Indian J. Fish., 60(1) : 125-130, 2013

Economic feasibility analysis of fisherwomen based microenterprises

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ABSTRACT

Women in fishing communities are major players in the post-harvest sector and are traditionally involved in processing and marketing of fish. The issue of women's limited control over resources has been discussed widely and there is need to develop micro-level interventions together with macro-level advocacy as a strategy to strengthen women's role in post-harvest activities and in preparing and marketing of value-added fish products. In marine fisheries, while high value species are mostly processed for export, most of the medium and low value species, which form bulk of the landings, are marketed fresh or processed for the domestic market. Women perform their tasks either at home or as labourers in commercial processing units. However, they fail to realise the benefits to support themselves as well as family. Location-specific and need-based training programmes for fisherwomen can enhance their technical know-how and awareness enabling them to start gainful employment ventures. The economic feasibility of fish based value added items by self help group (SHG) group micro-enterprises is discussed in this paper.

Keywords: Empowerment, Micro-enterprises, SHGs, Value added products

Introduction

The gendered lens of development has gained importance with the new economic order contributing to inclusive economic growth with women centered development being integrated with mainstream economic planning and policy making. Issues of poverty among women are quite distinct and complicated. Their general poverty conditions, morbidity, lack of food, drinking water, and sanitation facilities are some of the major issues that need attention. The conventional method of defining "economically active population" and "wage earner" preclude women's work within the household or family responsibilities. Consequently, contributions of women are not counted in the GNP (Gross National Product), and women's work is usually not recognised as being economically productive. This is aggravated by the fact that rural women are primarily engaged in subsistence rather than commercially-oriented activities, and female labour is customarily classified as "unpaid family workers" (FAO, 2010). Female members of a poor household are often far behind their male counterparts due to gender discrimination in distribution of food and other entitlements within the household (Anand, 2002).

Marine fisheries being one of the marginalised sectors reflects almost similar or even worse situations in comparison to what happens in other sectors to women depicting feminisation of poverty. The concept of 'empowerment' has been frequently used synonymous with micro-financing models in the country in that they contribute to the social and economic wellbeing of the hitherto marginalised section of the population. Self help group (SHG) movement, organising women into groups has been successful in uplifting the socio-economic milieu of the poor in addition to social empowerment. Initial stage of group activity is bound to mobilise thrift and internal lending with the corpus. The group graduates to access linkage to banks through the SHG-Bank linkage by which they can avail loan after the incubation stage based on the security of savings mobilised by the group. Several projects promoted by central and state governments have added to the strength of the programme by incorporating a large majority under this fold. Formation of micro-enterprises succeeds the bank linkage phase where the members opt to start new ventures with the capital mobilised from loan and owners equity. The World Bank's new strategy launched in 2002, called 'Reaching the Rural Poor' focuses on improving the lives of those living in rural areas. Ian Johnson, the Vice President of Sustainable Development, states that this strategy is contributing to the increase of productivity in rural areas, which will have a very positive impact on other sectors of the national

economy. Lyson (1995) emphasises the prospects of small enterprise framework as a possible rural development strategy for economically disadvantaged communities and provides this description to the nature of small scale flexibly specified firms. Firstly their businesses should provide products for local consumption that are not readily available in the mass market. Secondly, the small scale technically sophisticated enterprises should be able to fill the niche markets in the national economy which are otherwise too small for mass producers. Thirdly, small craft based, flexible specialised enterprises can reorient their production strategies to exploit the changing market conditions.

Development projects in India and other developing countries have been increasingly adopting SHG based interventions to uplift the poor. The Department of Science and Technology (DST), Government of India has been instrumental in funding projects to support the society based on findings from Research and Development institutions. The Central Institute of Fisheries Technology (CIFT), Kochi has implemented one such initiative in Kerala which caters to the empowerment of women in the fisheries sector of coastal Kerala. As a part of the project, women SHG groups were adopted and supported to implement gainful activities to improve their livelihoods. The project has identified that entrepreneurship stands as a vehicle to improve the quality of life of individuals, families and communities and sustain a healthy economy and environment. Entrepreneurship can be defined as a combination of three elements; a force that mobilises other resources to meet unmet market demand; the ability to create and build something from practically nothing and; the process of creating value by pulling together a unique package of resources to exploit an opportunity (Stevenson *et.al*., 1999; Rena, 2009). Petrin (1994) affirms that rural development is now being linked more and more to entrepreneurship. Besides rural entrepreneurship is likely to flourish in those rural areas where the two approaches to rural development; the 'bottom-up' and 'top-down' compliment each other. The 'top-down' approach gains effectiveness when it is tailored to the local environment that it intends to support. Here the training mode adopted by the project implementing agency, CIFT, has promoted the idea of linking lab to land. The second prerequisite for the success of rural entrepreneurship is the 'bottom-up' approach in which ownership of the initiative remains in the hands of members of the local community. The regional developmental agencies can contribute to this front. In the implementation of the project, local panchayath authorities act as active partners in motivating and contributing to ensuring success of the beneficiaries in their entrepreneurial ventures. The present analysis was carried out with the objectives to evaluate the economics of processing of selected fish based value added products and feasibility of micro enterprises manufacturing value added fish products.

Materials and methods

The study was based on primary data from a micro-enterprise formed as a part of the project. Data has been gathered by a survey among the respondents by simple random sampling from SHG's in Moothakunnam area (n=50) of Ernakulum District. These SHG group members have been associating with the Department of Science and Technology (DST) funded project on 'Location specific livelihood interventions in fisheries sector for the empowerment in fisheries sector of Kerala'. Value addition of marine fishes was demonstrated to stakeholders by way of trainings conducted during the project period. The stakeholders were imparted trainings on value addition of various fish products to start with. This was closely observed for a period of one year to work out the cost and earnings generated out of the enterprise. Feasibility analysis has been carried out using capital budgeting techniques used for evaluating economics projects. Present value of money has been accounted by taking into consideration the discounting factor. The tools used included net present value (NPV) and internal rate of return (IRR).

The net present value (NPV) and internal rate of return (IRR) were determined as indicators of profitability. These indicators are sensitive to changes in production and market variables (Head *et al*., 1996). These methods take into concern the time value of money and have therefore received greater acceptance by theorists.

Net present value model (NPV)

Net present value (NPV) is defined as the sum of the present values (PVs) of the individual cash flows. The NPV is used because it is an absolute measure of the value or expected value of an investment.

Net present value = Net cash x Discounting factor

where discounting factor is calculated at 10% rate of interest

If the five year NPV of savings exceeds the cost, the project will be considered successful.

Internal rate of return model (IRR)

The IRR is the compound rate of return paid by an investment. IRR gives each project's total return on its project cost. In other words, it determines the breakeven rate of return from a capital investment. By providing a rate of return measure, the IRR of project cash flow allows comparison with a designated opportunity cost of the funds being considered for the projects. For this study, an IRR of project cash flow that is greater than 10% (which is the standard rate of parking funds with a commercial bank) will constitute a rate of return that makes a project successful.

Results

The microenterprise model manufacturing fish-based products catering to the local domestic market has been examined in this paper. The groups manufactured fish cutlets, fish balls and fish and prawn pickles using locally available seasonal fish varieties. The economic angle of measuring in terms of costs and earnings provides an insight into the profitability of preparation of the items. Some of the diversified seafood products that are prepared by SHG groups and its economics are discussed below.

Fish balls and fish cutlets

Preparation of fish balls: Mixed fish mince was prepared from low value fishes with 1% salt and 5% cornstarch and spices. Balls of 2-3 cm diameter were prepared and cooked in 1% brine for 5-10 min. Cooked balls were cooled and then battered and breaded. Fish balls were packed in thermo framed trays in semi-cooked form or ready to eat form after frying in hot vegetable oil. The demand for fish balls is picking up in the internal marketing system and they are distributed through the chain of bakeries in the urban centres.

Preparation of fish cutlets: Fish mince was cooked for 20 min. Salt and turmeric were added to the cooked meat and mixed well. Chopped onions were fried in oil and then mixed with fried chilly and ginger. It was then mixed with cooked meat. To this, smashed potato and spices were added and mixed well. The meat was shaped, dipped in beaten eggs, rolled in bread crumbs and stored frozen. The cutlets were thawed, and fried in oil before use. This is a product found suitable for domestic markets owing to its limited shelf life.

The cost of production of 200 cutlets (7 kg) was estimated to be ₹ 938/- while the same quantity of fish balls requires an operational expense of ₹823/-. The local markets can be tapped by manufacturing items like fish cutlets and fish balls. A profit of ₹37.43 kg^{-1} can be earned from making fish cutlets and ₹25.32 kg^{-1} from fish balls. Preparation of fish cutlets alone provides a break even when 286.26 kg is produced and in case of fish balls it is 423.25 kg (Table 1).

Table 1. Economics of preparation of value added items from low value fish intended for local bakeries

Items	200 cutlets (1 cutlet=35gm) Amount (₹)	200 fish balls (1 fish ball=35gm) Amount (₹)
A. Cost of production		
Raw materials	253.75	254
Other ingredients	374.25	259
Packing charges	60	60
Wages to labour	200	200
Other expenses	50	50
Total	938	823
B. Revenue/Profit		
Selling price per kg	171.43	142.86
Cost of production per kg	134	117.54
Profit per piece	1.31	0.89
Profit per kg	37.43	25.32
Break even production	286.26	423.25

Fish and shellfish pickles

Fish and shellfish pickles are value added items which make use of ingredients like ginger, chilly and acetic acid. Fish was cut in to consumable sizes and washed. It was then mixed with 3% salt and dried for 2 h. The salted and partially dried fish was fried in oil. To this, ingredients like green chillies, garlic and ginger were added and fried in the remaining oil. When these ingredients were fried adequately, chilly powder and turmeric powder were added and the mixture was stirred in low flame. After removing the mixture from stove, fried fish and vinegar were added. This was thoroughly mixed; boiled and cooled water was added along with salt and sugar. This was stirred thoroughly. After cooling completely and allowing maturation for two days in a closed container, the pickles were packed in sterilised glass bottles.

With a cost of production of ₹333.63 kg^{-1}, making prawn pickle for local markets can fetch profit of ₹26.59 per bottle of 250 g. For fish pickle, the profit is ₹97.49 kg^{-1}. Pickles have shelf life of more than 6 months and seasonal variations in supply can be optimally utilised to avail the price advantage. Break even production is achieved when 705.07 kg of prawn pickle and 769.29 kg of fish pickle are produced (Table 2).

Microenterprise mode of working for SHGs ensures labour saving by using manpower from groups. This facilitates an additional income for participating group members by deploying their leisure time. The groups have choice of starting the enterprise either as exclusively manufacturing pickles or cutlets/balls or as combination of both.

Assumptions for financial analysis

The financial analysis is conducted using the following specific set of descriptive, operational and financial baseline assumptions.

- Initial start up capital expenses involves loan component of ₹25000, while rest is borne from the stakeholder's corpus
- Loans are at 12% rate of interest
- System is managed by the groups and additional labour requirements are presented in the analysis

Table 2. Economics of preparation of pickles from seafood

Items	Prawn pickle 100 bottles (1 bottle = 250 g)	Fish Pickle 200 bottle (1 bottle = 250 g)
A. Cost of production (₹)		
Raw materials	4700	4000
Other ingredients	1670	3484
Packing charges	770.68	1441.36
Wages to labour	1000	1000
Other expenses	200	200
Total cost of production	8340.68	10125.36
B. Revenue and profit (₹ per kg)		
Cost of production	333.63	202.51
Selling price	440	300
Profit per kg	106.37	97.49
Profit per bottle	26.59	24.37
Break even production	705.07	769.29

- Land and building (shed) used for the activity is rented on monthly basis
- Depreciation is calculated at 20% assuming zero salvage value for fixed assets at the end of the project
- Equal cash flows are assumed in each year (assuming constant prices for 5 year period - calculations are performed at 2010 prices)

Initial investment

An initial fixed investment of ₹75000/- has been incurred by the group in setting up the micro-enterprise. A loan from the commercial bank was also taken to adjust the initial expenses and hence interest rate servicing is also included in the variable expenses. The capital investment in the micro-enterprise started by the SHG groups was estimated to ₹ 75000/- (Table 3). The rental charges payable monthly is calculated for the year.

Table 3. Initial capital investment in microenterprise mode

Particulars	Amount (₹)
Annual rental charges	60000
Utensils for cooking and pre-processing	10000
Gas and stove-big size	2500
Packing machine	2500
Total	75000

Capital budgeting analysis revealed the following results (Table 4). The discounting factor is assumed as 10%, being the opportunity cost of alternative investments. Cash flow for each year is assumed to be equal for the purpose of the analysis. The micro-enterprise led by the groups, manufactured 200 cutlets and fish balls per day and 200 bottles of fish pickle and 100 bottles of prawn pickle per week. To facilitate unit based analysis, the study presumes preparation of 1 kg each of every single product.

Net present value of Option A, and C was found to be positive (1.44 lakh and 0.88 lakh respectively) indicating acceptability. Option B, denoting exclusively manufacturing fish cutlets and fish balls, showed a negative value (0.41 lakh) indicating non-viability. Internal rate of return also showed similar results accepting option A and C and rejecting B. According to these criteria, exercising

Table 4. Capital budgeting analysis to evaluate entrepreneurial options

Particulars	Discounting factor (10%)	Discounted cash flow (₹)		
		Option A	Option B	Option C
Year 1	0.909	52714.91	8236.36	39024.00
Year 2	0.826	47922.64	7487.60	35476.36
Year 3	0.751	43566.04	6806.91	32251.24
Year 4	0.683	39605.49	6188.10	29319.31
Year 5	0.621	36004.99	5625.55	26653.92
Total present value of cash flow		219814	34345	162725
NPV		144814	-40655	87725
IRR		57%	-23%	36%
(Cash flow generated from manufacturing 1 kg of each item)				
Option A: Fish cutlet, balls, fish and prawn pickles				
Option B: Fish cutlet and fish ball				
Option C: Fish and prawn pickles				
Particulars of cash flow (₹)		Option A	Option B	Option C
Cost of production		189043.2	60369.6	128673.6
Recurring fixed expenses for one year		6000	6000	6000
Gross receipts for one year		253029.6	75429.6	48926.4

option A with an IRR of 57%, *i. e.,* opting for manufacturing a combination of fish products including cutlets, balls and pickles is found most feasible.

Discussion

There is no dearth of literature on analysing economic and financial feasibility of capture and culture fisheries all over the world. Though theoretical attempts are being made to assess the impact of microenterprises in fisheries sector, feasibility analysis of entrepreneurial attempts have limited citations in national and international literature. Therefore the discussion has been drafted on the basis of theoretical discussions on the topic along with due emphasis on impact assessments of fisheries based micro-enterprises on livelihoods of fishers in previous studies.

Entrepreneurial orientation in rural areas is based on stimulating local entrepreneurial talent which would generate employment, earnings and economic value to households, region and economy as well. The Global Entrepreneurship Monitor Report in 2000 observes that about 70% of an area's economic performance is dependent upon how entrepreneurial the area's economy is. The enterprise options in fisheries sector are primarily oriented towards marketing of fresh fish both in export and domestic markets. The participation of women in fisheries is limited to marketing in domestic markets and in pre-processing and processing for export markets. Several studies on microfinance have recommended female entrepreneurs to tap the high-productivity activities (Kabeer, 2001; Lairap-Fonderson, 2002; Dessy and Ewoudou, 2006). The projects initiative of women empowerment initialised group mobilisation to start fish product based micro-enterprises. The transfer of technology to prepare value added products was done by way of training programmes for women groups conducted in the location (Moothakunnam in Ernakulam District in Kerala) introducing product variants like breaded and battered products, stuffed products and pickles using fish and oyster. Diversification of food products enhances price discrimination in the markets and can be adopted by women SHG groups in micro-enterprise mode contributing to self employment and livelihood support. This has eventually being boosted up by the domestic and export demand potential for value added products arising from the consumerist culture. There is an increasing tendency to switch over to assemble meals than preparing it from the basic ingredients (Sathiadhas and Hassan, 2000). Due to enhanced consumer preference in favour of value added products in export and domestic segments, entrepreneurial option of setting up of micro-enterprise manufacturing fish based value added products like pickles, dried items, breaded and battered products, fish cutlets, fish balls *etc* can prove successful. Any business enterprise can be evaluated in terms of its technical feasibility and economic viability. The technology of preparation of products can be easily adopted by groups as an extension of household culinary exercise and proper food safety measures to ensure quality assurance. For inculcating sense of food safety among the stakeholders, awareness campaigns projecting the importance of personal hygiene in food processing was also conducted. Manufacturing fish cutlets fetches profit of ₹37.43 kg^{-1} and ₹25.32 kg^{-1} for fish balls. Alternatively preparation of fish and prawn pickles can earn profit of ₹24.37 and ₹26.59 per bottle respectively. Due to limited shelf life of products like cutlets and fish balls, this is sold in nearby urban markets while pickles are distributed over a comparatively wide radius.

The criteria of NPV and IRR were used to compare alternative options of manufacturing cutlets and fish balls as well as fish and prawn pickles exclusively and on combined basis. This was based on some preset assumptions required for any financial analysis. It was found that manufacturing pickles exclusively is a viable option with an acceptable NPV of 87,725 and IRR of 36%. The most feasible option is manufacturing cutlets, fish balls and pickles on combined basis which fetches an NPV of 1, 44,814 and IRR of 57%. An NPV above zero is always acceptable since it indicates the ability to provide returns over and above the initial investment. When a choice has to be made between more than one investment options, it is better to go for an investment which provides a higher NPV. This criterion works in case of IRR also, that an investment opportunity yielding higher IRR is always better than one with a lower value. Hence option A, manufacturing cutlets and fish balls and pickles is the best entrepreneurial option. This analysis presents the most conservative estimates of preparing unit quantity of each item under consideration. Needless to say, this can be extended to preparation of additional quantities and tailoring to requirement of local markets. Besides, the wages to labour included in the cost, serves as an added income to the participating members.

Development of entrepreneurship can be stimulated through a set of supporting institutions, and through deliberate innovative action which stimulates changes and fully supports capable individuals or groups. Investigations show favourable financial returns for production of value-added fishery products in the micro-enterprise mode and indicate encouraging prospects. The DST funded project implemented by CIFT has successfully initiated women SHGs to form a microenterprise motivated by the training given to them as part of the project. Preparing value added products out of the locally available fish varieties was found as a feasible alternative from the results of financial analysis of different options of fish based products such as cutlets, fish balls and pickles either as standalone products or in combination. Further, training on food safety

measures have helped to maintain the quality of fish based products. There is a need for promotional efforts to introduce new and improved value-added fishery products through co-ordinated efforts between financial, marketing and fisheries institutions.

Acknowledgements

The authors are grateful to the Department of Science and Technology, New Delhi for the financial support to carry out the study. The authors are thankful to the Director, CIFT for providing facilities to carry out this work.

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Date of Receipt : 06.02.2012
Date of Acceptance : 07.11.2012