Prospects for Entrepreneurship Development in Integrated Farming Systems: Island Perspective

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Abstract

It is essential to diversify and adopt suitable technology based on integrated farming system principles to enhance the profitability of agriculture practised by small and marginal farmers. At the same time agribusiness offers large scope for value addition, packaging, retailing, and exports of agricultural products and agricultural input and marketing with advancement in technology and IT tools. Study of constraints and opportunities in island conditions showed considerable entrepreneur opportunities through different IFS models for lowlands and hilly uplands. The diversified products from rice and coconut based farming systems enables the entrepreneur to benefit from processing and value addition besides sale of unprocessed farm produce. This also greatly enhances the stability of the farm income and sustainability of agriculture.

Key words: diversified farming, resource use, business module, income

Introduction

The opening up of Indian economy to global market during early nineties due to globalization of trade and agriculture and the policy reforms at national level, the opportunities for entrepreneurship development in agricultural sector have significantly increased. Agribusiness has offered large scope for value addition, packaging, retailing, and exports of agricultural products and agricultural input and marketing with advancement in technology and IT tools (Verma *et al*., 2019). The micro financing, relaxations in government regulations, accessibility to advanced technology, guidance and workshops on agri and allied sectors have changed the outlook of highly skilled personnel opting for self employment in agriculture, thereby increasing the entrepreneurship prospective in India (Bairwa et al., 2014). Business opportunities are available in agricultural production, agro processing and value addition, agro produce manufacturing, agricultural marketing, agro-inputs manufacturing and marketing, agro service, agro tourism etc.

In recent years emphasis is given on the start-up economy. However, a very small proportion of start-ups focus on the agricultural sector, though it plays a pivotal role in the growth and development of the Indian economy and meet the food and nutrition requirements of growing billions and creates employment opportunities for more than 53% of rural population. The disclosed investment of about $65 million was made by agri start ups in Indian agriculture in 2018, which is a 21% increase from the previous year indicating the growing opportunities in this sector. Agripreneurship is a sustainable employment strategy that will ensure self-reliance and economic self-sufficiency to the entrepreneur (Uche and Familusi, 2018). The development of agricultural entrepreneurship refers to the promotion of entrepreneurial skills amongst common individuals and building the entrepreneurial approach in the field of agriculture (Uplaonkar and Biradar, 2015).

The emphasis on cereal production over the past three decades in most developing countries has resulted in low output prices and profitability for cereals and dampened agricultural growth. To reverse this trend, one of the opportunities identified in the agricultural strategies of donor agencies is agricultural diversification. Diversification is defined as a change in business activities based on the flexible and differentiated response to changing opportunities created by new production technology or markets signals. More specifically, it is defined as a change in product choice and input use decisions based on market forces and the principles of

profit maximization (Pingali 2004). At the farm level, diversification will represent a change in the underlying characteristics of the farm system such that farm practices and products are more aligned with the social, environmental, and economic contexts, as well as the constraints and opportunities that exist. The Integrated Farming System (IFS) provides a larger scope for diversification and entrepreneurship opportunities within broader scope of the sustainable development goals.

Integrated farming has been defined as the biologically IFS which: (1) integrates natural resources and regulation mechanisms into farming activities to achieve maximum replacement of off-farm inputs; (2) secures sustainable production of high quality food and other products through ecologically preferable technologies; (3) sustains farm income; (4) eliminates or reduces sources of present environment pollution generated by agriculture; and (5) sustains the multiple function of agriculture (IOBC, 1983). This section provides a glimpse of business opportunities in agriculture and allied sector in the Islands for entrepreneurship development in farming systems approach.

Methodology

Data collection

The basic data for this study was collected from two different approaches viz., farm household survey and field experiment. A farm household survey was carriedout by following stratified random sampling among the farm household in Andaman islands to collect information on farm details, inputs used, output, method of sale, income, constraint and socio-economic details. Information on integration of different farm enterprises and production of diversified products from IFS model for lowland / valley and hilly terrain was collected from the long-term ongoing field experiments on IFS under island condition. The data was compiled and economics were worked out for different IFS model and enterprises to project the entrepreneur opportunities for island condition.

Study area

The islands have 6% of geographical area under agriculture before 2004. However, 2004 Tsunami caused extensive damage to agriculture land affecting 8000ha, of which 42000 ha is permanently lost due to submergence. So at present only 4.8% of total geographical area is under agriculture. Farm diversification and landholding are considered as an important attribute of agricultural entrepreneurship as they can generally increase the net income, reduced dependence on agricultural subsidies and greater income stability (Clark, 2009). The total number of farm holdings is only 11954, having an average land holding of only 1.77 ha which is higher than national average of 1.17ha with majority of them are marginal (43%) holding having less than 1ha of land.

Rice is the main crop during wet season covering an area of 5390 ha, the area of which drastically reduced from 9000ha in 2006 due to impact of tsunami and other developmental activities especially in South Andaman region. Besides paddy common tropical vegetables are cultivated throughout the year both in wet and dry seasons. During Rabi pulses, oilseeds are also grown in the rice fallows. In Car Nicobar and Nancowry group of Islands the major land use are plantations, home gardens, natural forests and waste lands. In Great Nicobar rice and pulses are grown in coastal plains and plantations in upper slopes of hills. The North and Middle Andaman district forms the agricultural hub of the Islands, accounting for more than 50 of the agricultural production. The major crops grown in this region are food grains including rice, maize and pulses, sugarcane, fruits and vegetables and areca nut. The Nicobar region is dominated by plantation crops especially coconut, arecanut and cashew nut. The banana, pineapple, tapioca and sweet potato are grown in home gardens besides vegetables. The South Andaman district is contributing more to spices especially black pepper, clove and cinnamon mainly grown under intercropping with coconut.

Allied activities in agriculture always play a pivotal role in entrepreneurial growth and development (Chakraborty, 2014) and it has a major role in farm diversification and augmenting the income of the farmers. Differences were observed in major crops or farm animals across the island. Like crops, livestock population also varied across the district. The survey indicated the predominance of cattle, buffalo, goat population in NMA district, while

Nicobar is accounted for large population of pigs as it is an important component of tribal farming systems. The poultry especially commercial poultry is predominantly found in South Andaman because of its urban market. The kind of mixed farming is found in the islands. The crops include both seasonal and plantation crops, dairy, goat and backyard poultry are common in the rural areas of North and Middle Andaman and crops, dairy and poultry is common in the South Andaman district. Because of urbanization and increased demand from tourism sector the commercial poultry is well developed in the central zone. In Nicobar district, plantation crops (coconut) with pig and backyard poultry are the major components of farming system.

Results and discussion

Entrepreneurship opportunities

The structure of Island agriculture is undergoing transformation with the dominance of smallholders whose number has increased over time and will continue to do so in future. These farms need multienterprise farming activities that are complementary and technically compromising in the interest of the productivity of the whole farming system (Behera and France 2016). Small-size farmers can deal with issues such as under-employment and need for new jobs through entrepreneurship as opportunities exist for farmers to produce value-added agricultural products that are sold in local markets. Some of the entrepreneurial opportunities that are available in the islands are given in table 1.

Table1: Different entrepreneurship opportunities available in the Islands

District	Type of activities
Andaman Islands	• Post Harvest and Processing – Spices, coconut • Commercial Flower & Fruit Production – High value flower, fruits, vegetables – protected horticulture, vertical farming • Aromatic and Herbal Plantation- as intercrops in plantations • Dairy, Processing and Chilling • Goat farming • Broiler and Egg Production and Marketing • Carp Hatchery, crab fattening • Ornamental Fish • Agro tourism • Mushroom • Agro input marketing • Organic Farming • Mass Production of green manure seeds – *Sesbania*, sun hemp • Bio-Fertilizers Production and Marketing • Plant growth formulations – Panchakavya, bioconsortia • Vermicompost • Agro-based Industry – Coconut – virgin oil, coir industry, compost, charcoal making, handicrafts – coconut, shells, bamboo - Nicobar region
Nicobar Islands	• Major area under plantations – especially coconut • Have traditional knowledge and artisanal skill in making handicrafts from coconut shell, bamboo, pandanus leaves

These individual activities can be suitably integrated into a farming system model to diversify the agricultural production. The diversification of agricultural production system with interlinking of activities will helps in efficient resource recycling, reduce the cost of production and maximize overall farm production. It also helps in improvement in soil fertility, enhanced biodiversity conservation, imparts resilience to climatic risks and provides other environmental benefits.

Integrated Farming system for entrepreneurship development

The integrated farming system plays an important role in agricultural diversification besides improving the farm production which is found to be an alternative farm strategy for coastal plains and hilly uplands of Andaman Islands. The successful IFS models for providing entrepreneurship opportunities in the Islands are given in table 2.

Table 2: Suitable IFS models for different Physiographic locations of Andaman Island

Sl. No.	Physiography	IFS model
1	Coastal /valley plains	• Rice Based CS + Dairy/poultry + Fish • Rice Based CS- Mushroom • Vegetables (BBF) – fisheries – poultry • Vegetables – Fish (After Land modifications) • Mangroves- fish- mud crab fattening
2	Uplands (Hills)	• Coconut - fodder+ Dairy+ Goat + Fish – poultry • Coconut/ Areca nut - Spices - fodder + Livestock (goat/pig/dairy) • Coconut- fodder – dairy + organic inputs (compost/ panchkavya) • Arecanut – fodder + dairy/goat • Plantation based IFS can be converted into a agro tourism site

The establishment of farming system will be able to help the farmers for the efficient allocation of available resources in the farm and reduce the use of external inputs. With the aid of developed technology and the knowledge on the strength and are capabilities of farming system, it would be possible to provide entrepreneurial opportunities in the integrated farming systems approach. The integrated farming system plays an important role in agricultural diversification besides improving the farm production which is found to be an alternative farm strategy for coastal plains and hilly uplands of Andaman Islands (Fig. 1).

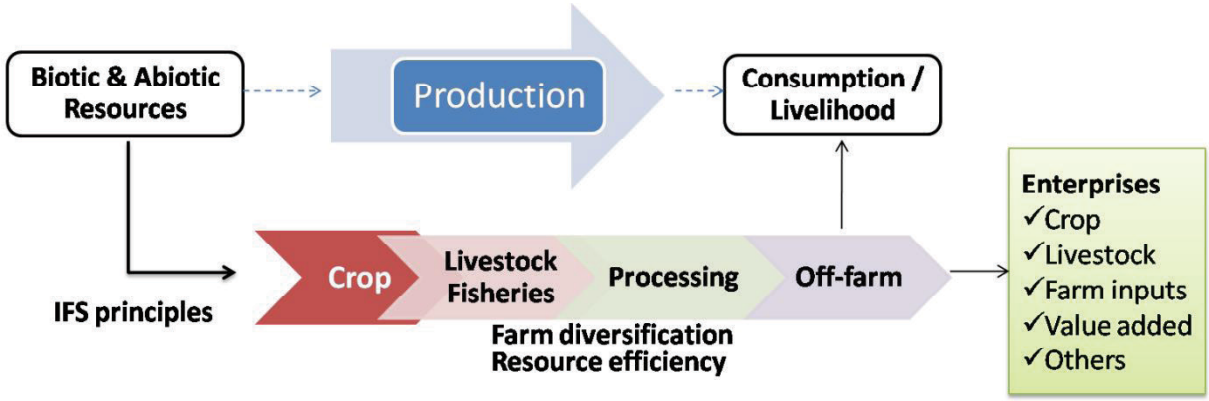

Fig 1: Role of IFS in providing entrepreneurs opportunity by diversification and resource efficiency

For the rice growing areas or lowland areas of Andaman Island a rice based farming system model was evaluated at Farmers field. In which cropping was undertaken in 0.90 ha and 0.036 ha was allocated for fishpond, poultry shed and cattle. In the IFS system a net return of Rs.1, 64,960/- was achieved as against Rs.57, 760/- from crop cultivation alone. Besides increase in farm production and productivity, it also generated employment to the tune of 239 man days year^{-1}(Ravisankar *et al*.2007).

Table 3: Production and employment opportunities in IFS

Components of IFS	Cost (Rs/ha)			Employment (Man days/ ha/year)	Farm production (MT/ha)
	Total Cost	Gross Return	Net Return		
Coastal and Valley plains					
Crop – dairy*	218500	426500	208000	352 (590/day)*	27.5
Crop – dairy-poultry-fish	99000	264900	164900	259 (636/day)	25.3
Hilly uplands					
Coconut-spices- pig-poultry cum fish	165300	394600	233300	207 (1127/day)	35.7
Areca nut + black pepper – coconut + fodder – livestock + poultry	157000	552000	394000	438 (900/day)	34.5

* per day net return or remuneration

An another IFS model involving crops + dairy based farming system in an area of 0.75ha with crops, vegetables, dairy and fishery recorded a net return of 2.08 lakhs with productivity of 27.5 MT and generation of employment 352 man days per year (Swarnam et al.). This could give a daily emolument of Rs.590 to Rs.1137 per day depending on the system which is much higher than the payment in other unorganised or services sector. Rice straw is the major farm waste mushroom cultivation can be integrated in the above systems as a subsidiary activity for further enhancing the farm income. In uplands coconut/arecanut with dairy/goat or poultry integrated into a system has greater potential for increasing farm income with less manpower or labour requirement than more intensive systems.

Constraints for entrepreneurial development in the Islands

Farming is a challenging livelihood option in India, especially in the Island region. Though agricultural and allied sector provides vast scope for entrepreneurial opportunities in the islands, they have to overcome many constraints to be successful entrepreneurs. It includes

1. Majority of the farmers are marginal and small holders and agriculture is largely a means of livelihood for them. The capital required for development of the farms into a business house is huge for them and organizations feel risk in making heavy investments and implementing modern technologies in agriculture which affect the profitability. Thus, resultant farmer members lose interest in their own enterprises.
2. Lack of hard work as the farmers want easy money without hard work. The present day youth is interested to work in service sectors (hotel, tourism, travels etc.) instead of working on their own farm even if they are underpaid.
3. Except few commodities most of the agricultural produce is imported from the mainland. This may affect the competitive advantage of the local produce and the farmers finally loss their interest.

4. The islands are scattered, remote and lack transportation facilities to reach out the market.

5. Lack of storage facilities and lack of capital for investment in agribusiness opportunities

Conclusions

Agri-entrepreneurship is need of the hour to make agriculture more attractive and profitable business enterprise for empowering the rural unemployed youth when other sector failed to provide employment opportunities. In the Islands agriculture and allied sector has good scope for entrepreneurship which can be harnessed by effective management of natural resources, agro inputs on the farm to meet the market demand. The constraints such as lack of financial capital, lack of hard work among farmers, non remunerative prices, lack of agro inputs, and market linkages has to be addressed for making agriculture as an avenue for business development. With proper training, formation of farmers producers organizations, increased government lending and development of infrastructural facilities for storage, promotion of farmers market and market intelligence by exploiting the IT tools will play a significant role in promoting entrepreneurship development in the Islands for growing household incomes. The good managerial skills and entrepreneurial expertise infuse with government measures would facilitate accomplishment of the growing needs of agri-business.

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