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Review Article

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Integrated Farming Systems; Current Status, Scope and Future Prospects under Indian Perspective

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A B S T R A C T

Small and marginal farmers are core to the Indian rural economy, constituting 86.2 percent to the farming community and possessing 47.3 percent of the total operational land. To handle the challenges to the labour oriented country like India, where farmers are even not able to earn their livelihood as they pay for all their inputs to the market for seeds, fertilizers, pesticides, energy, feed labour etc. The evolution and adoption of situation specific IFS module has enabled us to develop a framework for sustenance and economically feasible farming operation comparable to large sized single entrepreneur holdings. Under IFS an interrelated set of agri-entrepreneurs compatible to particular agri-ecological situation are tested and adopted so that the waste/ by product of an entrepreneur becomes resource for other, which reduces cost, improves production, enhances environmental quality, farm employment and farm income. After the trails conducted by AICRP on IFS, it has been found that the farm profitability may be increased from 3 to 5 times as compared to traditional farming. Multi-component farming is the way of efficient resource recycling within the system with increased economic profitability, production, sustainability and preserving environmental quality and maintaining biodiversity, helps for efficient utilization of natural resources and also may be potential tool to combat flood and drought.

Introduction

Agricultural systems are synthetic (man-made) systems embedded in the natural and social system. It is defined as assemblage of components which are united by some form of interactions and interdependence (Mc Connel and Dillon, 1997).

Indian economy is mostly agriculture oriented, small and marginal farmers are the core to the Indian rural economy constituting 86.2% of the total farming community and possessing only 47.3% of the total operational land (GOI, 2016). As per the latest information from agricultural census, the average size of operational holding has decreased from 2.28 hectares in 1970-71 to 1.84 hectares in 1980-81 to 1.41 hectares in 1995-96 to 1.08 hectares in 2015-16 (Fig 01). In the states of Bihar and Kerala, the operational size of land holding has been declined by three times during last decades whereas, in

Andhra Pradesh, Karnataka, Madhya Pradesh and Maharashtra it has been reduced by more than two times due to immense population explosion on the limited land resources (NABARD, 2014). The declining per capita land availability is serious threat to the sustainability, farm profitability and livelihood security of farmers and farming in the country (Siddeswaran *et al.,* 2012).

Globally 84% of the farmers are smaller than 2 ha and operate 52% of the farm land and 16% of world's farmers are larger than 2 ha but they represent and operate to the 48% of the world's farm land (Lowder *et al.,* 2016). In India, this situation is further worst where, 86% of farmers are smaller than 2.0 ha and handle only 47% of the farm land. Whereas, 14% of the country's farms are larger than 2.0 ha and operate 53% of the farm land. In India the per capita land availability has also decreased from 0.33 ha (1951) to 0.105 ha (2021) (Lal, 2016).

In India, due to ever increasing population and shrinking land resources there is hardly any scope for horizontal expansion of land for food production. Under the limited land resource situations of India, monocropping or single enterprize is never able to sustain small holder farmers. From the green revolution onward farmers are mostly concentrated on single enterprize based agricultural system that often lead to deterioration of soil health, higher risk of crop failure and a significant decline in productivity even after all managerial efforts (Rehman and Sarkar, 2012). Integrated farming system are less risky, benefit farmers through synergism among entrepreneurs, diversity in produce and maintain environmental soundness (Ravishankar *et al.,* 2007).

A System approach to handle any situation is need of hour for fulfilling the demand of ever increasing population without disturbing the ecological balance. Integrated farming system (IFS) seems to be the possible solution to the continuous increase of demand for food production, stability of income and nutritional security, particularly for small and marginal farmers with limited available resources.

The philosophy and vision behind shift from cropping system to farming system mode involves (i) In situ successful use of agriculture wastage generated on farm as input, (ii) decrease in cost of cultivation through enhanced input use efficiency, (iii) efficient use of by products of one entrepreneur to other entrepreneur (iv) improvement of soil, water and environmental quality and biodiversity, (v) enhanced water productivity, (vi) nutritional security and (vii) environmental sustainability by moderating continuous flow of green house gases from the soil to the environment. Integrated farming system is described as "A judicious combination of two or more than two agri-entrepreneurs using cardinal principles of minimal competition and maximum complementarity with advanced agronomic management tools aimed for sustainable and eco-friendly improvement of farm income, family nutrition and ecosystem services". A typical IFS prototype design involves generation of local societal specific modules based on availability of land, labour, market demand and capital available for the investment.

The vertical intensification of agricultural production system through diversification of agri-entrepreneurs is warranted need to achieve self sufficiency in cereals, pulses, milk, fruit, honey, egg, vegetables and meat for humans and feed, fodder for animals, without degradation of natural resource base and to achieve hospitable environment for all farmers and species of life on earth (Panwar *et al.,* 2019). Under the current scenario, intelligent management of available resources, including optimum allocation of resource, is important to alleviate the risk related to land sustainability. The ministry of Agriculture and Farmers Welfare, GOI has given major emphasis on adoption of situation specific integrated farming system modules for doubling farmers income, employment and uplifment in their socio-economical standard.

However, planning and implementation of IFS modules in our country lacks scientific and systemic approach. Hence proper understanding about interaction and linkage between the components of a

IFS module needs to be understood while designing a viable system for an agro ecological situation.

Challenges before traditional farming

Food insecurity and poverty are the major challenge before the developing countries of the world. Such problems are exacerbated by the sky rocketing food and fuel prices, global economic downturn, unstable market and climate change.

These problems are further multifold due to rise in cost of energy, depleting water resources, shrinking farm size, diversion of human capital from agri sector, soil degradation, imbalanced use of fertilizers, excessive pesticidal use and vulnerability to climate change (Paroda, 2012). Due to monsoon failures and small size of holdings they hardly get sufficient income to sustain their family (Kumar *et al.*, 2013).

In India crop + livestock are the predominant farming system since the time immemorial, around 84% of farm householders practice it. Although natural integration exist, but lacks much in needed recycling within the farm for reducing external dependence on market for resources. Under on-farm research components of the AICRP on Integrated Farming System to solved the problems of small resource poor farmers under diverse and risk prone environment. A holistic, resource availability based, client and situation oriented integrated approach, popularly known as IFS (Integrated Farming System) has been introduced.

Concept, components and goals of IFS

The basic concept of the Integrated Farming System is to let nothing as waste. It should be designed on the natural principles "An Organism or its waste is food for other organism "*Jeevahi Jeevashya Bhojanam*". The waste of an agri entrepreneur is misplaced resource which can become a resource/ input to other entrepreneur (Edward *et al.*, 1986). This approach is not only reliable way to efficient waste management but also a potential tool for achieving safe environment, substantial fertilizer economy, higher farm productivity and to drive higher employment and farm profitability through integration of various land based enterprises (Jayanthi *et al.*, 2003). The IFS module is designed after due understanding of interaction of agri entrepreneurs.

It may combine livestock, aquaculture, crop husbandry, poultry, sericulture, apiculture, piggery and agro-industry in an expanded symbiotic or synergetic system, so that the waste of one component becomes the input for other, with or without treatment to provide the means of production, such as nutrients, energy, feed for optimum production/ productivity at meager costs. The concepts associated by IFS is practiced by numerous farmers throughout the globe. A common characteristics of these systems is that they have a combination of crop and live stock enterprises and in some cases may include aquaculture and trees.

In India, crop + livestock are the predominant farming system and around 85% of farm households practice it since time immemorial. Although natural integration exist but it lacks much. There is need for further integration of entrepreneurs for within the entrepreneurs mutual benefits, minimal dependence on external markets and efficient resource utilization. Under on farm research components of the AICRP on Integrated Farming System, performance of existing farming system in 732 marginal households in 30 districts of the country in twenty states, clearly reveal that dairy is practiced by 86% of the farmers along with crop, followed by goat 24% and poultry 21% (Table:3).

The components of the farming system is designed by taking account of possibilities of risk minimization, improved recycling and utilization of onsite produced organic wastes, environmental quality upgradation, and conservation and sustenance of natural resources base. Under the IFS the components interact with each other in a manner that entrepreneurs are mutually supportive, interact eco-biologically in space and time.

Prototype integrated farming system module for various ecosystems of India

The Indian Council of Agricultural Research through its institution IIFSR (Indian Institute of Farming System Research) with its all Indian network programme on organic farming (AI-NPOF) have developed 60 prototype IFS modules including seven integrated organic farming system models involving state agricultural universities situated in 26 states and union territories. These models have the potential to enhance the income buy three to five times than existing system/ practices of farmers in a period of 3 to 4 years with the onetime capital investment ranging from ₹250000 to ₹500000/ ha on farm infrastructure (farm development, livestock sheds, purchase of animals, farm ponds, biogas, composting unit etc.) depending on the location and modules integrated (Panwar *et al.,* 2021).

Research Outcomes to the IFS

The preliminary research investigations under the IFS approach advocates the benefits of productivity improvements by 30-50% and more than double increase in employment generation over a traditional arable farming depending upon extent of integration of enterprises and level of their management. The integration is made in such a way that the byproduct/ waste of one component becomes input for other with a very high degree of complementary effect on each other (Lightfoot *et al.,* 1993).

Sheikh *et al.,* (2021) revealed that IFS is the main source to the livelihood security of 65% rural masses in the world. Integrated farming system being holistic approach, considers interaction among the different components of farming system. From the study conducted at Barabanki and Raibareilly in 2009-2012 on 42 farm families they found that 24 families followed rice-wheat-oilseed cropping system, reared cow buffalo (1-3Nos) and vegetables on the part of their lands. They also observed that some of the innovative farmers adopt SIFS (Specialized Integrated Farming System) practice rural poultry, off season vegetables and gladiolus cultivation for generation of their livelihood resource base. They further observed that the input cost in traditional farming system was almost constant while it decreased by 25 to 35% in subsequent years under IFS models. Thus, besides they observed total net return enhancement of four times as compared to traditional farming system. They concluded that integration of farm enterprises provide better livelihood in terms of enhanced food production, higher gross and net return, improved system/ farm productivity and also reduced the income imbalance between rural agricultural laboures and factory workers due to increased opportunities of the employment.

Goswami *et al.,* (2016) stated that the need to the sustainable agricultural advancements remain at the forefront of the global development practices with the small and marginal holder farmers, as a key to the improvements in food security, enhance nutrition and economic development as well.

Kumar *et al.,* (2012) studied different IFS models at Patna, Bihar and identified crop + fish + duck + goat as the best IFS model in terms of productivity and employment generation (752 man days/ year) due to better involvement of farm family laboures round the year.

Crop + livestock + fish + poultry farming system plays an important role in improving the soil physico-chemical and biological health and also increases the nutritional value of the soil in respect of farm production. This system facilitates best recycling of agri-wastes within the components making the entire production cost effective and environment sustaining (Kulkarni *et al.,* 2014)

Behra *et al.,* (2014) undertook a case study on small farms in eastern India with Crop + Livestock + Fishery + Agroforestry IFS module and reported that the total energy requirement involving the farming and house hold was 314.597 MJ and there was a net deficit of public energy by 62.743 MJ. This energy requirement can be met by renewable energy source by exploring biogas, solar panel and

windmill and the farm maybe more energy self-sufficient. The whole idea to produce modern form of energy at the farm itself was by linking various independent enterprises in order to bridge the energy deficit and future energy demands and offset emission.

Saxena *et al.,* (2003) revealed that inclusion of animal component in the system sets a positive link on sustainability by generating cash income, improving family nutrition and efficient recycling of crop residues and animal refuse into valuable nutrients source for crops. Integration of livestock with crops on watershed and on the individual holding basis has been observed and reported to improve the tradition farming from unjustified farming to ecologically justified sustainable farming (Dhiman *et al.,* 2003).

Patel *et al.,* (2020) reported that integrated farming system with cropping system along with other subsidiaries *i.e.* livestock, boundary plantation, seasonable vegetables, horticultural crops, vermin compost and farm pond is the most beneficial system which can augment the farm income of small and marginal farmers to improve their socioeconomic status with assured livelihood and nutritional security for long term in north Gujarat Agro-climatic Zone. Implementation of integrated farming system leads to sustainability and constancy in the farm income by varied income sources and due to efficient utilization of agri wastes/ byproducts as resource.

Kumar *et al.,* (2018) revealed that addition of organic residues in the farm of animal refuses and plant wastes help in improving soil physico-chemical and biological properties over a longer period of time with minimal environmental hazards and increased profit margin. IFS model comprised of crop components, dairy, poultry and fishery is the most suitable and efficient farming system module, giving the highest system productivity under irrigated agro system of the north eastern plan zone. However, they further recommended that Fishery + Poultry + Vegetable farming is potential IFS module to provide food and nutritional security, employability and profitability to resource poor small farmers of India's Central Himalayan regions.

Ramrao *et al.,* (2006) studied crop-livestock integrated farming system for the marginal farmers in the rainfed regions of Chhattisgarh in central India to find a sustainable mixed farming model which is economically viable integrating different components like crop, livestock, poultry and duck on 1.5 acre land holding. The module consisted of 2 bullocks + 1 cow + 1 buffalo + 10 goats + 10 Poultry + 10 ducks along with crops was the best in respect of net income of ₹93076 per year against sole arable farming of ₹35804 and generated employment of 316 man days /year.

Economic analysis of IFS modules

The economic analysis of different IFS modules adopted at different locations of the country on 1.0 hectare farm land, reveal that highest system cost (₹253000/ha), total working cost (₹122894/ha) was incurred with crop + dairy + poultry + goat/Sheep. Similarly, highest gross return (₹385700/ha), net return (₹262806/ha) as well as B:C ratio (2.13) was observed with crop + dairy + poultry + goat/Sheep system followed by crop + dairy + poultry + fishery. The net returns obtained with crop + dairy + poultry + goat/Sheep was 87.93 % higher over crop + dairy. Similarly B:C ratio with crop + dairy + poultry + goat/Sheep was 31.4 % higher over crop + dairy system (Table:5, Fig:4).

Goals of IFS modules

The basic goals of an integrating farming system modules are to:

To provide steady and stable round the year income and rejuvenation/ amelioration of the system productivity.

To establish agro-ecological equilibrium for reduction in population and incidence of biotic stresses through natural agro-entrepreneur

management and reduction in the use of agri-chemicals.

To achieve environmentally justified, sustainable and economically viable technology that encompasses rational and complementary utilization of available agro-resources of the region.

To conserve and enhance the natural resource base, protect the environment and enhance prosperity of farmers and also for their generations to come.

Advantages of IFS

As per NSSO (National Sample Survey Organization), 40% of the farmers want to quit agriculture and the young generation is no more interested in farming profession. The diversification in farming system mode of agriculture on small and marginal holdings can provide a proofing for predicted climate change related risk in agriculture. This can also be the only and potential tool for food and nutritional security and can generate the newer opportunities of employment, thus can prevent migration of laborers to the urban area, which is common problem of entire developing world (Singh, 2012).

Integrated farming system is a multidisciplinary whole farm approach to solve the problem of small and marginal farmers. The basic aim to the approach is to increase income, employment by integration of agri-components which may be adopted in the socio-economic condition of a locality. It also involves potential utilization of agriwastes and by product in a way that they become resource to other components of the system.

To eliminate the nutritional disorders, it is essential to strengthen the nutrition of the entire food chain as mineral nutrients and vitamins deficiencies are big concern in food being consumed. Horticultural, vegetable and plantation crops can provide 2 to 3 times more energy production than cereal crops and would also ensure nutrition and income from same piece of land (Gill *et al.,* 2009).

Some other advantages of integrated farming system are summarized below;

It helps in space utilization and increase overall productivity per unit area.

It provides diversified products. Thus most of the family demands are fulfilled by their own.

It also improves soil physico-chemical and biological properties and makes the soil suitable for all form of agricultural activities.

Reduces infestation of weed, insect pests and diseases due to adoption of scientific principles in the selection of crop rotations.

Renders nothing as wastes, as waste or by product of one entrepreneur becomes resource/ input for other.

It results on less reliance to outside input (fertilizers, pesticide, feeds, energy etc.). Thus reduces the overall cost at the farm.

Results to higher farm production and farm profit due to low cost of production.

Per unit area and resources, higher net returns are obtained.

It provides higher opportunities for employment round the year.

It provides diversified income source, guaranteeing a buffer against trade, stabilize market price, and also helps in reducing risk due to weather aberrations (Kumar *et al.*, 2015).

Table.1 Percent distribution of operational holdings under different farm size groups in India.

Sl. No.	Farm holding group	Percent of total no. of farm holdings
1.	Marginal (<1.0 ha)	68.45
2.	Small (1.0-2.0 ha)	17.62
3.	Semi-medium (2.0-4.0 ha)	9.55
4.	Medium (4.0-10.0 ha)	3.80
5.	Large (>10.0ha)	0.57

Source : Agriculture Census 2015-16

Table.2 Percent distribution of area operated under different land holding groups in India.

Sl. No.	Land holding group	Percent of area operated by group
1.	Marginal	24.03
2.	Small	22.91
3.	Semi-medium	23.84
4.	Medium	20.16
5.	Large	9.07

Source : Agriculture Census 2015-16

Table.3 Existence of farming components in the marginal households of India.

Component	Percent existence of component
Crop	100
Dairy	86
Goat	24
Poultry	21

Source: Gangwar *et al*., 2015

Fig.1 Percent distribution of number of operational holdings in India

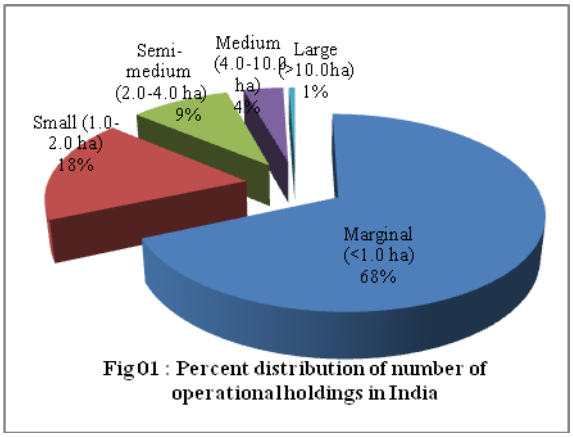


Fig 01 : Percent distribution of number of operational holdings in India

Table.4 Promising prototype IFS module for different agro ecosystem

Eco-System	Agro Ecological Region No (AER NO.)	Net farm income with existing system (₹/ha/year)	Promising prototype IFS component	Net income with IFS prototype (₹/ha/year)	Improvement in net income (number of times)	Reference location of prototype IFS model
Arid	2	87793	Cropping system, arid horticulture, buffalo, farm pond, boundary plantation	361416	4.1	S. K. Nagar (Gujarat)
Semi-arid	4,6,7,8,9	74254	Cropping system, horticulture, cow, buffalo, back yard poultry, goat/ sheep, fishery, mushroom, boundary plantation, farm pond	276396	3.7	Varanasi (U.P.) Siruguppa (Karnataka) Rajendranagar (Teleangana) Thanjavur (Tamilnadu)
Sub-humid	10,11,12, 13,14,15	66919	Cropping system, horticulture, cow, goat, poultry, duckery, fishery, , mushroom, biogas, boundary plantation, agro-forestry	246875	3.7	Jabalpur (M.P.) Raipur (Chhattisgarh) Ranchi (Jharkhand) Sabor (Bihar) Jammu (Jammu & Kashmir) Jorhat (Assam)
Humid	17,18,19, 20	57619	Cropping system, horticulture (cashew, coconut with pine apple, areca nut + banana), cow, pig, poultry, fishery, duckery, boundary plantation, land configuration based system	208134	3.6	Umiam (Meghalaya) Bhubaneswar (Odisha) Goa (Goa) Port Blair (Andaman & Nikobar Island)

*2 (Hot arid eco-region with desert and saline soils), 4 (Hot semi arid agro eco-region with coarse loamy alluvial soils), 6 (Hot semi arid-sub humid agro eco-region with alluvial and Tarai soil), 7 (Hot semi arid agro eco-region with moderately deep black soils), 8 (Hot semi arid agro eco-region with mixed red and black soils), 9 (Hot semi arid agro-eco-region with red loamy soils), 10 (Hot sub-humid agro eco-region with moderately deep black soil), 11 (Hot sub humid agro eco-region with red and yellow soils), 12 (Hot sub-humid agro eco-region with red lateritic soils), 13 (Hot sub-humid agro eco-region with alluvial soils), 14 (Warm sub-humid to humid with sub mountain shallow and skeletal soils), 15 (Hot sub-humid agro eco-region with loamy to clay alluvial soils), 17 (Warm per humid agro eco-region with shallow and skeletal red soils), 18 (Warm per humid agro-eco-region with red and yellow soils), 19 (Hot sub-humid coastal and deltaic alluvial soils) and 20 (Hot humid/ per-humid agro eco-region with red and lateritic and alluvial soils).

Fig.2 Percent of area operated under different farm holding groups in India

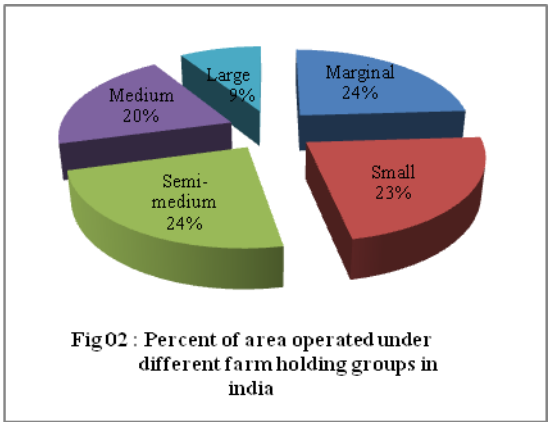


Fig 02 : Percent of area operated under different farm holding groups in india

Table.5 Partial budgeting of different agri enterprise combinations

Particulars	Cost of inputs and outputs under different IFS modules (₹)				Remarks
	Crop + Dairy	Crop + Dairy + Poultry	Crop + Dairy + Poultry+ Fishery	Crop + Dairy + Poultry + Goat/Sheep	
Development cost	162000	191000	207000	253000	System cost incurred to apply crop system on 1.0 ha area; two she calves 18 month's aged (₹ 16000); 150 chicks (₹25/chicks); fish pond 30 m × 15 m × 1 m can be dug with Govt. subsidy and 500 fingerlings of Rohu, Katla and Mrigal can be purchased @ ₹3.0/fingerlings and 10 goat kids @₹ 1500 per kid.
System cost (A)	16500	19000	20500	25000	
Added cost (B)					
Labour cost	4000	7000	9000	11000	
Veterinary cost	2500	3500	3800	4050	
Feed/ Fodder cost	41000	44500	50000	47000	
Miscellaneous cost (Transport, net, polythene etc.)	3500	5000	9000	8000	
Interest on total capital(@ 8% per annum)(C)	18360	21600	23944	27844	10 liter milk @ ₹35/liter can be sold for 245 days in a year. One calf can be sold in a year, fish can be harvested 5 times per year @ 250 kg/ harvest and sold @ ₹ 100/ kg in bulk. Poultry birds can be sold in 3 flocks of 125 birds of 2.0 kg average weight @ ₹ 120/ kg. Rice sold @ ₹ 2015/ qtl.
Total working cost (D)= (A+B+C)	85860	100600	116244	122894	
Added return					
Sale of rice(0.6 ha = 36 qtl)	71500	71500	71500	71500	
Sale of wheat(0.6 ha = 30 qtl)	60450	60450	60450	60450	
Sale of milk	85750	85750	85750	85750	
Sale of calves	8000	8000	8000	8000	
Sale of chicken	-	75000	75000	75000	
Sale of fish/ goat/ sheep	-	-	125000	85000	
Total added return	225700	300700	425700	385700	
Net return	139840	200100	309456	262806	
Output : Input ratio	2.62	2.98	3.66	3.13	
Benefit : cost ratio	1.62	1.98	2.66	2.13	

Note: Budgeting based on existing prices of inputs, output and services in the year 2021-2022.

Fig.3 Economics of different IFS modules

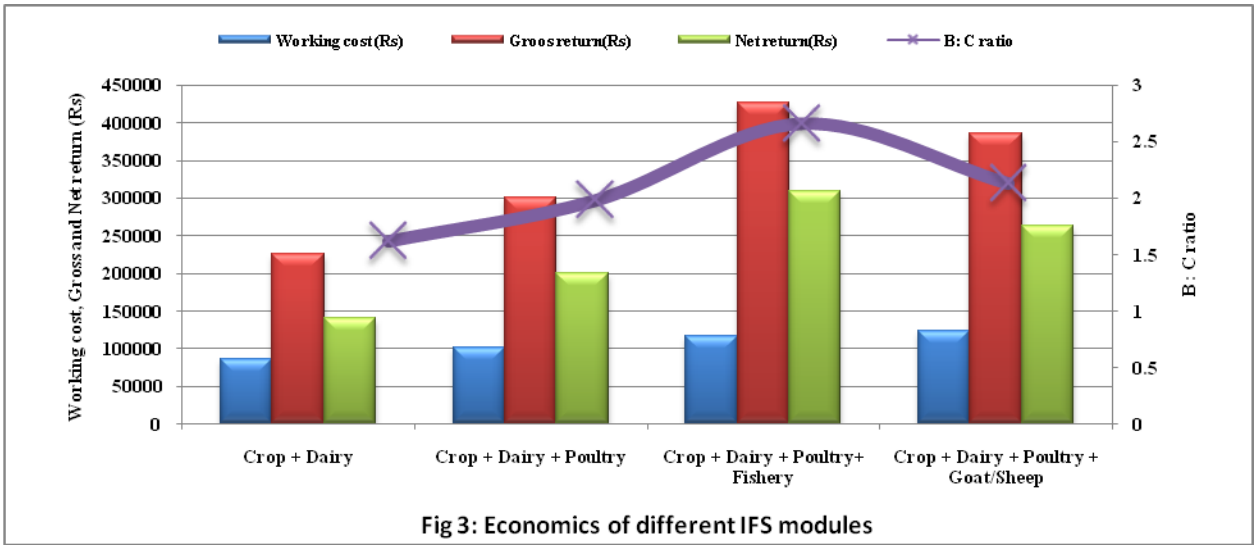
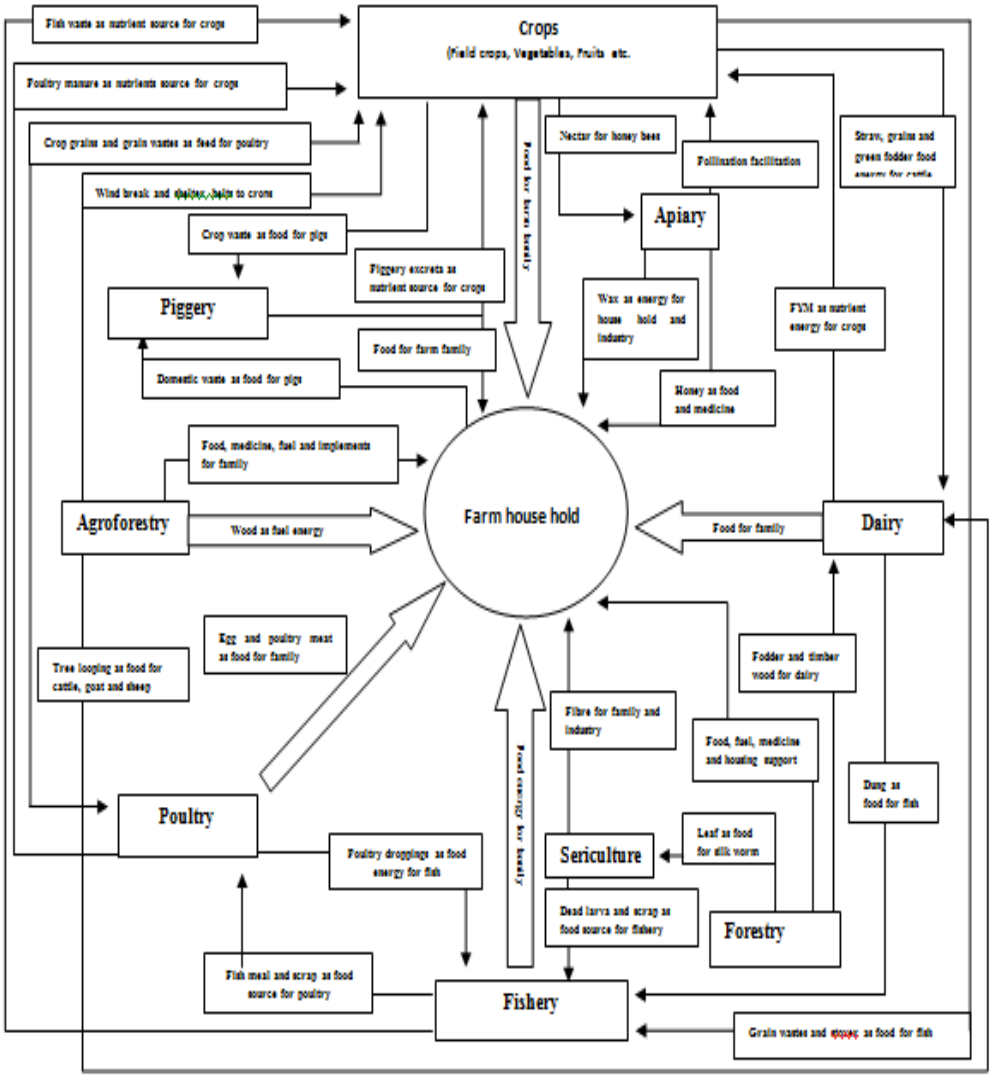


Fig 3: Economics of different IFS modules

Fig.4 Farming system components and their interrelated services



Scope of IFS in Indian perspectives

Integrated farming system model consist of varied range of efficient resource utilizing practices aimed to achieve acceptable profit and sustain production levels while minimizing the negative effect of intensive farming and preserving the environment (Lal and Miller 1990; Gupta *et al.*, 2012). IFS also incorporates sound management of farm resources to enhance the farm productivity and reduce the environmental degradation, improve the living standards of resource poor small and marginal farmers and maintain, resources, environment, food and nutritional sustainability and security (Kumar *et al.*, 2013). The IFS system imitates the nature's principles where not only crops, but varied types of plants, animals, birds, fish and other aquatic flora and fauna are utilized for production throughout the year (Kumar *et al.*, 2015). A combination of one or more enterprises with cropping, chosen carefully and executed efficiently gives greater dividends than a single enterprise especially for small and marginal farms.

Following factors should be duly considered while integration of agri components in a farming system module;

Soil and climatic factors of selected area.

Availability of land, capital, resources and labour in the locality.

Present level of utilization of the resources.

Economic feasibility, superiority of proposed farming system module over existing farm practice.

Managerial skill and attitude of the owner farmer.

Under Indian perspective, the adoption of integrated farming system has following scope

Farmers wish to improve his soil quality.

Dependence on scare water resources is minimized.

The dependence to external market for inputs may also be reduced.

The possibilities of all the farm of soil erosion may be reduced.

The possibilities of soil defect development may be reduced and the existing defects (salinity, alkalinity) may be overcomed.

Struggle for employment to the farm family is to greater extent reduced.

The IFS has prospect to maximize the farm profit with existing farm resources.

Is potential tools for nutritional security to the farm family as well as consumers of the agri-products.

Constraints in the adoption of IFS

Integrated farming system is knowledge and skill intensive practice, owing to integration of possible components of farming for improving livelihood in a sustainable and life enhancing way. Following difficulties are in general faced while adoption of a comprehensive integrated farming system module;

The IFS is a knowledge and skill intensive practice, thus the farmer has to be trained in handling of component enterprises.

The IFS module configuration requires higher initial cost, thus the government should provide financial support at cheaper rate of interest.

The IFS module requires a market skill among farmers to sale their produce at appropriate rate.

Before they start the IFS, prototype should be demonstrated to bring confidence among the farmers by establishing the model at block level.

The diversification of existing farming systems with change in crop(s) cropping system, addition and improvement of live stock component, inclusion of

horticulture, kitchen garden, primary and secondary processing are essential under current scenario for achieving/ sustaining life of small and marginal farmers. It has also been observed that IFS prototype may increase the farm production 2 to 3 times and may increase the net profit up to 3 to 5 times with improved system. Besides, it is also helpful in increasing employment opportunities upto 70-80%. The improved diversified system is also helpful in ensuring the nutritional security at farm level.

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