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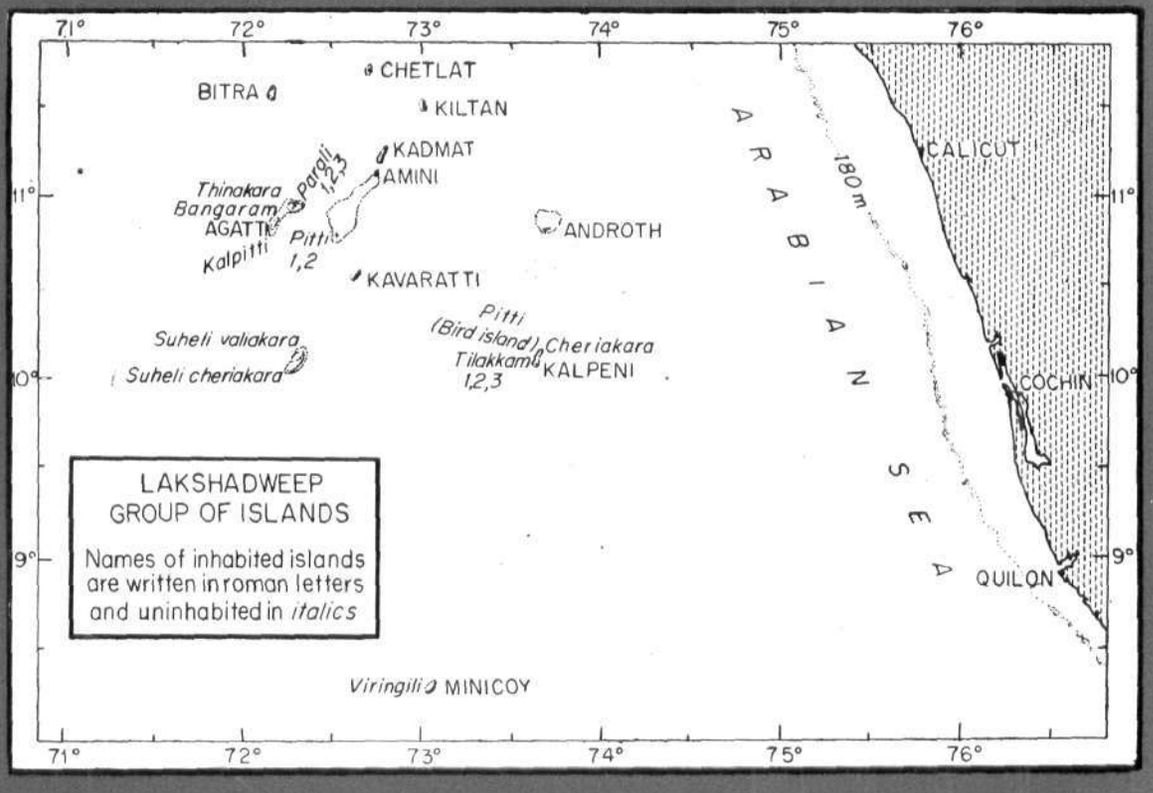

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POTENTIAL RESOURCES OF FISHES OTHER THAN TUNA IN LAKSHADWEEP

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Introduction

The tuna fishery of the Lakshadweep in the south-eastern Arabian Sea is often overemphasised to the extent to create an impression that there is no other exploitable resources of fishes other than tunas, especially the skipjack, *Katsuwonus pelamis*. At present, fishing in an organised manner exists only for tunas in the islands (Jones and Kumaran, 1959). There is a well-established traditional system for the capture of tunas in Minicoy and some other islands with indigenous craft and gear and mechanised boats. The highly productive waters around the islands (numbering twenty seven), the submerged banks and the crevices of coral boulders and reefs offer ideal habitats for a large number of economically important groups of fishes (Jones and Kumaran, 1980) which offers scope for extensive fishing by simple crafts and gears. Most of the other fish resources are now caught either as a by-catch of pole and line tuna fishery or as incidental catches in surface trolling.

The people of Lakshadweep are traditionally dependant on coconut and fish for subsistence for centuries, and avenues for other occupations are limited. Any developmental programme for improving the economy of Lakshadweep and to provide employment to the increasing population has to be mainly oriented towards

Table 1. *Composition of marine fish landings other than tunas and bill-fishes in Lakshadweep during* 1971-'84 (figures *in tonnes*)

Category	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	Average ('82-'84)	Percentage*
Elasmobranchs	120	157	171	253	325	354	296	198	364	284	211	240	332	287	286	25.6
Catfish	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—
Half beaks & Belonids	9	19	99	27	29	33	58	144	101	99	113	87	103	62	84	7.5
Flying fish	14	17	42	43	30	41	30	33	16	29	16	25	25	15	22	2.0
Perches	43	83	130	159	186	193	211	163	203	376	315	230	252	205	229	20.5
Goat fishes	8	12	36	32	34	58	29	27	27	27	25	27	32	24	28	2.5
Carangids	20	30	63	61	61	94	65	60	58	80	105	214	147	45	135	12.1
Seer fish	48	51	29	91	66	87	41	41	24	21	50	99	59	59	72	6.4
Barracuda	7	8	11	18	17	20	15	18	11	14	12	10	19	14	14	1.2
Sciaenids	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—
Silver bellies	—	—	—	—	5	—	—	—	—	—	—	—	—	—	—	—
Miscellaneous	134	172	232	279	224	361	281	201	233	206	203	239	237	265	248	22.2
Total (excluding tuna)	403	549	813	963	980	1241	1026	885	1037	1136	1050	1171	1206	976	1118	(24.0)
Tuna	774	514	1020	1254	1932	1291	1166	1875	2794	1760	2236	2966	3303	4313	3527	(76.0)
Grand Total	1177	1063	1833	2217	2912	2532	2192	2760	3831	2896	3286	4137	4509	5289	4645	

* Percentage to the Total (excluding tuna)
Percentage indicated in the brackets refer to percentage to Grand Total

the fishing industry. In this context, the diversification of fishing effort for the exploitation of fishery resources other than tuna and evolving cheaper preservation methods and effective marketing become essential for the futurological development in the fisheries sector of these islands.

Present status of the fishery resources other than tunas

The indigenous fishing craft employed for the capture of other fish resources in the islands vary from five to seven metres in length. In recent years, a few of the dug-out canoes have been fitted with 'Yamaha' outboard engines. Traditional drag nets of varying dimensions and cast nets are in use for the capture of other fishes, mostly from the lagoons. Harpoons are used for capturing sharks, rays and other big fishes from the open sea. 'Chilla' with spikes are used for catching half beaks, belonids and flying fishes. In the open sea, drift netting is carried out on a limited scale by mechanised boats introduced since the early sixties. Occasionally, trolling is done from mechanised boats for catching wahoo, sailfish etc. and long lines are employed for catching sharks and other large fishes. The method of capture is surface trolling with one troll line on either side of the boat. Considerable improvement in the fish landings in the islands have been observed in recent years. However, the increase in the landings of fishes other than tuna consequent on the introduction of mechanised boats is of a lesser magnitude than that of tuna.

The group-wise annual catch, average catch, and the percentage contribution of each group in the landings of other fishes for the years 1971 to 1984 are given in Table-1. The average contribution (average of 1982-'84) of the fishery resources other than tunas to the total fish production of the islands is 24.0%. However, it varies from island to island and is inversely related to the development of pole-and-line fishery for tuna of different islands. The average tuna landings in the islands was 3,527 tonnes and other fishes 1,118 tonnes. The landings of other fish resources excluding tuna was the lowest in 1971 (403 tonnes) and the highest in 1976 (1,241 tonnes).

It could be seen from Table-1 that the commercially important resources other than tunas in the Lakshadweep in the order of abundance are: sharks and rays (25.6%), perches (20.5%), carangids (12.1%), half beaks and

Fig. 1. *Abudefduf glaucus* a very common reef-flat fish.

belonids (7.5%), seer fishes (6.4%), flying fishes (2%) and goat fishes (2.5%). Devil rays *(Manta birostris)* and sail fish are caught in good numbers by the islanders except in Minicoy. Wahoo, *Acanthocybium solandri* is abundant all round the islands and are fished by trolling lines and harpooning. Sharks, rays, seer fish, snappers, rock cods, rabbit fishes *(Siganus* spp.) and surgeon fishes *(Acanthurus* spp.) are caught in good quantities from submerged banks and reefs when tuna fishing is poor. Flying fishes are caught in good numbers by torch fishing in most of the islands.

Since fishing effort is concentrated mainly for tuna in most of the islands, the catch of other fishes generally vary according to the fluctuations in the availability of tuna shoals around the islands. When the tuna catch became poor in a particular season, the effort expended for other groups of fishes was increased and consequently the landings of other resources also increased. This indicates that if the effort is diversified, the catches of other resources could be enhanced.

The status of other fishery resources of Minicoy Island

Minicoy Island, where the traditional pole-and line fishery for tunas is in vogue, the fishing effort for other fish resources is mainly during the latter half of the year when the pole and line boats fail to chum tuna shoals. The other fish resources constitute less than 2% of the total fish landing of Minicoy as the fishermen of Minicoy are averse to capture fishes other than tunas. This is not representative of the fishery in the rest of the islands where the proportion of other fishes in the landings is much higher.

The month-wise landings of the various other resources for 1984 and 1985 at Minicoy are given in Tables two and three. The annual average landings of other fishes is about 10.4 tonnes. The major constituents of other resources are wahoo *(Acanthocybium solandri)*, rainbow runner *(Elagatis bipinnulatus)*, carangids, dolphin fish (Coryphaena hippurus), barracudas (*Sphyraena* spp.), perches and sharks. *Acanthocybium solandri* caught mainly by troll lines constitutes the bulk of other fish landings at Minicoy, in both the years (22.8% and 38.7% respectively). The size of *A. solandri* which is a good quality fish ranged from 80–200 cm with a mode at 100 cm. The next most abundant in the landings is *Elagatis bipinnulatus* and *Coryphaena hippurus* which are mostly obtained as by-catch of pole and line fishing. The size of *E. bipinnulatus* in the landings ranged from 40–70 cm. Sharks are obtained in surface trolling and occasionally a by-catch of pole and line fishing for tuna. Eventhough there appears to be a great potential for carangids and perches around Minicoy, no special effort is taken for the exploitation of the resource.

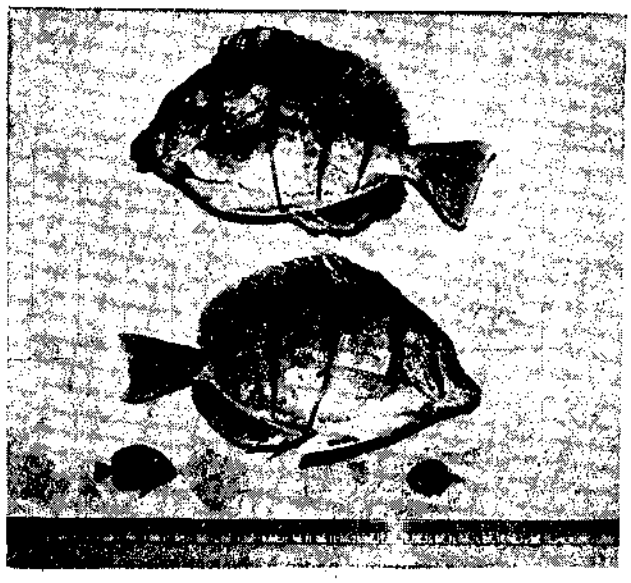

Fig. 2. *Acanthurus triostegus triostegus* the most common herbivorus fish of food value.

From the foregoing, it is evident that the islands have a resource potential for at least four major groups of fishes other than tunas viz., *Acanthocybium solandri,*

Table 2. *Monthly landings of fishes other than tunas and bill-fishes at Minicoy during* 1984 *(in kg)*

Month	*Acantho-cybium solandri*	Caran-gids	*Elagatis bipinnu-latus*	*Corypha-ena hippurus*	*Sphyraena* spp.	Perches	Sharks	Total
January	25.0	—	54.5	—	—	—	75.0	154.5
February	10.0	61.0	114.0	—	—	—	50.0	235.0
March	—	—	399.5	—	—	—	1,012.0	1,411.5
April	35.0	—	80.5	—	—	—	270.0	385.5
May	164.0	68.0	—	—	—	307.0	348.0	887.0
June	27.0	82.5	28.0	4.5	—	249.0	—	391.0
July	45.0	2.0	23.0	—	132.5	378.5	20.0	601.0
August	90.0	1,175.5	96.0	11.0	521.5	1,589.5	435.0	3,918.5
September	1,202.0	52.5	31.5	143.0	128.0	55.0	507.0	2,119.0
October	517.0	5.0	273.5	30.0	6.0	—	143.0	974.5
November	471.0	—	817.5	—	—	—	—	1,288.5
December	471.0	2.0	499.0	5.0	4.5	13.0	25.0	1,019.5
Total	3,057.0	1,448.5	2,417.0	193.5	792.5	2,592.0	2,885.0	13,385.5
%	22.8	10.8	18.1	1.4	5.9	19.4	21.6	

Table 3. *Monthly landings of fishes other than tunas and bill-fishes at Minicoy during* 1985 *(in kg)*

Month	*Acantho-cybium solandri*	Caran-gids	*Elagatis bipinnu-latus*	*Corypheena hippurus*	*Sphyraena* spp.	Perches	Sharks	Total
January	248.0	16.0	213.0	19.0	4.0	20.0	—	520.0
February	137.0	5.0	154.0	9.0	2.0	—	410.0	717.0
March	99.0	27.0	212.0	199.0	—	—	190.0	727.0
April	169.0	5.0	235.5	61.0	1.0	—	140.0	611.5
May	29.0	42.0	118.5	6.0	2.0	—	—	197.5
June	20.0	166.0	1.0	12.0	2.0	—	136.0	337.0
July	437.0	74.0	71.5	35.0	21.0	—	297.5	936.0
August	377.0	106.0	41.5	—	1.0	—	20.0	545.5
September	396.0	155.0	45.0	—	—	—	—	596.0
October	371.0	4.0	123.0	74.0	—	—	125	697.0
November	354.0	—	466.5	10.5	12.0	—	—	843.0
December	189.0	29.0	360.5	3.5	—	—	—	582.0
Total	2,826.0	629.0	2,042.0	429.0	45.0	20.0	1,318.5	7,309.5
%	38.7	8.6	27.9	5.9	0.6	0.3	18.0	

carangids, perches and sharks. The other two species i.e., *Elagatis bipinnulatus* and *Coryphaena hippurus* are landed mainly as a by-catch of pole and line fishery.

Strategies for future development

For the rational exploitation of the other fish resources available, attention has to be paid for the balanced development of indigenous and mechanised sector simultaneously.

1) *Development in the small-scale sector*

The small-scale sector remains under developed as the local people are practicing only the age-old methods for fishing to meet the local requirements and this sector

is also not organised. The traditional methods of fishing has not undergone any appreciable change in the islands over the years. Consequently the production of other fishes by traditional fishing operations has not increased significantly when compared to increasing trend in the operations of mechanised boats for tuna fishery.

Diversification of fishing effort, effecting improvements in the existing crafts and gears and providing financial support to develop traditional practices by artisanal fishermen employing indigenous crafts and gears are of prime importance for the development of small-scale sector aimed at the exploitation of resources other than tunas. This is labour intensive and can bring about economic uplift and generate employment to the increasing population.

2) *Large-scale development*

Although the use of mechanised boats for pole and line fishing was introduced two decades ago, there has not been any proportionate increase in the landings of other fish species. The main reason for this is the use of unsophisticated methods of fishing and inadequate marketing facilities. With the realisation of great potentials for increasing the fish landings, it is inevitable to extend the area of fishing operations by adopting improved technology. Sub-surface long lining with modifications suitable for local conditions when introduced will not only increase the exploitation of tunas, but also other resources such as sharks, carangids and perches. The methodologies practiced elsewhere may not be suitable to the conditions prevailing in Lakshadweep and in this context, the prevailing socio-economic level of the people also have to be seriously considered. A survey of the seas around the islands by drift gill netting and long lining have to be carried out to locate and chart productive areas for the different fish resources of economic importance and to evaluate the economics of operations and suitability of different gears.

Post-harvest technology and marketing

Simultaneous with the increased exploitation, facilities for processing and marketing the products have to be provided. At present, tuna is the only fish much sought after by the islanders. The traditionally cured product '*mas min*' is in good demand on the mainland. The other fishes are regarded as second rate by the islanders and hence the problem of disposal of the catch arises while developing other fishery resources. Effective preservation and processing techniques have to be adopted so that the surplus fish is brought to the mainland for marketing.

In order to improve the socio-economic conditions of the fishermen population, it is imperative to implement welfare programmes to provide technical and financial assistance for taking up fishing as an employment by the local population.

As avenues for other occupations are limited, a good percentage of the population remains idle for a substantial part of the year. The problem of unemployment and inadequate returns can be solved by diversification of employment through judicious exploitation of the fisheries resources around the islands. Provision of credit facilities by financial institutions, adoption of suitable preservation techniques and development of marketing facilities in the mainland to fetch higher prices are essential for the all-round development of the fisheries sector.