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Gender Roles in Integrated Farming System- A Study of Meghalaya, India

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ABSTRACT

The study was an attempt to know the involvement of male and female in integrated farming system in the North – East state of Meghalaya. Integrated Farming System is inter – related whole farm approach and very helpful in solving various problems of small and marginal farmers. The objectives are to increase income and employment opportunity for small-holding farmers by integrating various farm enterprises and recycling crop residues within the farm itself. The farmers need to be assured of regular income for living at least above poverty line. The study was conducted in West Garo Hills and South Garo Hills district of Meghalaya. Total 20 numbers of respondents were taken and their socio-economic characteristics were studied. Data were collected through interview method. Finding revealed that most of the respondents were belonged to the age group of 30-40 years with (40%), (55%) of Garo farmers studied up to primary (up to class 4) and 80% of the respondents were female and 20% of the respondents were male. It has been found that the farmers have followed at least three different components of integrated farming system such as fishery, agricultural crops and poultry farming.

Key words Integrated farming system, Fish farming, Agricultural crops, Poultry farming.

INTRODUCTION

Agriculture is the main occupation in India. Integrated farming system offers significant opportunities for maintaining and extending of biodiversity. Integrated farming system is that enterprises which are mutually supportive and depend on each other. Generally Integrated Farming System includes more than two enterprises having a strong inter relationship between the enterprises for production and consumption purposes. Here in this system the waste from one component is as an input for another component. Integrated Farming System is a multidis-ciplinary whole farm system that helps in solving many different problems. This may also generate more employment for the family members throughout the year (Kumar *et al*. 2015). Integrated Farming System plays a vital role for increasing the profit and production to meet the nutritional requirement with food security and with less investment (Sasikala *et al*. 2015). It also help reduce poverty and malnutrition and strengthen environmental sustainability (Walia

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and Kaur 2013). Woman's played a significant role in agricultural development and in other allied field activities. The participation of women varies greatly from region to region.

The major components of Farming System in North Eastern Region are crops, livestock, poultry and horticultural crops. Not only these but other components like aquaculture, mushroom cultivation and apiculture are also included. The farmers of Meghalaya earn income from various sources like dairy, poultry, crops cultivation, livestock (goat, pig, cattle and sheep) and fisheries. Integrated farming system enhances the productivity of crop yield, it provides an opportunity to increase economic yield and also to help the potentiality of production base for a long period of time. Integrated farming system helps in saving energy by reducing dependency on fossil energy source within short time. It also helps researchers and scientist in adopting new technologies as the resource farmers fully utilize the technology. By adopting the linkage of dairy, mushroom, sericulture helps the small and marginal farmers to flow money all-round the year. Integrated farming system provides scope to use inputs in various components for greater efficiency.

Like other region of the country, Meghalaya farmers have started integrated farming but very few of them have started as earlier were most of the farmers were involved in shifting cultivation. Realizing the benefits of the integrated farming system are practising it with settled agriculture farming.

Studies have shown that, in Meghalaya, the farm women are engaged in different operation of shifting cultivation, agricultural husbandry and fishery. The farmers of Meghalaya are mainly dependent on forest resources for their livelihood. Shifting cultivation and mixed farming system are prevalent in Meghalaya. The farm men and women are engaged in different farming activities. Some of the farming systems in Meghalaya are traditional farming system, marginally modern farming system, semi-modern farming system and modern farming system. The important crops of Meghalaya are cashew nuts, areca nuts, paddy and maize (Marak *et al.* 2015).

Women are also involved in production as well as processing of agriculture and horticultural crops, animal and aqua – cultural products. In production of field crops, rural women are employed in clod breaking, picking/ removal of stubble, sorting of seeds, seed treatment and sowing/ planting, raising of nursery for paddy, uprooting, washing carrying and transplanting, compost making, application of manure/fertilizer and top dressing, weeding, hoeing, gap filling, surveillance of insect pests and diseases, bird scarring, irrigation, harvesting, threshing and marketing. Animal husbandry and dairying are jobs mainly done by women and children among poorer peasant and agricultural workers' families. Women are employed in those operations which are manually operated or are least mechanized (Das and Lahiri, 2013).

Many women in developing countries are occupied in agriculture and other allied activities. Women play a vital role in agricultural development and allied fields including in the main crop production, livestock production, horticulture, post-harvest operations, agro/ social forestry, fisheries. The involvement of women varies widely among different ecological sub-zones, farming systems and stages in the family cycle. Woman contributes more to agricultural production and has been acknowledged. Recognition of their important role in agriculture should not obscure the fact that farm women continue to be concerned with their primary functions as wives, mothers and homemakers. While men went out hunting in search of food, women started gathering seeds from the native flora and began cultivating those of interest from the point of view of food, feed, fodder, fiber and fuel (Lal and Khurana 2011).

Integrated farming system manages gender issues also, as it involves both the male and female farmers and both the counterparts are equal contributor in various activities of the different farming system. In each farming system, some male dominated and female dominated activities are there to perform (Paul *et al*. 2015).

Objective of the study

1. To study the socio economic status of the respondents.

2. To study the role played by the respondents in different farming activities.

3. To study the involvement of men and women in different activities of each enterprise of Integrated Farming System.

MATERIALS AND METHODS

The study was conducted in West Garo Hills and South Garo Hills districts of Meghalaya. Garo Hills was a location purposively selected for the research study as the study mainly focus on Garo farm women practicing Integrated Farming System which is one of the livelihood farming system. Considering the above points West Garo Hills and South Garo Hills District of Meghalaya was selected for the purpose. This study was carried out in exploratory type of research design. Altogether twenty numbers of respondents were taken for study from both the district. The respondents were following at least three components of integrated farming system. Information was collected from the KVKs, line departments; Government Programs, Non-Governmental Organizations regarding different models of Integrated Farming System. Activities of different components of IFS were enlisted by consulting experts. Data related to roles of men and women in different Integrated Farming System models and also constraints faced by women were collected. For the purpose, semi-structured pre tested, interview schedule was used. Information was collected through interview method. In addition, Focus Group Discussion was held before the collection of individual information. Appropriate statistical techniques were used for analyzing the data.

RESULTS AND DISCUSSION

The age of the respondents was recorded by asking the respondent what their age was at the time of interview. The Table 1.1 revealed that most of the respondents were belonged to the age group of 30–40 years with (40%) followed by 41–50 years age group with (30%) and only 20% of the respondents were in 51–60 years age group. Thus, it can be concluded that highest percentage belonged to age group (30–40 years) and lowest percentage belonged to age group (51–60).

Educational status of Garo farm men and women helps in gaining more knowledge and decision-making process. Table 1.2 clearly indicates that (55%) of Garo farmers studied up to primary (up to class 4), (15%) up to middle school (5-8 class) followed by 25% up to high school (class 9 and 10). Only 5 per cent of farmers studied up to graduation level.

The distribution of gender helps to know the involvement of male and female in all the farming activities and decision-making process. Table 1.3 revealed that (80%) of the respondents were women followed by 20% of the respondents were male.

Distribution of socio economic characteristics of the respondents

Table 1. 1. Distribution of respondents according to their age n=20.

Sl. No.	Age (years)	Frequency	Percentage (%)
1	30-40	8	40%
2	41-50	6	30%
3	51-60	4	20%
	Total	20	100%

Table 1. 2. Distribution of respondents according to their educational qualification n=20.

Sl. No.	Educational qualification	Frequency	Percentage (%)
1	Primary	11	55%
2	Middle school	3	15%
3	High school	5	25%
4	Graduation	1	5%
	Total	20	100%

Table 1. 3. Distribution of respondents according to their gender n=20.

Sl. No.	Gender	Frequency	Percentage (%)
1	Male	4	20%
2	Female	16	80%
Total		20	100%

Role played by the respondents in different farming system:

a) **Role played in different activities of fish farming**

Fish farming is also known as aquaculture. There are different roles and activities played in fish farming. The roles played in different activities of fish farming are enlisted and briefly describe in below. Pond preparation is the first and basic step in fish farming. It is important to prepare a pond in a proper way; without a proper construction it is not possible to start any fish farming. In the case of pond preparation process, good management practices are the basic solution for obtaining better fish yield. The farmers of Garo Hills have chosen a sustainable method to make pond preparation more suitable for environment friendly fish farming technique.

The activity of fertilization can greatly increase the production of fish. Here the farmers who followed integrated farming system used the waste products from piggery, poultry, duckery, as fertilizer in fish farming. Liming plays a crucial role in fish farming as lime regulates the pH of water and mud. The farmers of Garo Hills apply lime when the color of the water changes as when the color changes it indicates that there is imbalance of water pH. Like all animals' fish also requires food to supply energy for their movement. Mostly the Garo farmers planted banana tree, litchi, areca nuts, mango, near the pond, but most of the time bananas leaves were used to feed the fish as they are easily available.

Herein stocking of culturable species the farmers were selected some of the culturable fish and fast-growing fish seed into pond for growing.

In case of water quality maintenance, the farmers used to drain water ones in 2 or 3 years. Here in aquatic weed and predator control, the weed grown were eaten by the fish but excess amount of weed which were not be able to eat by the fish were removed by the farmers manually. During harvesting the farmers used net for catching the fish and the activity of marketing of the fish were done by both male and female. While record keeping, the farmers maintained a record book and noted all the necessary information in details for future use.

The technical information was collected from group discussion, consultation by experts and secondary source. Keeping that in view the information collected for each activity.

b) Role played in different activities of agricultural crops

Agricultural crops farming is one of the components in integrated farming system. The farmers of Meghalaya used to grow paddy mostly for consumption purpose only. Maize and wheat are planted rarely or not at all by the farmers. The involvement of men and women in different activities of agricultural crops varies greatly.

The different activities of agricultural crops include seed selection- before starting the plantation of crops the healthy seeds to be planted were selected by the farmers. This is the first and most important step for better yielding of the crops. Nursery bed preparation- after the process of selection of seeds was done, the farmers used to carry out the nursery bed preparation. During nursery bed preparation the farmers prepared a proper water supply system and efficient drainage system, removed all the unwanted particles like grass and other small stone particles. The farmers dig the soil very well so that there are no lumps and the ground were raised level properly. Soil solarisation -soil solarization is an environmentally friendly method of using the sun's power to control pests such as bacteria, insects and weeds in the soil. Here the farmers of Garo hills covered the soil with a transparent polythene cover to trap solar energy. Seed soaking and seed treatment – the farmers soaked seed in gunny bag in dark room or into the pond for 24 hours for sprouting. Sowing of seeds–after soaking of the seeds the farmers sow the seeds.

Tillage (ploughing) and incorporation of weed biomass – the farmers of Garo hills has practice tillage system to control weed.

Harrowing / patella – the activity of harrowing has been practiced by the farmers to smooth the surface of the soil and also removed weeds and cover seed after sowing.

Layout and formation of irrigation channels and bunds – the farmers construct small channels along

the fields and the slope to carry water between the crop rows. Manuring – generally the farmers of Garo hills applied manures from the residues of piggery, cow dung, poultry, duckery.

Transplanting–the crops that are grown in the protected environment were transplanted by the farmers to reach the proper points of maturity and to minimize weed. Inter – culture operation- the farmers replanted the crops to reach the proper maturity. Weeding – transplanting of the crop has been carried out by the farmers to minimize weed. Spraying and dusting / insect management / disease management – the farmers has practiced the activity of spraying and dusting to control insect and disease when necessary. Irrigation – irrigation is one of the important activities carried out by the farmers to control the amount of water of the field. Harvesting and threshing - the farmers had done the process to harvesting and threshing when the crops were matured by using sickle or by machine to gather grains.

Winnowing –winnowing is the process of removing the grains from lighter particles of chaff, dirt. The famers carried out this activity by throwing the mixture into the air so that the wind blows away the lighter chaff and the heavier grains fall back down for recovery. The farmers even used a shaped basket shaken to raise the chaff.Grading – the farmer separates the quality grains and spread on the ground manually.

Packaging and storage – after the grains were fully dried the farmers of Garo hills packed in a gunny bag and stored in a dark room. Transportation and marketing– in case of transportation and marketing, the farmers exchange with other household necessary items among themselves and due to poor transportation system they stored for their consumption purpose and hardly sell on market. Information was collection from secondary sources and expert's advice through group discussion on the above activities.

c) Role played in different activities of poultry farming

Poultry farming is the most common components among the components of integrated farming system. It includes duck, chicken, geese and they give meet and eggs as food. The different activities involve in poultry farming are : Housing – housing is the first and important activity carried out by the farm workers before purchasing the birds. Feeding – here the farm workers free the birds' to eats in their surrounding and sometimes they give grains to eat, water was kept in a container and change every morning and evening.

Egg collection – the eggs were collected every morning by the farmers.

Egg Candling – the farmers used the methods of candling eggs before brooding.

Hatching and brooding – the hens were kept separated from other birds during brooding.

The vaccinations of the chicks were done when necessary by consulting a veterinarian.

The farm workers isolate of the sick birds from the other birds and consulted a veterinarian.

Cleaning and disinfection of the poultry shed were carried out 3 to 4 times in a week.

Cleaning of the farm premises was done by the worker every 3 to 4 times in a week.

The provision of water and feed were kept separate from the other birds during natural brooding. Marketing (Purchase/Selling) of poultry/Egg/poultry liter were done at the village itself and sometimes to the market.

As of records keeping, before collection of data discussion were held with the farmers, farm women, animal scientists and information were collected from secondary sources. Basing on those information questions were included in the interview schedules.

The involvement of male and female in each farming system like in fishery, agricultural crop and poultry farming of integrated farming system has listed as follow :

Table 2.1. Distribution of respondents according to the involvement in fish farming : n=10.

Sl. No.	Activities	Involvement: Male only f	%	Female only f	%	Both f	%	None of them f	%
1	Pond preparation and maintenance	8	80%	0	0%	2	20%	0	0%
2	Fertilization	7	70%	1	10%	2	20%	0	0%
3	Liming	0	0%	0	0%	0	0%	10	100%
4	Feeding	0	0%	5	50%	5	50%	0	0%
5	Stocking of culturable species	0	0%	1	10%	9	90%	0	0%
6	Water quality maintenance	6	60%	0	0%	4	40%	0	0%
7	Aquatic weed and predator control	0	0%	1	10%	6	60%	3	30%
8	Harvesting and marketing	3	30%	6	60%	1	10%	0	0%
9	Record keeping	0	0%	1	10%	9	90%	0	0%

The data in Table 2.1 shows the involvement of respondents in fish farming. There are various activities which have been performed by male, female, both and none of them. In fish farming the percentage share of work done by male respondents in pond preparation and maintenance was 80%, fertilization was 70%, water quality maintenance was 60% and harvesting and marketing was 30%.

The maximum involvement of both respondents were in the activities such as stocking of culturable species and record keeping with 90% followed by aquatic weed and predator control and harvesting and marketing with 60% each, feeding with 50%, water quality maintenance with 40% and pond preparation and maintenance with 20%. None of them were involved in liming activities with 100%.

The data presented in Table 2.2 showed the maximum percentage share of work done by male respondents in seed selection 75% and only 25% of the respondents were female, while the minimum percentages share of involvement by the male respondents were in transplanting and marketing each. The highest percentage of involvement by female respondents in harvesting with 87.5% followed by winnowing with 50% while manuring and weeding with 25% each.

The maximum percentage share of involvement by both the respondents were in transplanting and marketing with 87.5% each followed by weeding with 75% while 50% each in nursery bed preparation and packaging and storage whereas the minimum percentage share of involvement were in harrowing with 25% followed by spraying and dusting / insect management / disease management with 37.5% only. None of them were involved in activities like soil solarization, harrowing, spraying and dusting/ insect management / disease management with 37.5% each respectively.

The data in Table 2.3 showed the involvement of respondents in poultry farming. There are various activities which have performed by male, female, both and none of them. In poultry farming the maximum percentage share of activities or work done by male respondents were in isolations of the sick birds and consulting veterinarian 78.57%, housing with 71.42 % followed by egg collection, egg candling, vaccination of the chicks, marketing and record keeping with 50% each, minimum involvement of activities were in feeding with only 21.42 %. The highest percentage share involvement by female respondents were in cleaning of the farm premises with 28.75% followed by cleaning and disinfection of the poultry shed and provision of water and feed during natural brooding with 14.28% each.

Table 2.2. Distribution of respondents according to involvement in agricultural crops : n=8.

Sl. No.	Activities	Involvement: Male only f	%	Female only f	%	Both f	%	None of them f	%
1	Seed selection	6	75%	0	0%	2	25%	0	0%
2	Nursery bed preparation	3	37.5%	0	0%	5	62.5%	0	0%
3	Soil solarization	5	62.5%	0	0%	0	0%	3	37.5%
4	Seed soaking and seed treatment	4	50%	0	0%	4	50%	0	0%
5	Sowing of seeds	4	50%	0	0%	4	50%	0	0%
6	Tillage (ploughing) and incorporation of weed biomass	8	100%	0	0%	0	0%	0	0%
7	Harrowing / patella	3	37.5%	0	0%	2	25%	3	37.5%
8	Layout and formation of irrigation channels and bunds	4	50%	0	0%	4	50%	0	0%
9	Manuring	2	25%	2	25%	4	50%	0	0%
10	Transplanting	1	12.5%	0	0%	7	87.5%	0	0%
11	Inter – culture operation								
12	Weeding	0	0%	2	25%	6	75%	0	0%
	Spraying and dusting / insect management / disease management	2	25%	0	0%	3	37.5%	3	37.5%
13	Irrigation	4	50%	0	0%	4	50%	0	0%
14	Harvesting	0	0%	7	87.5%	1	12.5%	0	0%
15	Threshing	4	50%	0	0%	4	50%	0	0%
16	Winnowing	0	0%	4	50%	4	50%	0	0%
17	Grading	4	50%	0	0%	4	50%	0	0%
18	Packaging and storage	3	37.5%	0	0%	5	62.5%	0	0%
19	Transportation	3	37.5%	0	0%	5	62.5%	0	0%
20	Marketing	1	12.5%	0	0%	7	87.5%	0	0%

Table 2. 3. Distribution of respondents according to involvement in poultry farming : n=14.

Sl. No.	Activities	Involvement: Male only f	%	Female only f	%	Both f	%	None of them f	%
1.	Housing	10	71.42%	4	28.75%	0	0%	0	0%
2.	Feeding	3	21.42%	11	78.57%	0	0%	0	0%
3.	Egg collection	7	50%	7	50%	0	0%	0	0%
4.	Egg candling	7	50%	7	50%		0%		0%
5.	Hatching and brooding	4	28.75%	10	71.42%	0	0%	0	0%
6.	Vaccination of the chicks	7	50%	7	50%	0	0%	0	0%
7.	Isolations of the sick birds and consulting veterinarian	11	78.57%	3	21.42%	0	0%	0	0%
8.	Cleaning and disinfection of the poultry shed	4	28.75%	8	57.14%	2	14.28%	0	0%
9.	Cleaning of the farm premises	5	35.71%	5	35.71%	4	28.75%	0	0%
10.	Provision of water and feed during natural brooding	5	35.71%	7	50%	2	14.28%	0	0%
11.	Marketing (Purchase/ Selling) of poultry/								

Table 2. 3. Continued.

Sl. No.	Activities	Involvement: Male only f	Male only %	Female only f	Female only %	Both f	Both %	None of them f	None of them %
	Egg/poultry litter	7	50%	7	50%	0	0%	0	0%
12.	Record keeping	7	50%	7	50%	0	0%	0	0%

CONCLUSION

In the conclusion, it is found that female respondents were higher than the male respondents. It has been noticed that in the fish farming system most of the important activities were coming from both respondents that is from male and female respondents except in pond preparation it was performed by male. In agriculture the major activities like seed selection, soil solarization and ploughing were performed by male and other activities like irrigation, application of fertilizer and manures were performed by both male and female respondents. In poultry farming also there were major contribution coming from both male and female except in pond preparation and application of fertilizer which were performed by male respondents. Based on the study there was a need to strengthen the hands of farmers by providing the latest information, their needs of resources and technical knowledge on various components of integrated farming system so that the small and marginal farmers could get profit, better production, increase food security and employment opportunities to improve their standard of living.

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