

## Possibilities in Inland Fisheries for Developing the Peasant Economy of the Dry Zone – Part 11

Lal de Alwis

*There is an urgent need to generate more full time employment in the dry zone of Sri Lanka, to improve the rural economy and uplift the nutritional status of the peasants in these areas. The utilisation of the dry zone tanks for inland fisheries can help in relieving these problems, maintains Lal de Alwis of the People's Bank Research Department in this study of the possibilities of inland fisheries. The first part of this paper was carried in our issue of Oct/Nov 1982.*

In the dry Zone of Sri Lanka, which covers approximately 66 per cent of the total land area of the country and holds 33 per cent of the country's population, the peasant community is characterised by acute problems of poverty and malnutrition. The lack of economic activity and poor levels of income were also revealed in a study carried out by the University of Peradeniya (see box below). In this context the necessity to develop the natural resources within the Dry Zone such as the inland water bodies, has been emphasised. (Details of the available water bodies and production potential were listed in part 1 of this

**NOTE:** Fluctuations may be due to the following reasons:

- i. Seasonal migration of fishermen.
- ii. Fluctuation of water level.
- iii. Agricultural activities of the area.
- iv. Weather conditions of the Zone.

It was illustrated in Part 1, that potential production of inland fish is undoubtedly high in these water bodies and efforts should be made for expansion of potential capacity. The discussion was then turned to the need to give due consideration to people's preferences in order to create a market for inland fish in areas away from the coastal fishing centres.

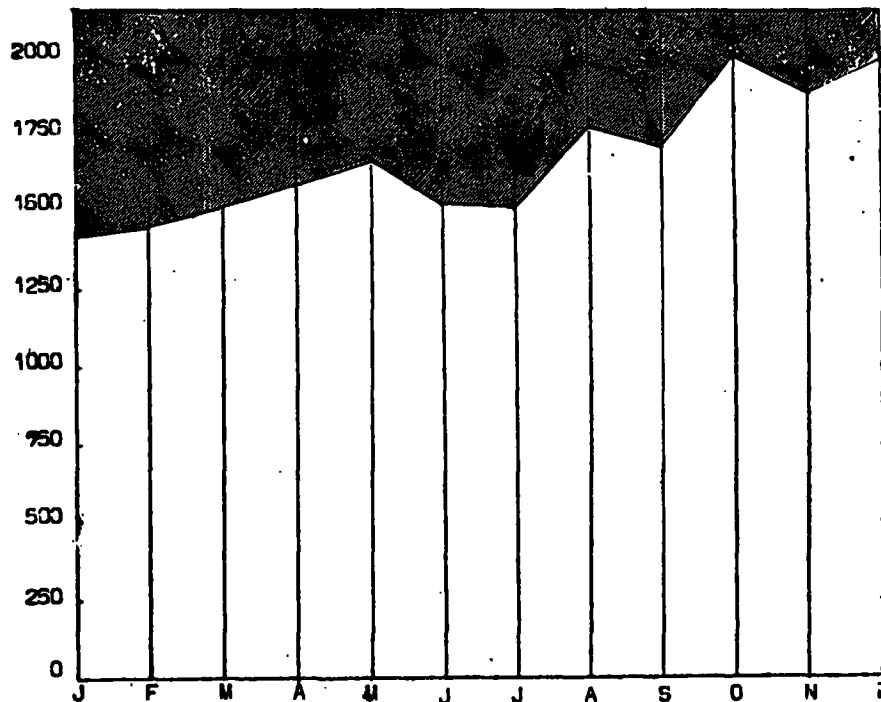
- \* Over 70,000 families seem to be dependent on paddy cultivation under the minor irrigation works in the Dry Zone. (pp.3)
- \* The average size of the family for the Dry Zone as a whole is about 6 persons. (pp.18)
- \* There is a relatively large labour force though its rate of participation is not as high as it has to be. This suggests the need to generate more employment opportunities in the Dry Zone areas. (pp.20)
- \* Unemployed persons comprise 7.92 per cent. (pp.21).
- \* A particularly noteworthy feature of the occupational structure of the Dry Zone is the incidence of part farming. (pp.23)
- \* On average the Dry Zone farms are less than 3.7 acres in size. (pp.25)
- \* The household annual income varies from Rs.3,600/- to Ts.7,000/-.
- \* Generally farm incomes in minor irrigation areas are less than those under major irrigation areas. Another difference is that farm incomes of households operating under minor irrigation are subject to a higher degree of fluctuation. (pp.27)

Source: Socio-economic Survey of Minor Irrigation in the Dry Zone of Sri Lanka. University of Peradeniya, 1980 October.

(10) A preliminary study of 21 Ceylon Lakes - Limnology and Fish Production Potential - A. S. Mendis, Bulletin 1 Fisheries Research Studies, Ceylon, 1965, pp. 7-16.

paper). Changes in the levels of water in the Dry Zone tanks can effect fishing activities, though there are other factors as well as may be observed in the diagram.

Diagram 1 Monthly fish production in perennial tanks of the Dry Zone – 1981



### Productive Capacity

The production potential of 17 inland water bodies has been computed in 1962. It shows that the fish catch is 100 lbs/acre per annum in the Parakrama Samudraya. This productivity figure had risen to 475 lb/acre per annum in 1975 with the introduction of fast growing hybrid varieties of fish. A similar productivity increase had been recorded for other tanks in the Dry Zone during the same period.

By using hybrid varieties of fish to utilize the unutilized and underutilized fish food in the irrigation tanks the quantities of fish available for catch per acre should be further increased. Through such successful fish farming efforts it was expected to produce 66 lbs/acre per annum in the large irrigation tanks by 1980; which is a six fold increase over that of the productivity in 1965. Production was expected to be 26,000 tons per year from only the large irrigation (10)

The production figures of the large, medium, and small scale tanks and vilus has been computed at 39,450 tons in 1980. According to the report of the aquaculture development and training project of the Government of

Sri Lanka, in 1981, the fish productivity ratio of the seasonal tanks was 500-1,000 lb/acre per annum and it was possible to further increase the productivity of this sector to 3,000 lb/acre per annum with additional inputs. (11) Beside these possibilities the fish production both freshwater and brackish water in the whole inland sector was 19,947 \* tons in the year 1980. This was dramatically increased to 29,000\* tons in 1981. However, this was far below the computed production potential of the year 1981, although it was a 43.4 per cent increase over the production of inland fish in 1980.

The potential production of inland fish is therefore undoubtedly very high in the Dry Zone water bodies and efforts should be made for the expansion of potential capacity.

### Marketability and Popularisation

Most of the inland water bodies are far from the coastal fishing areas, and therefore their produce may have good demand in the hinterland. Generally, the fish caught in coastal areas are packed with ice and transported to the interior of the country which involves a middleman in the process. This would necessarily add to costs over the distribution channel and the price of sea fish at the consumer's end. On the other hand if fish is not packed in ice it could get spoiled within a few hours and will not be marketable.

It appears that neither a high price per unit nor spoiling of sea fish is avoidable at the consumer's end. These factors should result in further discouraging accessibility of sea fish to the people living in the interior of the country; while encouraging consumers to shift to the nearest alternative product. One consequence is that it creates competition between sea fish and fresh water fish. The preferences of people are based purely on unit price, quantity, freshness, taste and food habits. If these preferences are given due consideration in promoting inland fisheries a wider market could be created for these fish, especially in the areas away from the coastal fishing centres.

One of the apparent problems regarding the marketability of inland fish is its taste. If the same methods and style of cooking sea fish are used in cooking inland fish the fresh water fish does not have a very palatable taste. Furthermore, in the popular recipes used in Sri Lanka there is no mention yet in those for cooking inland fish; neither has the media made any attempt to introduce recipes using inland fish. These are disadvantages in the popularisation of inland fish in Sri Lanka.

Generally Sri Lankan cooking utilises a large amount of spices and ingredients to upgrade the taste and smell of food, "Embul Thiyal" with blood fish varieties is a very popular and delicious method of cooking

fish in the southern part of the country and this can be cited as an example of cooking speciality. In the same way, in order to popularize the consumption of inland fish, the introduction of suitable methods of cooking such fish is essential.

Another argument against the marketability of inland fish has been based on the cultural and religious backgrounds of the people. Sri Lanka has a long-standing cultural heritage largely based on Buddhism where killing of living beings for any purpose is not looked on with favour. Though there are such prohibitions in Buddhism there are many Buddhists who by necessity are engaged in fishing largely in the coastal regions south of Bentota, and even in the Dry Zone tanks at present

For instance, the majority of the fishermen engaged in inland fishing in Hambantota District may be identified as Buddhists; where at present inland fishing has become an active industry. The catch is consumed here by the people in various forms such as fresh fish, dried fish, smoked fish etc.

Historical evidence, for instance the Perimiyankulam inscription of the 2nd century A.D. and the Samanthapasarika of the 3rd century A.D., shows the involvement of people in inland fishing activities in ancient times. According to the Samanthapasarika, written by Ven. Buddhagosha, both inland fishing as well as fish culture in inland waters were in existence in the Anuradhapura regime and was an accepted occupation and this in turn contributed to relaxation of taboos on fishing in inland waters at that time.

Robert Knox in his reference to a medieval period (1681 A.D.) in Sri Lanka's history has also provided information on inland fishery. These evidences suggests the presence of fishing activities without any cultural and religious obstacles.

A similar example of cultural prejudices in Sri Lanka may be seen in the case of poultry around the 1950's. In the 1950's Sri Lanka imported poultry products from neighbouring countries while more intensive local poultry development started in the 1960's. Here too there were similar cultural and religious restraints against the programme. There were also attempts to create a prejudice against the taste and the nutritional value of the different varieties of eggs.

However, in 1980 despite the religious and cultural barriers the country was close to self-efficiency in poultry products. Today no barriers exist and modern conditions have encouraged people to expand poultry farming rapidly. Many Asian countries with a similar cultural and religious heritage have already entered the era of fish farming in homesteads and at farm level.

When the above factors are considered, to expect that the problems regarding popularisation of the consumption of inland fish may be solved in a matter of a few decades will not be an unrealistic assumption.

### Infrastructural facilities

A separate Division of Inland Fisheries was set up in the Fisheries Ministry in 1979 although efforts to develop this sector commenced in 1950's. But comparatively little attention was paid to this sector by either the private or public sectors until the formation of an Inland Fisheries Division in July 1979.

Development of inland fisheries has been accorded high priority in the (1977-1983) Master Plan in view of its vast development potential. Prior to the present Master Plan the capital investment allotted to the development of inland fisheries was below 10 per cent of the total investment of the Ministry. Under the new Master Plan it has been given a higher position in the total investment structure of the Ministry. (See table III).

Having considered the potential harvests of the inland water bodies the Ministry of Fisheries started a subsidy scheme to encourage investment in this sector. Furthermore, facilities for technical assistance and other infrastructural network also began to be provided. The first subsidy scheme for the development of inland fisheries was started in 1980. A subsidy of 35 per cent of the total cost of non mechanized craft and gear used for fishing in these Dry Zone water bodies granted under this scheme.

The seven fishing crafts and their gear issued under this scheme had not shown a substantial performance in 1980. The quantum of subsidy was increased to a 90 per cent of the total cost of craft and gear in 1981. The aim of this upward revision in the subsidy was to intensify inland fish production by using an increased number of fishing units in the inland waters. Under the present scheme Rs.8.44 million has been granted for 1,390

Table III Public Sector Investment in Inland Fisheries

Year	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Amount Rs.Mn	.13	.13	.82	11.29	6.49	3.25	3.82	3.70	6.86	21.14	29.90*

\* Planned

Source: Ministry of Fisheries

(11) Project of the Government of Sri Lanka for the aquaculture development and training - UNDP pp. 4

\* (This includes both the fresh and brackish water production of fish.)

crafts and gear over the period of October 1, 1981 to May 31, 1982. This dual increase, namely the quantum of subsidy and the number of fishing units getting it, gave rise to a 45 per cent increase in inland fish production in 1981 over that of the year 1980. In addition to this subsidy scheme, the Ministry of Fisheries is providing a 50 per cent subsidy for setting up of pond fish farming units in order to popularise this venture among the villagers. This scheme grants Rs.2,000/- to Rs.10,000/- for a pond covering an area of 10 perches to one acre, respectively. About Rs.1.3 million has been granted so far to the pond fish farmers under this scheme, according to the Ministry. (Table IV)

In addition to the financial subsidies granted by the Ministry of Fisheries, credit facilities were also announced for this sector to be made available through the network of state banks. This scheme was started in 1980 and its main objective was to increase the number of crafts in operation by 800 in the inland waters, in order to increase fish production and reach the targeted figures. This credit scheme has been linked with the 35 per cent subsidy scheme granted as costs of the craft and gear from 1980.

The People's Bank and Bank of Ceylon provided a maximum amount of Rs.4,000/- per fishing unit for the purchase of craft and allied gear. These loan facilities were

#### Bank of Ceylon

1. Giants Tank
2. Kanthalai Tank
3. Mahakanadarawa Tank
4. Mahawillachchiya Tank
5. Minneriya Tank
6. Padaviya Tank
7. Senanayake Samudraya
8. Udawalawe Tank
9. Unichchai Tank
10. Vavunikulam Tank

Though in the 40's and 50's inland fisheries was given little attention from the 1960's its resource potential and commercial and nutritional values began to be realised. The experiences of the Asian countries such as Japan, China, Korea, Taiwan, Philippines, Thailand, Malaysia, as well as Bangladesh and India was the driving force behind this development. During the last two decades a series of research projects were conducted on various aspects of the hydro biological conditions of the inland water bodies in Sri Lanka, where inland fisheries would be suitable. Findings of this research suggested that conditions were favourable in Sri Lanka.

The government therefore decided to provide more infrastructural facilities for the development of this sector, which also included assistance in kind and cash, through foreign aid as well as local channels, for setting up of fish breeding and research centres; for improving the standards of technical and commercial know-how; and for promoting inland fishing activity in rural areas. The result is that today there are 17 fish breeding stocking and distribution centres in operation

The progressive increase in the distribution of fingerlings helped to establish a large number of inland water bodies mostly in the Dry Zone, and some of these have been developed into commercial fishing centres at present. (Table V and VI).

Also, aquaculturists and fisheries instructors are deployed to cover almost the entire island, which includes both inland waters where fishing is now conducted and; the water bodies where inland fisheries have been planned. (See table VII).

The increasing facilities provided to this sector may help to create a greater interest in this newly developing area.

There are other factors that encourage the peasants to carry out fishing in the Dry Zone inland waters. For instance more than 90 per cent of inland water bodies spread over the Dry Zone are very closely connected to the paddy lands in the area. Over 70,000 families seem to be dependent on paddy cultivation under the minor irrigation work in the Dry Zone, (13) and dependant families

Table IV Pond Subsidy Programme

Station	No. of Applications Approved	No. of Cases Paid	Amount paid	Extent
1. Beragala	12	5	4,500.00	5 1/2 p - 3 acres
2. Polonnaruwa	115	56	113,423.00	13.6 acres
3. Galle	134	111	206,750.00	15.25 acres
4. Pitipana	112	49	126,150.00	10.5 acres
5. Pambala	31	17	70,800.00	6.3 acres
6. Ginigathena	154	54	153,500.00	5.3 acres
7. Nuwara Eliya	52	28	66,120.75	3.7 acres
8. Inginiyagala	68	44	152,080.00	15.7 acres
9. Mankulam	12	11	87,000.00	11.5 acres
10. Anuradhapura	9	8	16,200.00	5.4 acres
11. Panapitiya	28	27	28,087.00	1.9 acres
12. Muruthawela	36	17	32,625.00	1.8 acres
13. Rambodagalla	46	6	21,700.00	4 acres
14. Udawalawe	33	29	52,300.00	4 acres
15. Dambulla	4			
<b>Total</b>	<b>846</b>	<b>462</b>	<b>1,131,035.75</b>	<b>99.25 acres</b>

There are 462 pond fish farming units which have been paid subsidy amounting to Rs.1,131,035/ and the area covered by those ponds is 99.25 acres in 1982. At present the number of pond units operating in the island is not a significant feature in the country's fisheries. The University has received 496 and 1006 applications for subsidy in 1981 and 1982 respectively, and the number of applications approved in each of these years had been 414 and 846 respectively. Among the approved cases 121 and 640 applicants were paid a sum of Rs.242,168/- and Rs.1,131,036 in each year making a subsidy total of Rs.1,373,203 in 1982 December. Presently the total pond spread area is 235 acres.

Pond farming units are now becoming more popular in the upcountry, especially in Passara and Nuwara Eliya areas and this venture could be further extended to the Dry Zone areas where farm lands and irrigation water is available.

(13) Socio-economic Survey of Minor Irrigation in the Dry Zone of Sri Lanka University of Peradeniya, 1980 Oct.pp.3-27

under the major irrigation reservoir are much higher than this. Therefore the main source of income or the livelihood of the majority of the people in the Dry Zone is cultivation of farm crops (mainly paddy) and allied activities.

The dependence on one major farm crop is a risk. Crop failures due to natural causes have taken place once in seven years, according to recent findings on dry zone farming. The peasants in new settlements of the Dry Zone

considered. Such alternative sources could withstand wider variations in environmental and climatic conditions and therefore come to the rescue of the settlers by supplying them food and an income in difficult times

Table V The Fingerlings Collected, Produced and Stocked

Name of Inland fisheries station	1977			1978			1979			1980		
	Collected	Produced	Stocked	Collected	Produced	Stocked	Collected	Produced	Stocked	Collected	Produced	Stocked
Polonnaruwa	-	351,000	323,828	-	575,400	488,410	70,000	828,700	643,500	2,000	1,056,950	684,194
Ginigathena	-	28,500	20,000	-	135,564	152,917	-	160,000	133,230	42,260	348,185	354,386
Nuwara Eliya	-	-	-	-	-	31,885	27,430	-	39,540	10,212	28,110	78,020
Uda Walawe (New & Old)	-	330,000	310,123	-	638,898	942,729	8,500	1,089,500	442,740	-	279,100	268,012
Rambodagalla	-	100,000	40,000	-	250,000	206,500	-	191,500	148,130	-	190,700	226,443
Inginliyala	-	-	-	-	149,130	97,870	-	287,500	267,540	-	683,015	327,750
Panapitiya	-	46,000	29,205	-	49,900	30,057	-	71,000	60,020	80	75,450	67,580
Padaviya	-	-	-	-	-	-	-	1,500	-	-	8,150	1,450
Pembala	-	-	-	-	-	-	-	-	-	250,350	8,000	70,860
Beragala	-	-	-	-	-	-	-	-	-	45,500	204,000	127,415
Mankulam	-	-	-	-	-	-	-	-	-	1,216,500	-	250,500
Muruthuwala	-	-	-	-	-	-	-	-	-	-	-	1,825
Head Office	-	-	-	-	-	-	-	-	-	-	-	-
Distribution Centre	275,242	-	278,842	308,864	-	308,239	237,222	-	272,400	748,895	-	518,018
<b>Total:</b>	<b>401,783</b>	<b>863,500</b>	<b>1,077,704</b>	<b>634,864</b>	<b>2,797,382</b>	<b>2,533,237</b>	<b>675,152</b>	<b>2,815,550</b>	<b>2,350,820</b>	<b>2,801,592</b>	<b>2,911,580</b>	<b>3,259,914</b>

Source: Ministry of Fisheries

Table VI Fresh Water Fish Production in the Dry Zone \* - 1981 (Tons)

District	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Anuradhapura	357	413	489	495	523	511	549	456	468	575	557	523	5,916
Polonnaruwa	236	302	304	270	261	323	218	492	476	608	405	451	4,346
Mullathivu	107	83	91	71	71	43	53	32	38	67	98	66	820
Batticaloa & Amparsai	654	568	531	660	717	532	536	658	607	652	694	682	7,491
Kurunegala	18	05	14	9	11	13	14	16	22	11	25	25	183
Hambantota	27	46	57	49	61	97	73	67	42	61	79	113	774
Ratnapura	11	24	17	22	24	09	81	54	61	34	34	125	497

Source: Ministry of Fisheries

\* Production fluctuations in the months are indicated in the diagram on page 11.

vities in two seasons i.e. "Major" and "Minor" (or Maha or Yala) according to the availability of water. Hence, the majority of inhabitants in the Dry Zone have "two peak working seasons" in a year. (Diagram 11.). (14)

Two of the problems involved in this type of economy are:

- (i) Cultivation of one major farm crop in the Dry Zone has become risky due to natural causes.
- (ii) Depression of human activities in the farm lands between two cultivation peaks have resulted in reducing the income of the peasants.

Between those two labour intensive peak seasons the peasants have sufficient time to be mobilized to develop activities such as inland fisheries or related areas.

are given only limited extents of allotments which cannot be used for extensive dry farming; which contrasts with the position of land available for farming in the typical traditional villages. In few of the Dry Zone villages land is available in abundance and this can be used for alternative income generating purposes; including cultivation of food crops etc.

However, the average size of the family for the Dry Zone as a whole is 5.8 and average farms are less than 3.7 acres in size. A particularly noteworthy feature of the occupational structure of the Dry Zone is the incidence of part time farming. Hence there is a relatively large labour force whose rate of participation is low. This situation points to the need to generate more employment opportunities in such areas. (15)

Furthermore, the importance of alternative sources of income or food have to be

Taking into consideration the above factors the advantage of inland fishery may be listed as follows:

- i. Unlike crop production, the fishery industry in the Dry Zone tanks may not be affected seriously during a dry spell of weather;
- ii. Pests are very common among field crops, though pests may not be found to the same extent in fisheries;
- iii. Although inland fishery can withstand the effects of Cyclones or heavy rains; most of the crops cultivated in the Dry Zone are less susceptible to these hazards;
- iv. Fisheries can provide work for all active members of the family and also nutritious food. (15)

Therefore inland fisheries can become an alternative product to cultivation of farm crops in the Dry Zone, which ensures additional income as well as an insurance against the vagaries of crop failures. Furthermore, it also helps to diversify their economy and minimize the risk of dependence on one major farm product (mainly paddy).

### A Source of Subsidiary Income

Income inequalities throughout the year can be noted among different sections of peasant society in the Dry Zone. The household annual income varies from Rs.3,600/- to Rs.7,000/-. Generally farm incomes in minor irrigation areas are less than those under major irrigation. Another difference is that farm incomes of households operating under minor irrigation are subject to a higher degree of fluctuation. (14). Their financial assets are generally very limited and a large part of the Dry Zone peasant society has lived in a debt cycle. In 1957, 60 per cent of agricultural families were in debt. The debt position of the rural sector has been increased by 134 per cent during the year

1976. (16) To overcome this recurring debt situation in the rural sector successive governments have taken several steps in the form of pumping in of institutional credit, although this may not be the ultimate answer to the question of indebtedness.

The other factor to be taken into consideration is the time in which the peasants need credit or the time in which they become indebted owing to their commitments. It has been noted that peasants have heavy transactions, involving large sums of money, during the first half of the cultivation season or a few months after the harvests. Generally they spend much on their agricultural commitments as well as for consumption purposes. This weakens their financial position and they are then compelled to look for sources of borrowing during the latter part of the cultivation season. (17)

It is here that the additional income from inland fisheries could come in good stead; to minimize these seasonal income variations and somewhat relieve the indebtedness of peasants during the such times.

### Utilization of Time

The peasants carry out their farm work mainly during the day time. Fishing takes place in the tanks during the nights. The occurrence of these two activities at two different times can also contribute towards increasing their output, since they could utilize both day and night alternatively. In the peak periods there is a shortage of agricultural labour in the Dry Zone farm lands, and to meet the demand cultivators have to hire labourers from surrounding areas. It is only during this peak farming period that peasants cannot be fully involved in fishing activities.

My observations, during many visits to the various Dry Zone agricultural areas, with a view to ascertaining the prospects of inland fisheries, were that peasants who reside close, to water bodies often go fishing. Some of the peasants were also involved in fish distribution and sales, drying and allied activities. During the periods of lull in agricultural activities peasants do little farm work during the day and they use their time at night for fishing. The others who organize sales and distribution do it during the day in this period. This may be a possible answer to optimize utilization of time and resources of peasants during the lull periods, particularly those living on farm lands of the Dry Zone.

DIAGRAM 11  
THE DRY ZONE AGRICULTURAL CALENDAR  
Showing Periods of Employment & under Employment

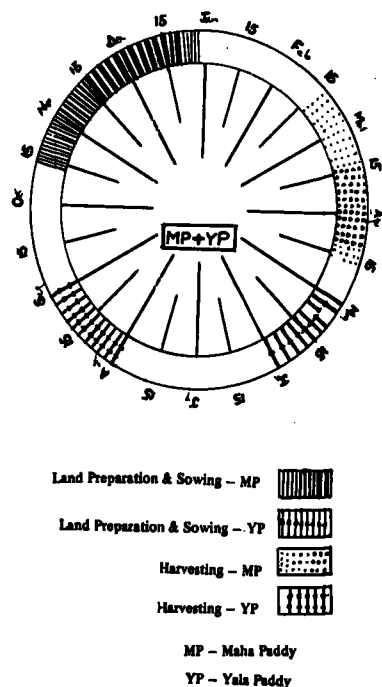


Table VII  
Development of Aquaculture (ACC) - 19.

Name of Inland Fisheries Station	Districts covered at present	Number of ACC deployed at present
1. Polonnaruwa	Polonnaruwa Trincomalee	3
2. Uda-Welawa	Ratnapura Moneragala (Part)	6 (under training) 5 11
3. Ginigethena	Kandy Kegalle	2
4. Rambodapath	Kurunegala	2
5. Pitipana	Gampaha Colombo (Part)	2
6. Inginiyala	Moneragala (Part) Ampara Batticaloa	2
7. Pannapitiya	Kalutara	2
8. Nuwara Eliya	Nuwara Eliya	2
9. Padaviya	Anuradhapura (Part) Mullaitivu	2
10. Head Office Distribution Centre	Colombo	1 (D.F.E.O.)
11. Mankulam	Mullaitivu Jaffna Mannar	1
12. Dambulu-Oya	Matale	2
13. Pambala	Puttalam	2
14. Muruthawela	Matare Hambantota	3
15. Galle	Galle	1
16. Beragala	Badulla	1
17. Anuradhapura	Anuradhapura (Part)	1 (D.F.E.O.)
Total	All Island	38 (A.C.C.) 2 (D.F.E.O.) 40

Source: Ministry of Fisheries

(15) Small farmer Development Manual - Vol.1, Field Action for Small Farmers, Small Fishermen and Peasants. FAO Thailand 1978; pp. 107.

(16) Survey of Credit and Rural Indebtedness among Paddy Farmers 1976 - Central Bank of Ceylon pp. 6-31.

(17) Rainfed farming in the Dry Zone of Sri Lanka. ARTI-April 1980. pp. 104-107

(18) Socio-Economic Survey of Nine Colonization Schemes in Ceylon 1967-68, Faculty of Agriculture - University of Ceylon, 1969.