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Adoption of Indigenous Paddy Cultivation Practices among Tribal Farm Women of West Garo Hills District of Meghalaya

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ABSTRACT

The study was conducted in West Garo Hills District of Meghalaya and with the objective to determine the extent of adoption of indigenous paddy cultivation practices by the tribal farm women. Proportionate random sampling was used in selection of 120 respondents in the selected blocks. Indigenous practices having rationality for adoption of paddy cultivation practices were collected and the data is analyzed with percentage analysis. The findings on the socio-economic profile showed that majority of the respondents were old aged and illiterates, practiced farming as their occupation, had low level of annual income and social participation, had medium level of farming experience, extension agency contact, mass media exposure, livestock possession, cosmopoliteness, innovativeness and risk orientation and belonged to high level of fatalism. The findings on adoption revealed that majority of the respondents had adopted soil water conservation practice followed by irrigation, weed control management, nursery management, pest management and main field preparation.

Keywords: Adoption, Indigenous farm practices, Farm women, Meghalaya

INDIGENOUS knowledge is the knowledge of indigenous people inhabiting in different geographical region of the world with their own language, culture, tradition, belief, folklore, rites and rituals Chhetry and Belbahri, 2009).

According to 2011 Census, about 87.00 per cent of the rural women in India are employed in agricultural sector. The role of participation of women was found to be 58.30 per cent in marginal farms (Saikia 1985). However, despite their major contributions, they do not get due recognition.

Through the long path from primitive agriculture, tribal farm women in particular have developed a number of farming techniques through their own age old experiments by trial and error in an attempt to overcome numerous problems faced during the farming operations. This knowledge is based on many generations of insight gained through close interaction within the natural and physical micro-environments.

Agriculture is the main occupation of the people of Meghalaya. About 83 per cent of the total population of state depends on agriculture for their livelihood. The state offers scope for cultivation of a wide variety of agricultural crops because of highly diversified topography, altitude and climate condition. It is one of the most potential zones for eco-friendly agriculture. In the field of agriculture, Meghalaya is one of the states in India, where indigenous knowledge is extensively used for the cultivation of crops. West Garo Hills is one such districts of Meghalaya where immense use of indigenous knowledge is widely seen in agricultural and allied activities.

Today many indigenous knowledge systems are at risk of becoming extinct because of rapidly changing natural environments and fast pacing economic, political and cultural changes on a global scale. Practices vanish as they become appropriate for new challenges or because they adapt too slowly. Keeping this in view, an attempt has been made to find out the extent of adoption of indigenous paddy cultivation among tribal farm women in West Garo Hills District of Meghalaya.

METHODOLOGY

West Garo Hills District in Meghalaya was selected for the study considering the availability of number of

tribal agriculture families wherein most of the women are following the indigenous practices. Data were collected from 120 tribal farm women selected based on simple random sampling method. To understand the socio-personal background of the respondents, fifteen independent variables *viz.,* age, educational status, occupational status, annual income, farm size, farming experience, social participation, extension agency contact, mass media exposure, livestock possession, cosmopoliteness, fatalism, innovativeness, risk orientation and scientific orientation were selected based on judges opinion. Further, they were quantified by adopting suitable scoring procedure. Percentage analysis was employed for the study and the results obtained were tabulated and appropriate inferences were drawn.

RESULTS AND DISCUSSION

Socio-personal profile of the respondents

The findings on socio-personal profile of the respondents are presented in Table 1.

TABLE 1

Socio-personal profile of the respondents

(n=120)

Sl. No.	Socio-personal profile	% of Respondents
1	2	3
1.	Age	
	Young	15.00
	Middle	26.70
	Old	58.30
2.	Educational status	
	Illiterate	31.66
	Primary school level	29.16
	Secondary school level	19.14
	Higher secondary level	13.34
	Collegiate level	6.70
3.	Occupational status	
	Agriculture as primary occupation	96.70
	Agriculture as secondary occupation	3.30
4.	Annual income	
	Low	58.30
	Medium	20.00
	High	21.70
5.	Farm size	
	Marginal farmers	38.30
	Small farmers	31.70
	Big farmers	30.00
6.	Farming experience	
	Low	22.50
	Medium	44.20
	High	33.30
7.	Social participation	
	Low	46.70
	Medium	33.30
	High	20.00
8.	Extension agency contact	
	Low	75.00
	Medium	15.00
	High	10.00
9.	Mass media exposure	
	Low	68.40
	Medium	18.30
	High	13.30
10.	Livestock possession	
	Low	13.30
	Medium	68.40
	High	18.30
11.	Cosmopoliteness	
	Low	25.00
	Medium	44.17
	High	30.83
12.	Fatalism	
	Low	7.50
	Medium	9.20
	High	83.30
13.	Innovativeness	
	Low	13.30
	Medium	56.70
	High	30.00
14.	Risk orientation	
	Low	36.70
	Medium	50.00
	High	13.30
15.	Scientific orientation	
	Low	25.00
	Medium	48.30
	High	26.70

The data in Table 1 showed that majority of the respondents were old aged (58.30 per cent) and about one-third of the respondents were illiterates (31.66 per cent), most of the respondents practiced farming as their occupation (96.70 per cent) and nearly three-fifth of the respondents had low annual income (58.30 per cent). About two-fifth of the respondents possessed marginal farms (38.30 per cent). As many of the farm holdings were traditionally owned and due to property partition, it would have resulted in marginal to small farmer categories. The reported findings on farm size derive support from the findings of Satarji (2011).

More than two-fifth (44.20 per cent) of the respondents had medium level of farming experience while 46.70 per cent of the respondents belonged to low level of social participation. Similar finding on farming experience was reported by Guna (2013), while similar finding on social participation was reported by Swantantra Kumar (2016). A greater number of respondents (75.00 per cent) had low level of extension agency contact, while more than two-third of the respondents had low level of mass media exposure (68.40 per cent). Lesser awareness about the extension agents and irregular visits of extension officials in the study area may be attributed as the reasons for existing low to medium levels of extension agency contact among the respondents. The finding on mass media exposure derives support from the findings of Ruchi and Singh (2014).

More than two-third of the respondents possessed medium level of livestock possession (68.40 per cent). More than two-fifth of the respondents fell under medium level of cosmopoliteness (44.17 per cent). Most of the respondents (83.30 per cent) belonged to high level of fatalism, while medium level of innovativeness was observed among majority of the respondents (56.70 per cent). High level of fatalism may be due to the fact that farm women are still have traditional beliefs which would have motivated them to adopt the indigenous practices to a greater extent. Exactly half the proportion of the respondents fell under medium level of risk orientation, while a little less than fifty percent of the respondents belonged to medium level of scientific orientation (48.30 per cent). Similar finding on livestock management was reported by Nishi *et al.* (2011).

In order to have an in depth idea about the adoption of practices, practicewise adoption of indigenous paddy cultivation practices were analysed and the results are presented in Table 2.

TABLE 2

Practicewise adoption of indigenous paddy cultivation practices

(n=120)

Indigenous practices	Adopted		Not adopted	
	Number	Per cent	Number	Per cent
1	2	3	4	5
I **Selection of Variety and Seed Treatment**				
1 Selection of indigenous variety	95	79.17	25	20.83
2 Broadcasting of paddy seeds with ash	65	54.17	55	45.83
3 Soaking seeds for 24 hours in water and covering with gunny bag until they sprout	120	100.00	-	-
4 Soaking paddy seeds for 24 hours in a vessel covered with paddy straw and bamboo leaves for early sprouting	43	35.83	77	64.17
Mean Percentage	**-**	**67.29**	**-**	**32.71**
II **Nursery Management**				
1 Place with higher elevation is selected for raising paddy nursery for better germination	85	70.83	35	29.17

1		2	3	4	5
2	Burning of farm waste and trash on the nursery beds to sterilize the nursery bed	90	75.00	30	25.00
3	Dusting ash on the germinated paddy nursery before occurrence of heavy rains to prevent toppling of seedlings	92	76.67	28	23.33
4	Clipping off the tip of rice seedlings before transplanting to destroy the eggs of stem borer	85	70.83	35	29.17
	Mean Percentage	**-**	**73.33**	**-**	**26.67**
III	**Main Field Preparation**				
1	Summer ploughing	120	100.00	_	_
2	Leveling the surface of field by moving soil with bamboo made in a shape of ladder	62	51.67	58	48.33
3	Incorporation of crop residue in the soil to improve soil fertility	75	62.50	45	37.50
	Mean Percentage	**-**	**71.39**	**-**	**28.61**
IV	**Manures and Manuring**				
1	Removing turf clods from the sides of the irrigation channel to enhance fertility of soil	45	37.50	75	62.50
2	Incorporating leaves of trees as a manure	81	67.50	39	32.50
3	Cattle penning	120	100	-	-
	Mean Percentage	**-**	**68.34**	**-**	**31.66**
V	**Weed Control Method**				
1	Sieving rice seeds before sowing to control weeds	120	100.00	-	2
2	Incorporating weeded weeds before flowering stage in the soil	75	62.50	45	37.50
	Mean Percentage	**-**	**81.25**	**-**	**18.75**
VI	**Pest Management**				
	Insect Pest Management				
1	Draining water from rice field and keeping dry for 3-4 days	120	100.00	-	-
2	Pumelo (*Citrus grandis*) is used for controlling insect pests	75	62.50	45	37.50
3	Keeping dead crabs on the bamboo stick which acts as a insect repellant	73	60.83	47	39.17
4	Dusting of ash to control fungal diseases	75	62.50	45	37.50
5	Using stingy bugs against caseworm	66	55.00	54	45.00
6	Keeping neem leaf branches in the rice field	80	66.67	40	33.33
7	Spraying neem oil for controlling leaf blight, rust and bacterial diseases	42	35.00	78	65.00
8	Placing gunnies filled with neem cake in the irrigation channel to control stem borer and gall flies	120	100.00	-	-
9	Burning discarded cycle tyre which produce odour and smoke that controls gundhi bugs	55	45.83	65	54.17
	Mean Percentage	**-**	**65.37**	**-**	**34.63**

1	2	3	4	5
Non-insect Pest Management				
Rodents				
1 Covering rat holes with mud	100	83.33	20	16.67
2 Keeping bamboo traps at the entrance of the rat hole	95	79.17	25	20.83
3 Tying polythene sheets and papers on bamboo stick to scare away the rodents	100	83.33	20	16.67
4 Fumigating burrows for controlling rats	90	75.00	30	25.00
Birds				
5. Tying polythene sheets to scare away birds	120	100.00	-	-
6 Keeping puppet dolls to scare away birds	75	62.50	45	37.50
Mean Percentage	**-**	**80.56**	**-**	**19.44**
Overall Mean Percentage	**-**	**72.97**	**-**	**27.03**
VII **Soil Water Conservation**				
1 Deep ploughing	120	100.00	-	-
2 Ploughing after every showering season to conserve moisture	120	100.00	-	-
3 Use of green leaf manure	88	73.33	32	26.67
Mean Percentage	**-**	**91.11**	**-**	**8.89**
VIII **Irrigation**				
1 Irrigating from the channels when the well completely dries up	100	83.33	20	16.67
IX **Post Harvest Practices**				
1 Storing harvested grains in store room called 'Jam" by making a barrier with bamboo	100	83.33	20	16.67
2 Storing paddy seeds with ipomea (*Carnea fistulosa*) leaves	25	20.83	95	79.17
3 Storing food grains in the big drums made of clay added with cow dung	30	25.00	90	75.00
4 Storing paddy in large mud pot with paddy straw for a longer period	72	60.00	48	40.00
Mean Percentage	-	47.30	-	52.70
5 Incorporation of crop residue in the soil to improve soil fertility	75	62.50	45	37.50
Mean Percentage	**-**	**71.39**	**-**	**28.61**

Selection of variety and seed treatment

It is observed from the Table 2 that cent per cent of the respondents had adopted soaking paddy seeds for 24 hours in water and covered with gunny bag, followed by selection of indigenous paddy variety (79.17 per cent), broadcasting paddy seeds with ash (54.17 per cent) and soaking paddy seeds for 24 hours in a vessel covered with paddy straw and bamboo leaves (35.83 per cent). Soaking of paddy seeds for 24 hours in a vessel covered with paddy straw and bamboo leaves for early sprouting were not adopted by most of the respondents due to the complex nature of the practice. Similar finding was reported by Ram *et al.* (2015).

Nursery management

A little more than three- fourth of the respondents had dusted ash on the germinated paddy nursery to prevent toppling of seedlings (76.67 per cent), followed by burning farm waste and trash on the nursery beds to

sterilize it (75.00 per cent), selecting place with higher elevation for raising paddy nursery for better germination and clipping off the tip of rice seedlings to destroy the eggs of stem borer (70.83 per cent under each).

The practice of clipping off the tip of rice seedlings before transplanting to destroy the eggs of stem borer was found to be effective in controlling the pest in its dormant stage and hence majority of them might have adopted it. Similar finding on clipping off the tip of rice seedlings is reported by Narasimhan (2014).

Main field preparation

It is observed from Table 2 that cent per cent of the respondents followed summer ploughing. This was followed by incorporating crop residue in the soil (62.50 per cent) and leveling the surface field with bamboo made in ladder shape (51.67 per cent). All of them might have adopted summer ploughing as the practice was perceived to be effective and easy method for pulverizing and retaining the moisture in the soil. Similar finding on summer ploughing is reported by Sathish (2015).

Manures and manuring

Cent per cent of the respondents had adopted cattle penning followed by incorporating leaves of the trees (67.50 per cent) and removed turf clods from the sides of the channel to enhance fertility (37.50 per cent). Cattle penning and incorporating leaves of trees are traditional practices which enhanced soil fertility without additional cost. The findings on cattle penning is in line with the findings of Badgujjar (2012).

Weed control method

Cent per cent of the respondents had sieved rice seeds before sowing followed by *insitu* ploughing in the main field (62.50 per cent).The respondents expressed that incorporating weeds before flowering stage improved the soil fertility. Hence, majority of the respondents might have adopted this practice. Similar finding on incorporating weeded weeds into the soil reported by Valeria Lakra *et al.* (2010).

Pest Management

Insect pest management

It is observed that cent per cent of the respondents had drained water from rice field and kept dry for 3-4 days and placed gunnies filled with neem cake in the irrigation channel to control stem borer and gall flies, kept neem leaf branches in the field to control insect (66.67 per cent), dusted ash to control fungal diseases and used pumelo to control insect pests (62.50 per cent), kept dead crabs on the bamboo stick to repel insects (60.83 per cent), used stingy bugs against caseworm (55.00 per cent), burnt discarded tyre to produce odour and smoke to controls Gundhi bugs (45.83 per cent) and sprayed neem oil for controlling leaf blight, rust and bacterial diseases.

The given data revealed that cent per cent of the respondents adopted draining water from rice field and keeping dry for 3-4 days. They believed that draining water washed away the dormant insect eggs in the field which will hatch during the growth of crop. Similar finding on draining water from rice field is reported by Patidar (2013).

Non-insect pest management

It is also clear from the data in Table 2 that cent per cent of the respondents tied polythene sheets to scare away birds. Majority of them might have tied polythene sheets to scare away birds as it was perceived to be an easy and effective method. Similar finding on tying polythene sheets is reported by Bihari *et al.* (2012).

Soil water conservation

The data in Table revealed that cent per cent of the farm women had adopted deep ploughing after every showering (100.00%) followed by application of green leaf manure (73.33 per cent). Deep ploughing is believed to be a common and widely adopted practice. Hence, all the respondents might have adopted this practice.Similar findings on deep ploughing is reported by Ram *et al.* (2015). It is observed that 73.33 per cent of the respondents had adopted green leaf manure due to easy availability of the material.

Irrigation

It is observed that 83.33 per cent of the respondents had used channel irrigation water when there was shortage of rain water. Further, the data revealed that more than eighty per cent of the respondents (83.33 per cent) had adopted irrigating from the channels when the well water completely dries up. This practice is followed by majority of the respondents due to easy maintenance of water during the dry season.

Post harvest

It could be noticed that most of the respondents had adopted the practices *viz.,* storing harvested grains in store room called 'jam', making a barrier with bamboo (83.33 per cent), followed by storing paddy in large mud pot with paddy straw for a longer period (60.00 per cent) and storing food grains in big drums made of clay added with cow dung (25.00 per cent) and storing paddy seeds with ipomea leaves (20.83 per cent). Majority of the farm women adopted storing paddy in large mud pot with paddy straw for a longer period to enhance the good condition of storage for longer period. Similar finding on Storing grains with drums was reported by Neerja Sharma *et al.* (2014).

Within the tribal population, women traditionally have greater responsibility both in the domestic and farm sectors, which drives them to interact more with the surroundings. Women's knowledge has been the mainstay of the indigenous paddy cultivation. Majority of the respondents were old age (58.30 per cent) and were illiterates (31.66 per cent) practiced farming as their occupation (96.70 per cent) had low annual income (58.30 per cent) possessed marginal farms (38.30 per cent), had medium level of farming experience (44.20 per cent), had low level of social participation (46.70 per cent). A good number of the respondents (75.00 per cent) had low level of extension agency contact, mass media exposure low level (68.40 per cent), livestock possession medium level (68.40 per cent), medium level of cosmopoliteness (44.17 per cent), high level of fatalism (83.30 per cent), medium level of innovativeness (56.70 per cent), medium level of risk orientation (50.00 per cent) and medium level of scientific orientation (48.30 per cent).

Adoption of indigenous paddy cultivation practices results in eco-f+riendly environment and it is necessary to make promotional efforts for the preservation and spread of these practices.

Further, the study revealed that majority of the respondents had adopted the indigenous practices under paddy cultivation to a greater extent. This shows the conviction of farm women in the adoption of indigenous practices. Therefore, extension workers should identify and include them in the technology transmission process for sustainable agricultural practices.

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