	100.00	20	23,595	100.00

Table No. B-1

Average Monthly Fish Production of the five tanks for the period 1981-1984
(in metric tons)

Year	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
1981	6.44	9.76	10.35	9.60	10.28	19.36	14.6	13.45	7.55	6.77	15.56	13.69
1982	5.5	6.6	8.9	12.4	11.5	15.4	12	14	18.1	15.1	14.7	14.1
1983	23.4	27	29.6	20.9	20.9	18.2	18.8	16.8	22.1	10.5	7.5	8.7
1984	2.8	4.0	54.4	135.7	82.9	59.6	44.5	29.2	18.8	28.8	26.8	27.5

Table No. B-2

Average Monthly Fish Production in Each Tank of the Study area (for the period 1981-1984)

(in metric tons)

Tank	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Tissa	8.77	19.1	12.1	17.16	21.5	24.9	23.05	25.3	15.9	11.5	13.5	11.8
Yoda Wewa	8.2	6.7	7.9	7.3	8.3	8.4	9.5	15	9.3	4.6	6.8	7.3
Weerawila	2.8	2.9	5	4	7	2.4	1.9	4.3	5.1	3.8	4.3	4.4
Badagiriya	19.5	26.2	89.9	186.9	115.5	85.8	54.3	33.0	34.1	39.3	33.9	28.9
Ridiyagama	8.6	12.5	14.2	8.2	6.5	19.2	23.3	14.3	17.9	19.7	22.1	25.8

Table No. B-3

Monthly Fish Production of Each Tank in 1981

(in metric tons)

Tank	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Tissa	1.97	7.11	8.49	7.85	10.17	27.80	23.34	18.07	12.79	-	14.70	20.68
Yodawewa	17.09	11.72	17.15	12.55	8.43	18.30	16.45	17.94	7.32	-	11.40	13.38
Weerawila	1.99	1.99	0.89	3.18	2.30	1.78	1.54	2.13	2.23	-	5.74	8.09
Badagiriya	4.95	16.81	7.88	11.44	14.45	24.32	19.05	19.61	8.75	20.40	32.82	16.85
Ridiyagama	6.24	11.18	17.35	13.02	16.05	24.61	12.65	9.55	6.69	13.49	13.16	24.48

Source : Unpublished production statistics; Fresh Water Fish Breeding and Experimental Centre, Muruthawela

Table No. B-4

Monthly Fish Production of Each Tank in 1982
(in metric tons)

Tank	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Tissa	7.58	3.66	4.93	15.76	32.91	32.30	25.62	25.16	33.23	34.29	33.53	20.38
Yoda Wewa	7.06	6.02	5.98	9.68	17.67	7.48	7.14	9.18	8.72	13.05	11.07	8.57
Weerawila	3.85	5.50	8.11	3.94	6.92	3.51	1.01	4.52	5.50	8.38	7.51	6.56
Badagiriya	4.40	10.78	16.22	22.65	-	18.49	15.39	22.64	33.52	12.19	11.78	19.09
Ridiyagama	4.83	6.90	9.46	9.75	-	15.34	10.96	8.63	9.65	7.82	9.44	15.96

Source : Unpublished production statistics, Fresh Water Fish Breeding and Experimental Centre, Muruthawela.

Table No. B-5

Monthly Fish Production of Each Tank in 1983

(in metric tons)

Tank	Jan.	Feb.	March	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Tissa	25.52	32.543	33.250	41.08	41.08	35.15	36.0	42.20	-	6.47	-	-
Yoda Wewa	8.47	9.044	6.095	5.20	5.20	3.43	8.28	10.05	-	-	-	-
Weerawila	5.55	4.119	8.268	6.38	8.00	-	-	-	5.60	3.39	-	-
Badagiriya	68.51	77.060	84.560	42.43	40.00	15.21	19.03	23.03	78.96	24.60	17.10	28.71
Ridiyagama	9.04	12.031	15.644	9.84	10.14	36.98	30.46	8.56	25.84	18.05	20.17	15.01

Source : Unpublished production statistics; Fresh Water Fish Breeding and Experimental Centre, Muruthawela.

Table No. B-6

Monthly Fish Production of Each Tank in 1984

(in metric tons)

Tank	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Tissa	-	-	1.88	3.98	1.64	4.22	7.225	15.61	17.44	5.25	5.79	6.2
Yoda Wewa	-	-	2.27	1.82	1.78	4.22	5.940	22.70	20.96	5.424	4.90	4.48
Weerawila	-	-	2.59	1.79	3.61	4.49	5.070	10.53	11.21	3.556	3.95	2.92
Badagiriya	-	-	250.90	671.09	407.35	285.14	163.900	66.78	15.03	100.040	73.71	51.02
Ridiyagama	14.21	20.05	14.28	-	-	-	39.200	30.38	29.56	39.326	45.70	47.88

Source : Unpublished production statistics; Fresh Water Fish Breeding and Experimental Centre, Muruthawela.

Appendix 2

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