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Role performance of Indian tribal women in agro bio-diversity conservation

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ABSTRACT

The role of women in tribal communities is substantial and crucial. They constitute about half the total population but in tribal society women are more important than in other social groups, because they work harder and the family economy and management depends on them. Awais *et al.* (2009). This study was designed to investigate the role performance of tribal women of the Nilgiris district in farm management. A sample of 180 tribal women was taken as respondents for the study. The results suggest that the Irula tribal women performed roles like cultivating traditional crop varieties (4.30), preservation of forest produce (4.30), livestock maintenance (4.30) and cultivating medicinal plants (4.17) for example Coleus aromaticus, Spilanthus calva, Solanum nigrum, Eclipta prostrate, Withania somnifera. Their high level of role performance in activities like nutrient management for the crops (4.30), utilization of locally available resources (4.30), using farm yard manure (4.17) and watershed management (4.00) were found out.

INTRODUCTION

The term "indigenous" peoples or population is used in various senses. It should be mentioned that there is a fundamental epistemological and political sociological difference in the choice of the appendage "people" or population". Williams (2005). The term "biodiversity" was coined by Walter G Rosen on 21-24 September, 1986 at the National Forum on Biodiversity held in Washington DC. Biodiversity then refers to all biological entities, which is an intimidating idea because it seems impossible to operationalize it. The standard move at this stage is to suggest that three entities capture what is important about biodiversity: genes (alleles), species and ecosystems. Margules (2002). To find out suitable and concrete evidences or facts to the above-mentioned views, a study was needed. The results of the empirical approaches could be used in making necessary changes in the agro biodiversity conservation and livelihood sustainability among the tribal women.

Ramakrishnan (2002) had reported that although the term "*agricultural biodiversity"* is relatively new, it has come into wide use in recent years as evidenced by bibliographic references - the concept itself is quite old. It is the result of the careful selection and inventive developments of farmers, herders and fishers over millennia (Banerjee, 2002). Agricultural biodiversity is a vital sub-set of biodiversity. It is a creation of humankind whose food and livelihood security depend on the sustained management of those diverse biological resources that

are important for food and agriculture Brahmi (2004).

Chelala (2002) observed that women are traditional protectors of the environment. A world survey on public attitudes toward the environment sponsored by the United Nations Environment Programme showed that women, when compared to men, are more likely to choose a lower standard of living with fewer health risks over a higher standard of living with more health risks. Khan (2010). The platform for action adopted by the Fourth World conference on Women in Beijing identified the need to involve women more actively in environmental decision making at all levels, as well as to incorporate their perspective in all strategies leading to sustainable development Kumary (2008).

FAO (2006) reported that we know the price of everything but value of nothing in the nature. The comment applies to the biological diversity. The word 'Biodiversity' is frequently appearing many times in the headlines of leading newspapers, journals and broadcasting news with a serious emotional warning. India is well known for the diverse varieties of food crops and other plant species. The climate here is ideally suited for varied forms of species to co exist. The tribals have been the custodians of the rich biodiverse heritage for over 4000 years. The prevalent diverse cultural and social groups with varying food habits from region to region have sustained diverse food crops too systematically. However, in the recent few decades there has been tremendous strain on our biowealth. Pandey (2004). The risk has been further accentuated with the introduction of hybrid varieties with the practice of mono crop cultivation besides use of large-scale chemical inputs. Thus, one can attribute the loss of several traditional or coarse crop species such as vegetables, fruits and food crops alike to the onset of green revolution (Ramachandra and Nagarathna, 2003).

To find out suitable and concrete evidences or facts to the above-mentioned views, a study was needed. The results of the empirical approaches could be used in making necessary changes in the agro biodiversity conservation and livelihood sustainability among the tribal women. With this background, the present study was designed based on the objective of studying the role performance in agro bio-diversity conservation among the tribal women of the Nilgiris district.

MATERIAL AND METHODS

Nilgiris district of Tamil Nadu was purposively selected because it is one of the districts in Tamil Nadu in which more percentage of tribal population has been reported. Kotagiri and Udhagamandalam blocks were purposively selected because these two blocks have relatively more percentage of the selected tribal communities *viz.*, todas, irulas and kotas. Of these, four revenue villages from Kotagiri block and to revenue villages from Udhagamandalam block were further selected considering the maximum number of identified tribal habitations *viz.*, todas, irulas and kotas. A sample of 60 tribal women from each tribal community has been selected. Random sampling was adopted in selection of the respondents. Thus, totally 180 respondents were considered for the study.

OBSERVATIONS AND ANALYSIS

The findings on distribution of tribal women according to their role performance in agro bio-diversity conservation are given in Table 1,2,3 and 4. Index based mean scores have been worked out and the results are presented hereunder.

Genetic resources :

Majority of the respondents performed roles like livestock maintenance (3.98) (for example maintenance of cattle like Jersey, Crossbred Jersey, Holstein Friesian and Holstein Friesian Cross), exotic breeds husbandry (3.91), cultivating traditional crop varieties (3.91), cultivating domesticated crop varieties (3.87) and cultivating location specific crops like minor millets (3.57) with respect to genetic resources.

Among the three tribal communities, the irula women secured the highest mean score (3.78). The reason might be due to the fact that, although the conservation of varieties was too tedious, the kota women had belief that it spoke of the wealth of the system and the community. But the toda women secured the lowest mean score (3.05). The reason might be due to the recent shifting of traditional occupation of pastoralism to agriculture by toda women. Thus, it would take more time to perform effective roles in agro bio-diversity conservation with special reference to genetic resources.

The roles of toda women in the context of genetic resources include exotic breeds husbandry (4.52) (for example Toda buffalo, a unique buffalo breed named after toda community), livestock maintenance (4.50), cultivating domesticated crop varieties (4.03) and cultivating

traditional crop varieties (3.52). But toda women showed much interest towards embroidery which is their traditional occupation as reported.

Irula women performed roles like cultivating traditional crop varieties (4.30), preservation of forest produce (4.30), livestock maintenance (4.30) and cultivating medicinal plants (4.17) for example *Coleus aromaticus, Spilanthus calva, Solanum nigrum, Eclipta prostrate, Withania somnifera*. They undergo special training under various schemes with the help of NGOs.

Kota women performed roles like cultivating traditional crop varieties (3.90), cultivating non domesticated wild varieties (3.90), cultivating domesticated crop varieties (3.58) and cultivating medicinal plants (3.48). Usually kota women did not involve much in collection of forest produce as Irula women did.

To sum up, genetic resources were the basic component of conservation of the traditional and wild resources of the crops and the products. The tribal women performed better in these roles.

Agro biodiversity systems :

The overall analysis indicated that the tribal women performed roles like nutrient management for the crops (3.90), utilization of locally available resources (3.68), using farm yard manure (3.66) and adopting natural management practices (3.47) with regard to agro biodiversity systems.

Among the three tribal communities, the highest mean score had been secured by the irula women (3.89) while the next highest mean score were seen among the kota women (3.39). This would be possible as farming is the major livelihood option for both irula and kota women as they are intensively occupied in farming activities with special reference to agro bio-diversity systems.

Toda women performed roles like nutrient management for the crops (3.92), indigenous management practices (3.50), utilization of locally available resources (3.50) and using farm yard manure (3.48).

The high level of role performance in activities like nutrient management for the crops (4.30), utilization of locally available resources (4.30), using farm yard manure (4.17) and watershed management (4.00) for irula women. Among the three tribal communities, irula women had undergone special training on "Herbal Medicine Preparation" jointly organized by Nilgiri Adivasi Welfare Association (NAWA) and Earth Trust.

Kota women performed well in activities like

Table 1 : Role performance of tribal women in Genetic resources **(n=180)**

Sr. No.	Category	Todas (n=60)		Irulas (n=60)		Kotas (n=60)		Total (n=180)	
		Total scores	Mean scores	Total scores	Mean scores	Total scores	Mean scores	Total scores	Mean scores
Genetic resources									
1.	Cultivating domesticated crop varieties	242	4.03	240	4.00	215	3.58	697	3.87
2.	Cultivating traditional crop varieties	211	3.52	258	4.30	234	3.90	703	3.91
3.	Cultivating non domesticated wild varieties	122	2.03	233	3.88	234	3.90	589	3.27
4.	Cultivating medicinal plants	90	1.50	250	4.17	209	3.48	549	3.05
5.	Cultivating location specific crops like minor millets	210	3.50	223	3.72	209	3.48	642	3.57
6.	Domestication of wild varieties	92	1.53	179	2.98	200	3.33	471	2.62
7.	Collection of forest produce	84	1.40	227	3.78	195	3.25	506	2.81
8.	Preservation of forests produce	89	1.48	258	4.30	189	3.15	536	2.98
9.	Conserving soil quality and health	92	1.53	236	3.93	197	3.28	525	2.92
10.	Water management practices	90	1.50	227	3.78	195	3.25	512	2.84
11.	Livestock maintenance	270	4.50	258	4.30	189	3.15	717	3.98
12.	Exotic breeds husbandry	271	4.52	236	3.93	197	3.28	704	3.91
	Overall mean score	2.59		3.92		3.42		3.31	

watershed management (3.90), nutrient management for the crops (3.48), organic cultivation (3.48) and using farm yard manure (3.33). Kota women are also trying to come to the streamline to enhance their role performance in bio-diversity conservation.

Biotic factors :

The overall analysis indicated that the majority of the respondents performed well in roles like kitchen gardening (3.26), seed banks of traditional crops (3.24), preservation of extinct varieties (3.19) (for example, Rosemary, Thyme, Citronella, Gaultheria and other herbal crops) and storage of seeds with advanced systems (3.15) with respect to biotic factors.

Among the three tribal communities, the irula women secured the highest mean score (3.82) followed by the kota women (3.30). The reason might be due to that, these two tribal communities had come up with innovative ideas with respect to their role performance in biotic factors due to the special training imparted by NGOs as stated above.

Toda women took keen interest to perform roles like kitchen gardening (3.53), storage of seeds with advanced systems (2.52), seed banks of traditional crops (2.07) and preservation of extinct varieties (1.98). Toda women are yet to become aware about the medicinal plant gardens and its importance.

Irula women performed extremely well in activities

Table 2 : Role performance of tribal women in Agro biodiversity systems **(n=180)**

Sr. No.	Category	Todas (n=60)		Irulas (n=60)		Kotas(n=60)		Total (n=180)	
		Total scores	Mean scores	Total scores	Mean scores	Total scores	Mean scores	Total scores	Mean scores
Agro biodiversity systems									
1.	Water shed management	93	1.55	240	4.00	234	3.90	567	3.15
2.	Nutrient management for the crops	235	3.92	258	4.30	209	3.48	702	3.90
3.	Organic cultivation	149	2.48	233	3.88	209	3.48	591	3.28
4.	Using farm yard manure	209	3.48	250	4.17	200	3.33	659	3.66
5.	Adopting natural management practices	207	3.45	223	3.72	195	3.25	625	3.47
6.	Indigenous management practices	210	3.50	179	2.98	189	3.15	578	3.21
7.	Using natural pollinators	152	2.53	227	3.78	197	3.28	576	3.20
8.	Utilization of locally available resources	210	3.50	258	4.30	195	3.25	663	3.68
	Overall mean score	3.05		3.89		3.39		3.44	

Table 3 : Role performance of tribal women in biotic factors **(n=180)**

Sr. No.	Category	Todas (n=60)		Irulas (n=60)		Kotas (n=60)		Total (n=180)	
		Total scores	Mean scores	Total scores	Mean scores	Total scores	Mean scores	Total scores	Mean scores
Biotic factors									
1.	Gene banks	117	1.95	233	3.88	209	3.48	559	3.11
2.	Seed banks of traditional crops	124	2.07	250	4.17	209	3.48	583	3.24
3.	Medicinal plant garden	90	1.50	223	3.72	200	3.33	513	2.85
4.	Kitchen gardening	212	3.53	179	2.98	195	3.25	586	3.26
5.	Storage of seeds with advanced systems	151	2.52	227	3.78	189	3.15	567	3.15
6.	Preservation of extinct varieties	119	1.98	258	4.30	197	3.28	574	3.19
7.	Preserving soil biota	89	1.48	236	3.93	195	3.25	520	2.89
8.	Conserving the micro organism population	91	1.52	227	3.78	189	3.15	507	2.82
	Overall mean score	2.07		3.82		3.30		3.06	

like preservation of extinct varieties (4.30) for example, *Asparagus racemosus*, *Gymnema stlvestre* etc., seed banks of traditional crops (4.17), preserving soil biota (3.93) and gene banks (3.88). Thus, irula women performed well in the conservation of biotic factors when compared to their counterparts.

Kota women performed their roles like gene banks (3.48), seed banks of traditional crops (3.48), medicinal plant garden (3.33), preservation of extinct varieties (3.28) for example, *Abrus precatorius, Ficus racemosa* and kitchen gardening (3.25). Kota women were observed to be at par with irula women in the conservation of biotic components. Fernandez (2009) also reported the same.

Social values :

Majority of the tribal women were observed to have performed roles like human participation (4.04), indigenous post harvest methodologies (3.77), change in food habit (3.70), indigenous storage practices (3.59) and indigenous value addition of the produces (3.59) for example thiribala choornam to reduce antibiotic, rue oil for treatment of skin diseases, with regard to social values.

Among the tribal women, the irula women had secured the highest overall mean score (3.78) followed by the kota women (3.40). The reason might be due to the fact that, the irula women had uplifted their status by actively involving in following the social values like running a separate medicinal plant unit and value addition of these medicinal produces.

Human participation in value addition of the crop products (4.50), usage of easily available resources (3.52), indigenous storage practices (3.52), indigenous storage practices (3.52), marketing of the produce locally and outside market (3.52), fixing price for the produce (3.52), change in food habit (3.52) and diversification of agriculture (3.52) were the social values that toda women had with them.

Irula women were able to use indigenous post harvest methodologies (4.30), change in food habit (4.30), participation in community crop management practices (4.17) and use of indigenous value addition of the produces (3.93) with respect to social values.

Human participation (3.90), easily available resources are used (3.90), indigenous storage practices (3.48), indigenous post harvest methodologies (3.48) and

Table 4 : Role performance of tribal women in social values **(n=180)**

Sr. No.	Category	Todas (n=60)		Irulas (n=60)		Kotas (n=60)		Total (n=180)	
		Total scores	Mean scores	Total scores	Mean scores	Total scores	Mean scores	Total scores	Mean scores
Social values									
1.	Human participation	270	4.50	223	3.72	234	3.90	727	4.04
2.	Easily available resources are used	211	3.52	179	2.98	234	3.90	624	3.47
3.	Indigenous storage practices	211	3.52	227	3.78	209	3.48	647	3.59
4.	Indigenous post harvest methodologies	211	3.52	258	4.30	209	3.48	678	3.77
5.	Indigenous value addition of the produces	210	3.50	236	3.93	200	3.33	646	3.59
6.	Community storage centres	90	1.50	227	3.78	209	3.48	526	2.92
7.	Community crop management practices	90	1.50	250	4.17	200	3.33	540	3.00
8.	Marketing of the produce locally and outside market	211	3.52	223	3.72	195	3.25	629	3.49
9.	Exchange of seeds within and outside the community	90	1.50	179	2.98	189	3.15	458	2.54
10.	Fixing price for the produce	211	3.52	227	3.78	197	3.28	635	3.53
11.	Change in food habit	211	3.52	258	4.30	197	3.28	666	3.70
12.	Diversification of agriculture	211	3.52	236	3.93	195	3.25	642	3.57
13.	Soil and water testing labs	151	2.52	227	3.78	189	3.15	567	3.15
	Overall mean score	3.05		3.78		3.40		3.41	
	$F = 2.888^{NS}$								

NS=Non-significant

community storage centers (3.48) were the social values withheld by kota women.

Human intervention in value addition of the crop products, community storage centers, crop management practices and exchanging of the seeds within the community led to measure the level of participation in agro biodiversity conservation practices. This helped the respondents to maintain a seed bank of various seeds with required qualities. Further the 'F' value confirmed that there is no significant difference among the three tribal communities.

Thus, the overall analysis with reference to farm management inferred that, tribal farm women play an important role in farm activities especially in post-harvest operations and livestock and poultry rearing. Economic pressure is forcing them to break away their traditional roles of housewives into farm or non-farm laborers. The findings of the present study reveal that contribution of female labour in different activities as well as in total family income were substantial.

Conclusion :

The tribes lead a living more close to nature and depend on it for their survival. They should be made aware of the usefulness of the botanical varieties in meeting the diverse needs of nature. Also, they should be educated suitably about the importance of maintaining diversity and the impact of loss of biodiversity. Further, the threatened species should be enlisted and tribes' help is sought in collecting such rare species. Women's involvement in the collection and preservation of these kinds of species is well acknowledged. They should know the value of every species; proper valuing of species is the need of the hour. The development departments should be fully involved in creating necessary awareness and information dissemination about agro biodiversity conservation among the tribes; especially the tribal women.

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