

Fishing technology

Mechanization ahoy!

Technological change has transformed the living standards of fishermen in southern Sri Lanka

The post-war period in Sri Lanka was characterized by rapid rates of growth of population that exerted tremendous pressure on food supplies. In order to face the new challenges, the State, which assumed a regulatory role during the pre-war period, took an active role—one of reformism—to expand fish production. Many technological innovations have been introduced to fisheries since then, with major emphasis on mechanization. The State intervention in fisheries was mainly characterized by measures adopted to improve traditional crafts and gear, introduction of new fishing techniques and the development of fisheries infrastructure to facilitate reaping the full benefits of the above measures. In order to help the asset-poor fishermen to adopt the new technology, a large array of credit schemes were implemented through the State-owned banks. It was envisaged that all these measures would lead to large increases in production, while improving the living standards of the resource users.

Since the late 1930s, experiments have been conducted by the State to introduce suitable mechanized crafts into Sri Lankan fisheries, and the results of such experiments led to the introduction of four main types of mechanized vessels; mechanized crafts with outboard engines (the most commonly used craft is the 17-23 ft fibre-glass FRP boat); one-day operating craft (ODOC) with inboard engine; multi-day operating craft with inboard engine and ice compartment (MDOC); small trawlers (10-11 tonne boats).

The latter craft did not become very popular among the fishermen in Sri Lanka, mainly due to its high initial cost. The MDOC is the only craft used by the fishermen to exploit deep-sea fish resources. Along with the mechanized

craft, new fishing gear and fishing techniques were also introduced into Sri Lankan fisheries.

The new fish-catching technology introduced was essentially an 'output-enhancing' technology. With its ability to engage in year-round fishing, the mechanized craft enabled the fishermen to stabilize inter-temporal flows of fishing incomes. Yet, the new technology was highly capital-biased and its adoption demanded an array of inshore and offshore facilities.

A modern craft, such as the MDOC with accompanying gear, cost about SLRs 1,593,000 in 1994, as against SLRs 24,500 for a non-mechanized traditional craft (NMTC) and accompanying gear. By 1998, the cost of an MDOC with accessories amounted to SLRs 3-4 million (US\$ 1 = SLRs 70).

Costs of crafts & accompanying gear (1994)

Type of Craft	Cost of Craft (SLRs.)	Cost of Gear (SLRs.)
MDOC ¹	1,307,000	205,300
ODOC ¹	784,621	77,500
FRP ²	72,000	78,000
MTC ³	14,100	58,000
NMTC ⁴	5,700	6,200

1 with 34 hp engine

2 18.5 feet FRP boat with 15 hp OBM

3 Mechanized Traditional Craft—17.8 feet fibre glass canoe with 8 hp OBM

4 9 feet wooden *theppam*

(Source: Field studies, 1994)

No savings

Although ordinary fishermen are unlikely to have savings sufficient enough to meet the heavy capital funds required for the purchase of modern crafts and gear, this technology showed a high rate of

diffusion within the coastal community of Sri Lanka.

The 1970s marked the era of a 'blue revolution' (the technological revolution in marine fisheries), where the rate of adoption of mechanized fishing took place at a rapid pace. This period also coincided with rapid increases in fish production—from 85,229 tonnes of fish in 1971 to 206,843 tonnes in 1981. The degree of mechanization of fishing crafts reached the 50 per cent mark by the mid-1980s and remained around that level since then.

Quite interestingly, the State had played a commendable role as an agent of change or a catalyst in the drive towards the mechanization of Sri Lankan fisheries. A large amount of subsidies have gone into fisheries since the early 1960s to enable fishermen to acquire mechanized crafts and engines.

The increased craft issues during the 1960s and 1970s coincided with the period of rapidly increasing rate of mechanization of fishing crafts. The late 1970s and early 1980s also marked a significant increase in the amount of subsidies granted to fisheries.

It is quite apparent that the State has taken an active role in the process of technological change in fisheries. It has also been able to shift fishing effort from

one set of resources to another by changing the nature of craft and engine issued under subsidy schemes.

For Sri Lankan fishermen, both formal and informal sources of credit are important. The financial intermediaries involved in the formal sector consist of State-owned commercial banks, fisheries co-operatives and the Ministry of Fisheries, while the informal sources consist of private moneylenders, fish merchants, boutique owners, fellow fishermen and kinsmen.

While professional moneylenders of the informal credit market and the institutional credit agencies of the formal credit market are ready to advance credit at comparatively moderate rates of interest to the agriculturist who offers his land as a collateral, those very same lenders are reluctant to advance money to fishermen, considering that the latter have no reliable security to offer them, in compensation for the risk they take.

No collateral

Fishing craft and gear are the only assets owned by fishermen, and these depreciate rapidly and also bear the risk of damage and loss at sea. Therefore, fishermen's access to credit is limited by 'collateral-specific risks'. Therefore, fishermen are put at a serious disadvantage in the credit market because many lenders consider them less creditworthy. State involvement in



providing the fishermen with funds under various credit schemes can be viewed as a measure taken to redress the above situation.

Fixed capital, such as crafts, engines, gear and other accessories amount to sizeable investments. All types of craft owners in the south of Sri Lanka depend, to a considerable extent, on external funds to secure their fixed capital needs.

Credit has been important in the acquisition of both crafts and gear. Total borrowals added up to large amounts. The higher the degree of mechanization, the higher has been the average amount of credit required. Both formal and informal sources have been equally important for all types of craft owners in securing their fixed capital needs.

Formal sources have provided almost 60 per cent of all credit required by fishermen. Although they have played an equally important role, the co-operative lending schemes can be considered the most successful, taking into account the fact that lending facilities of this source were extended to all types of craft owners. One should also not undermine the important role played by the fish merchant, contributing 22 per cent to the total credit amount. Contributions of the moneylender and fellow fishermen have been quite low, which, among other

things, reveal the inability of these sources to meet the large loan amounts demanded by fishermen to acquire modern crafts and gear.

Naturally, we expect a fisherman adopting modern technology to perform better and live better than one who continues to use traditional technology. Comparison of living standards of fishermen across different technological categories will provide us with information on the relative strength of these technological types in making the fishermen better-off and, also on the pattern of social stratification of fishing communities.

There is a very high degree of variation of incomes of fishermen within a particular technological category. Interestingly, there are fishermen in modern fisheries whose incomes exceed SLRS 20,000 a month, which is comparable to the monthly salary of an executive in a private company or a university academic in Sri Lanka.

Monthly returns

The monthly returns of asset owners are higher than the monthly income of crew workers (with the exception of NMTC), indicating that asset owners earn more than those who do not own fishing assets. Of course, if the asset owner is a fisherman, his income would be much higher (because he will receive a

crew-share as well). Evidently, the higher the degree of mechanization of fishing crafts, the higher would be the income of craft owners. Clearly, modernization of fisheries has brought about an increase in the living standards of fishermen.

Average incomes of selected occupational categories

Sub-sector	Occupational category	Average income (SLRs/month)
Agriculture	Paddy ploughing	3,465
	Tea plucking	1,958
	Rubber tapping	1,958
	Coconut husking	3,694
	Coconut plucking	3,522
Building construction	Master Carpenter	4,460
	Skilled Helper	3,336
	Master Mason	4,356
	Unskilled Helper	2,534
Fisheries	Crew Share - MDOC	8,654
	Crew Share - ODOC	4,741
	Crew Share - FRP	4,692
	Crew Share - MTC	3,919
	Crew Share - NMTC	2,694

Adopted from Central Bank, 1998

The incomes of fishermen engaged on mechanized crafts appear to be higher than those of other occupational categories (except crew workers of MTC, who earn incomes slightly below those earned by skilled workers in the building construction sector). The crew workers in traditional fishing earn the same monthly income as unskilled workers in other sectors, indicating their relative poverty, compared to many occupational categories.

In general, it is evident that fishermen who have adopted modern technology are earning higher incomes than skilled workers in the unorganized sector.

The new fish-catching technology introduced to Sri Lanka was essentially a productivity-enhancing technology that led to higher average annual fish catches. However, the adoption of new technology required the fishermen to make high capital commitments. The State has played an important role in helping the asset-poor fishermen in adopting the new technology, by way of craft and engine issues under subsidy schemes. Today, approximately half of Sri Lanka's fishing fleet consist of mechanized crafts.

Fishermen depended heavily on external funds to secure their fixed capital needs. The higher the degree of mechanization, the higher was the average amount of credit obtained. While both formal and informal sectors have catered to the fixed capital demand, the formal sources, such as the State-owned banks and fisheries co-operatives, have played a more important role in the provision of funds for the acquisition of modern mechanized crafts.

Comparison of incomes of fishermen across different technological categories revealed that fishermen who adopted mechanized fishing were able to increase the level of their incomes. Comparison of fishing incomes with those of other occupational categories revealed that fishermen engaged in mechanized crafts were earning higher incomes than those earned by most of the other occupational categories in the unorganized sector.

In general, it is well evident that modernization of fisheries has brought an increase in the living standards of the fishermen of southern Sri Lanka. ❧

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