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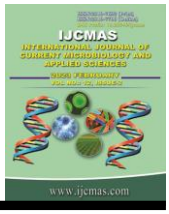

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Constraints Faced by the IFS Adopted Farmers in the State of Telangana, India

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A B S T R A C T

Population estimates for India range from 1370 million in 2030 to 1600 million in 2050. The average size of landholding in Telangana state has decreased slightly from 1.30 ha to 1.11 ha, from 2000 to 2016. Farming is unsustainable on such a small scale. There is a pressing need for an integrated farming system (IFS) approach in agriculture to produce not only human food (cereals, pulses, oilseeds, milk, fruit, fish, meat, etc.), but also animal feed, fodder, fuel, and fiber. The data was collected for the agriculture year 2021-22. Respondents were selected using a multi-stage random sampling method. The impact of integrated farming systems on livelihood security opined by adopted farmers showed increase in soil fertility, land productivity, waste recycling, net returns and decrease in cost of cultivation, incidence of pests and diseases etc., To examine the respondents' experiences with integrated farming systems, Garrett's ranking technique was used. First and foremost, the high price fluctuations (75) was the major constraint in crop production. To enhance the self-confidence and interest of farmers in rural areas, scientists should offer cluster-specific live demonstrations of the Integrated Farming System. This will help to attract and keep young people in agriculture to a larger extent.

Introduction

Population estimates for India range from 1370 million in 2030 to 1600 million in 2050. It was estimated that 289 and 349 mt of food grains, need to be produced during those times to meet the demand. As things stand, it looks like agricultural land in the country will continue to decline, and by 2030, more than 20 per cent of farmland will have been converted to non-agricultural uses (Gill *et al.*, 2009).

Due to population growth and division of land, Telangana State's total number of land holdings increased from 48.28 lakhs in 2005-06 to 59.48 lakhs in 2015-16 (https://www.telangana.gov.in/). The average size of landholding in the state has decreased slightly from 1.30 ha to 1.11 ha, from 2000 to 2016 (https://www.thehindu.com) as against all India average 1.16 ha. Farming is unsustainable on such a small scale. Although they play a crucial role in the states' food grain basket, the smallholder farmers who own less than 2 ha of land don't make

enough money to meet their own basic needs. There is a pressing need for an IFS approach in agriculture to produce not only human food (cereals, pulses, oil seeds, milk, fruit, fish, meat, etc.), but also animal feed, fodder, fuel, and fiber. The farming methods used to increase crop yields while taking care of optimal resource utilization are modified by the farming systems approach. Dairy, poultry, pig, fish, and sericulture are just a few examples of profitable agricultural enterprises. Finding the right balance between these and others that consider the local climate and farmers' financial situations is key to agricultural success.

However, a review of the relevant literature reveals a dearth of research into IFS's effects on the economies of small and marginal farmers. Present study fills that gap by illuminating the diversity of IFS models in use today and the ways in which they affect farmers' ability to make a living, thus allowing researchers and policymakers to develop more effective strategies for helping small holders' families prosper. Hence, the study carried with following objectives that include Impact of IFS on livelihood security opined by farmers, And to find out the constraints faced by the IFS adopted farmers in the Telangana state.

Materials and Methods

Data was gathered from both IFS adopters and Non-IFS adopters using pre-tested schedule, and it covered topics like the perception of IFS adopted farmers, and the challenges they face. The data was collected for the agriculture year 2021-22. Respondents were selected using a multi-stage random sampling method. A total of 540 farmers were used as a representative sample from the three zones of Telangana; two seventy of these farmers followed integrated farming systems, and the remaining were Non-IFS.

Garrett's ranking technique

To examine the respondents' experiences with integrated farming systems, Garrett's ranking technique was used. Participants were asked to rate how important a variety of factors that prevent widespread adoption of integrated farming methods. The following formula was used to convert these ranks into point values (Dhanavandan, 2016).

Per cent position = $100 * (R_{ij} - 0.5)/N_j$

Where, R_{ij} = Rank given for i^{th} factor (constraint) by j^{th} individual

Nj = Number of factors (constraints) ranked by j^{th} individual

Scores were calculated based on where the percentile fell using the table provided by Garrett and Woodworth (1969). After that, totalled everyone's responses on each factor and then split the total by how many people had their scores added. The factors with the greatest impact were determined by sorting the average scores across all of them from highest to lowest.

Results and Discussion

Impact of IFS on livelihood security opined by farmers from Telangana state

Table 1 displays the results of an assessment of the farmers' views on how various IFS modules had affected various facets of their livelihood security. 67.78 per cent of farmers thought that using IFS had increased soil fertility. A further 62.22 per cent of farmers reported an increase in land production after implementing IFS. 61.11 per cent of IFS farmers also said that they recycled more items on their farm as a result of using IFS. This occurred because outputs from certain enterprises were used as inputs in others. 83.33 per cent of farmers felt that IFS improved animal feed availability. Intriguingly, 92.22 per cent of respondents reported lower cultivation costs after implementing IFS. This was because of economies of scale and the effective use of resources across various parts of the IFS. The majority of IFS farmers (86.67%) believe that the greater profits are the result of a reduction in the

cost of cultivation. About 3.33 per cent of farmers had the opinion that IFS caused an increase in cultivation costs. This was because, for newly adopted IFS, the fixed cost was higher than the variable cost in the first year. An further 87.78 per cent of IFS farmers reported working on their farms year-round. That's right; IFS was responsible for creating year-round job openings. About 64.44 per cent of respondents thought that seasonal labour migration in pursuit of employment had decreased because all members of IFS farm families were involved in farm activities year-round. They also felt that they were more successful in their IFS farming endeavours because of the help and encouragement of their family members. An overwhelming majority of people (83.33%) agreed that their food security had improved. In addition, roughly 82.22 per cent of IFS farmers believe that their standard of living had increased as a result of implementing IFS. Approximately 85.56 per cent of farmers in the southern region of Telangana said that IFS reduced the need for pest and disease control. The centre and northern parts of Telangana also showed the same patterns. The findings corroborate those of research by Wader (2003) on the various livestock-based farming methods used in northern Karnataka.

Constraints faced by the IFS farmers in adoption

Constraints faced by IFS farmers in crop production

Given the farmers' views on the importance of hindering factors, it was crucial to pinpoint the most significant challenges they faced when trying to adopt IFS modules. As a result, a survey was conducted to collect data on farmers' opinions about the constraints they faced when trying to implement IFS modules.

Among the various constraints faced by the farmers in different crop cultivation in Telangana state divided into two parts production related constraints and marketing of the output related constraints. First and foremost, the extreme price fluctuations (75.07) under marketing constraints. As a result, it poses significant challenges for farmers. Most farmers were not paid a fair price for their produce, according to a study done by NABARD (NABARD NRMC Final Report, 2018-19). Due to the monopolistic practices of informal buyers/traders, farmers were unable to receive the minimum support price (MSP) for their agricultural produce. An additional factor could be that the price of farm produce fluctuated more widely in response to changes in market demand and in the quality of produce, resulting in lower income for farmers. Another major constraint was lack of availability of labour at right time (73.7) under production related constraints.Efficient integration of various enterprises in a farm involves high labour work, which was a major constraint since labour force in agriculture was depleting due to migration towards cities, and other rural employment programme opportunities. Hence it was highly difficult for the farmers to take the risk of maintaining three to four enterprises which requires high manpower and maintenance round the year. Due to enormous scarcity and high cost of labour (ranging from Rs. 500- Rs.600/day) in peak seasons had forced many of the farmers to opt only two enterprises viz., crop and dairy.

The findings match with the research results of Gopika (2018) and Shivaji (2014). Non availability of quality inputs in required quantity and at required time, with high cost was the major problem in integrating different farming systems. Lack of suitable farm implements and machineries, lack of custom hiring centres, lack of awareness about subsidies on farm inputs, infrastructural needs to take up dairying, poultry or aquaculture in the farms were the constraints with mean score value of 73.51 and 68.64. The results are in line with the findings of Gopika (2018) and Shivaji (2014).

Untimely payment for the produce was another major constraint with a mean score of 60.80. In Telangana, majority of the paddy farmers used to sell their produce to IKP (Indira Kranthi Pathakam) centres, these IKP centres send bills to rice mill and they will provide payment to the farmers, it takes

around one month to get returns from the produce. Lack of knowledge regarding pest attack, lack of resistant varieties for pest and diseases, low investment capacity, lack of exclusive markets, lack of storage facilities, natural calamities, lack of market information at right time, lack of knowledge on balanced use of fertiliser, lack of technical knowledge regarding crop harvest, lack of training facilities, transportation problem are the constraints from higher to lower priority which plays a vital role to affect the crop cultivation were listed in the table 2.

Constraints faced by farmers in livestock (cattle+goat) enterprise

Table 3 shows production constraints for livestock. Constraints on livestock production can be broken down into three basic categories. Various production, feeding, and marketing issues plagued the farming community. Lack of knowledge on veterinarian services was the significant challenge for livestock farmers.

Furthermore, it was discovered that public veterinary services are not easily accessible. Transportation costs will increase for every farmer who wants these services (whether to take their animals somewhere or get medical care). A further barrier identified for local farmers was the high price of concentrates. Murrah buffaloes, which are expensive to raise, were common among Telangana's farmers.

The daily cost of concentrate for each of these animals was ₹3,000. Farmers in Telangana state confront a number of challenges, including a lack of artificial insemination (AI) facilities, a shortage of green fodder and dry fodder, significant price fluctuations, a lack of organised marketing facility, a lack of improved breeds, a lack of financial support, a lack of information about balanced feeding, a lack of efficient transport and marketing facilities, a reduction in grazing acreage for animals, and a lack of awareness on state government initiatives. Multiple studies had reported parallel results (Gopika, 2018).

Constraints faced by IFS farmers in backyard poultry

Table 4 displays the challenges encountered by farmers raising backyard poultry. Lack of information about veterinary services (mean score of 65.93) and lack of awareness about diseases (mean score of 57.43) were the main challenges faced by the farmers. Poultry production also requires knowledge of numerous procedures, the absence of which will result in low output. This reflects a general ignorance on the side of farmers about the high-yielding indigenous breeds that are available to them. With a mean score of 57.22, seasonal demand was also another key limitation of backyard poultry.

Since poultry farmers' incomes hinged so much on seasonal demand, they often struggled during off-peak months. According to the farmers in the research region, the lack of a distinctive breed was another barrier, with a mean score of 55.70. This was because, in their opinion, better chicks varieties were either too expensive or unavailable at costs that were acceptable to them. The research of Ramya *et al.,* (2021) supports these results. With a mean score of 48.80, lack of sufficient transportation facilities was also a difficulty experienced by IFS ranchers in backyard poultry. The absence of veterinary and medical services was also a serious concern in backyard poultry, leading to a high incidence of disease; with mean score of 41.67. Lack of organised marketing facilities and lack of proper housing are other constraints faced by IFS farmers in backyard poultry.

Constraints faced by ifs farmers in horticulture

The horticultural difficulties experienced by farmers in the research area are outlined in Table 5. These limitations can be broken down into two categories: production-based and marketing-based. The productivity of sweet lemons in the southern zone of Telangana has dropped because of a shortage of high-yielding root stocks, which was identified as the most significant constraint under production-related constraints with a mean score of 71.37.

Table.1 Farmers perception about impact of IFS on livelihood security

Sl. No	Particulars	South zone		Central zone		North zone	
		No	Per cent	No	Per cent	No	Per cent
A	**Soil fertility**						
1	Increase-1	61	67.78	54	60.00	49	54.44
2	Decrease-2	0	0.00	0	0.00	0	0.00
3	No change-3	29	32.22	36	40.00	41	45.56
B	**Land Productivity**						
1	Increase-1	56	62.22	48	53.33	68	75.56
2	Decrease-2	0	0.00	0	0.00	0	0.00
3	No change-3	34	37.78	42	46.67	22	24.44
C	**Recycling of waste materials**						
1	Increase-1	55	61.11	46	51.11	52	57.78
2	Decrease-2	0	0.00	0	0.00	0	0.00
3	No change-3	35	38.89	44	48.89	38	42.22
D	**Fodder availability**						
1	Increase-1	75	83.33	42	46.67	60	66.67
2	Decrease-2	9	10.00	28	31.11	15	16.67
3	No change-3	6	6.67	20	22.22	15	16.67
E	**Cost of cultivation**						
1	Increase-1	3	3.33	6	6.67	10	11.11
2	Decrease-2	83	92.22	52	57.78	65	72.22
3	No change-3	4	4.44	32	35.56	15	16.67
F	**Net return**						
1	Increase-1	78	86.67	52	57.78	65	72.22
2	Decrease-2	0	0.00	6	0.00	10	0.00
3	No change-3	12	13.33	32	35.56	15	16.67
G	**Employment generation**						
1	Increase-1	79	87.78	65	72.22	85	94.44
2	Decrease-2	0	0.00	0	0.00	0	0.00
3	No change-3	11	1.22	35	3.89	5	0.56
H	Seasonal migration						
1	Increase-1	0	0.00	0	0.00	0	0.00
2	Decrease-2	58	64.44	84	93.33	70	77.78
3	No change-3	32	35.56	6	6.67	10	11.11
I	**Balance of food**						
1	Increase-1	75	83.33	69	76.67	56	62.22
2	Decrease-2	0	0.00	0	0.00	0	0.00
3	No change-3	15	16.67	31	34.44	34	37.78

J	**Standard of living**						
1	Increase-1	74	82.22	90	100.00	82	91.11
2	Decrease-2	0	0.00	0	0.00	0	0.00
3	No change-3	16	17.78	0	0.00	8	8.89
K	**Pest and disease control**						
1	Increase-1	0	0.00	0	0.00	0	0.00
2	Decrease-2	77	85.56	88	97.78	69	76.67
3	No change-3	13	14.44	2	2.22	21	23.33

Table.2 Constraints faced by IFS farmers in crop production

Sl. No	Constraints	Garett Score	Mean Score	Rank	Overall rank
A	**Production**				
1	High cost of inputs	19847	73.51	II	**III**
2	Natural calamities	10765	39.87	VII	**XI**
3	Low investment capacity	13477	49.91	VI	**VIII**
4	Lack of knowledge regarding Pest attack	14015	51.91	IV	**VI**
5	Lack of availability of labor at right time	19898	73.70	I	**II**
6	Lack of machineries subsidy	18533	68.64	III	**IV**
7	Lack of resistant varieties for pest and diseases	13710	50.78	V	**VII**
8	Lack of training facilities	7599	28.14	X	**XV**
9	Lack of knowledge on balance use of fertilizer	10515	38.94	VIII	**XIII**
10	Lack of technical knowledge regarding crop harvest	7409	27.44	IX	**XIV**
B	**Marketing constraints**				
1	High price fluctuations	20270	75.07	I	**I**
2	Lack of storage facilities	11475	42.50	IV	**X**
3	Transportation problem	6210	23.00	VI	**XVI**
4	Lack of exclusive markets	12861	47.63	III	**IX**
5	Lack of market information at right time	10724	39.72	V	**XII**
6	Untimely payment for the produce	16416	60.80	II	**V**

Table.3 Constraints faced by IFS farmers in livestock enterprise

Sl. No	Constraints	Garett Score	Mean Score	Rank	Overall rank
A	**Production**				
1	Lack of knowledge about animal health and veterinary services	19382	71.79	I	I
2	Lack of awareness about AI	16678	61.77	II	III
3	Lack of improved breeds	12035	44.57	III	VII
4	Lack of financial support	11100	41.11	IV	VIII
5	Lack of awareness on state gvt schemes	8575	31.76	V	XII
B	**Feeding**				
1	High cost of concentrate	17285	64.02	I	II
2	Lack of green fodder and dry fodder	16775	62.13	II	IV
3	Reduced grazing land for animals	9360	34.67	IV	XI
4	Inadequate knowledge about balanced feeding	11120	41.19	III	IX
C	**Marketing**				
1	High price fluctuations	15140	56.07	I	V
2	Lack of organized marketing facility	14940	55.33	II	VI
3	lack of efficient transport and marketing facilities	10690	39.59	III	X

Table.4 Constraints faced by IFS farmers in backyard poultry

Sl. No	Constraints	Garett Score	Mean Score	Rank	Overall rank
A	**Production**				
1	Lack of knowledge about diseases	15505	57.43	II	**II**
2	Non-descript breed	15040	55.70	III	**IV**
3	Lack of knowledge about veterinary services	17800	65.93	I	**I**
4	High incidence of diseases	11250	41.67	IV	**VI**
5	Lack of proper housing	8175	30.28	V	**VIII**
B	Marketing				
1	Seasonal demand	15450	57.22	I	**III**
2	Lack of transportation facilities	13175	48.80	II	**V**
3	Lack of organized marketing facilities	12145	44.98	III	**VII**

Table.5 Constraints faced by IFS farmers in horticulture

Sl. No	Constraints	Garett Score	Mean Score	Rank	Overall rank
A	**Production**				
1	Lack of high yielding root stock	19270	71.37	I	**I**
2	Lack of availability of labor	16155	59.83	II	**II**
3	Incidence of pest and diseases	13995	51.83	III	**V**
4	Lack of knowledge about HYV	9080	33.63	V	**IX**
5	Difficulty in diagnosing pest and diseases	9270	34.33	IV	**VIII**
B	Marketing				
1	Lack of proper transportation facilities	15395	57.02	II	**IV**
2	Markets are distinctly located	15732	58.27	I	**III**
3	Lack of market information	12948	47.96	III	**VI**
4	Lack of storage facilities	11045	40.91	IV	**VII**

With a mean score of 59.83, lack of labour availability was another constraint faced by farmers in the research area. Given the perishable nature of fruits and vegetables, the high expense of transporting them from the field to the market as a result of their dispersed locations was rated as the most significant marketing-related barrier (mean score: 58.27). Another aspect pulling the mean score in marketing was the absence of adequate transportation facilities (57.02). Another factor limiting farmers' revenue in the research area was the incidence of pests and diseases. Low productivity in sweet lemon cultivation can be attributed to several problems, including the presence of several diseases. The marketing of sweet lemons was hindered by a lack of market intelligence and a shortage of storage capacity. In accordance with these results, the survey found that the vast majority of farmers preferred to have processing facilities located close to residential areas. Another limitation in Telangana was the difficulty in identifying pests and diseases, as well as the lack of knowledge about high-yielding varieties.

In conclusion, the paper was tried to document the impact of IFS on livelihood security opened by farmers, and the constraints faced by IFS farmers who had been adopted. In order to overcome these constraints, the State Agriculture Department should establish efficient marketing infrastructure at the village level and train farmers in the grading and packaging of horticulture crops in order to prevent middlemen's interference and marketing stress. Panchayat-level regulated milk procurement systems should be implemented to ensure remunerative prices and subsidies via efficient cooperative systems. Farmers who live close to fruit orchards or who are marginal farmers can incorporate mushroom and apiary cultivation into their established agriculture practices. To enhance the self-confidence and interest of farmers in rural areas, scientists should offer cluster-specific live demonstrations of the Integrated Farming System. This will help to attract and keep young people in agriculture to a larger extent.

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