GENDER ANALYSIS OF FACTORS INFLUENCING AGRO-BIODIVERSITY CONSERVATION IN DINVAR, KERMANSHAH PROVINCE, IRAN

Iraj Malakmohammadi[a], Neda Heidarian[b], Hosein Shbanali Fami[c], and Atri Samiee[d]
[a,b,c] Department of Agricultural Extension Education, College of Agriculture, University of Tehran, Karaj, Iran
[d]Department of Agricultural Extension Education, College of Agriculture, Islamic Azad University, Science and Research Branch, Tehran, Iran
[a]Corresponding author: amalek@ut.ac.ir

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Abstract: With the dawn of the debates on agro-biodiversity erosion, more people and governments than ever before recognize the need to conserve agro-biodiversity. Although, the threat of agro-biodiversity erosion as a global concern has stimulated many studies to explore how this diversity can be maintained, practices of farmers and roles played by them in agro-biodiversity conservation have been little investigated in detail, particularly from gender analysis perspective. Considering the significance of agro-biodiversity conservation, however, women and men must play an equal part in its management. There is, therefore an urgent need to consider gender - who does or uses what and how and why - in development efforts, to ensure the sustainable conservation and use of agro-biodiversity now and in the future. Both FAO (2004) and Convention on Biological Diversity (CBD 2001) identify women as users, managers and preservers of biological diversity and give priority to their recognition and consequent involvement. The contribution of women to the maintenance and enhancement of crop diversity, which is often overlooked, is very important. Therefore, an analysis of their role is an important factor in understanding agro-biodiversity management (Padmanabhan, 2004).

Keywords: agro-biodiversity, agro-ecosystem Conservation, , gender analysis

I. INTRODUCTION

Today, agro-biodiversity conservation, as a special category of biodiversity conservation has become one of the most important challenges to sustainable development globally since it was emphasized in the Rio de Janeiro and Johannesburg meetings held in 1992 and 2002, respectively (Abdelali-Martini et al., 2008). Yet, nobody knows all of the effects of agro-biodiversity loss. Obviously, the key point is that a loss of diversity may lead to significant risks for food supplies (Heal et al., 2004). Agrobiodiversity comprises a multitude of plant and animal varieties, continuously grow and raise over time. It is the result of an ongoing process of domestication and selection by generations of farming families to meet their needs in food security, nutrition, income and cultural integrity (Padmanabhan, 2004).

The Convention on Biological Diversity (in Parris 2001) defines biodiversity as the variety among living organisms, including diversity within and among species and diversity within and among ecosystems. Agro-biodiversity is essentially the biodiversity present in and supported by agricultural landscapes. It includes the diversity of knowledge and management styles ('culture'). It is the source of many agro-ecosystem benefits and services that are of local value, but it can also represent global values. Agro-biodiversity can be considered in three levels based on:- *genetic diversity* ('within species'): the diversity of genes within already domesticated plants and livestock species and their wild relatives; species diversity (among species) the number and population size of wild species (flora, fauna) fauna) surviving in agricultural landscapes, including soil biota; acknowledging the effects of non-native species on agriculture and native biodiversity;- *ecosystem diversity* ('of ecosystems'): the ecosystems formed by biotic and abiotic interactions of species relevant to agriculture or of species and communities partially dependent on agricultural habitats (Kuncoro et al., 2006).

There are two broad approaches to conserving agricultural biodiversity. First, the ex situ approach attempts to maintain genetic resources outside of agroecosystems, in germplasm banks. Whereas such preservation may prevent the extinction of abandoned varieties, it stops or greatly alters the evolutionary processes that mould the populations' diversity. Second, in situ approaches (or on-farm conservation) aim to maintain the existing genetic resources on-farm, allowing evolutionary processes to maintain and continue to create diversity. The latter will require full involvement of the key stakeholders, including farmers and herders, who are the main custodians of local agro-biodiversity (Abdelali-Martini et al., 2008). All agree that cultural practices

of farmers are important in maintaining diversity, but much information is anecdotal (Louette and Smale, 2000).

Yet, there remains a need for research and development workers, together with policymakers and donors, to better understand the contributions that women make as agro-biodiversity managers. Moreover, there is a need to fully examine the agro-economic and sociocultural circumstances surrounding women as they take up this role, among their multiple roles within rural farming households and communities.

Not all the farmers or all the members of a community play the same part in maintaining diversity of crop varieties. It is clear that men and women play different roles within particular systems of agricultural production, and occupy different socioeconomic positions as a result of these different roles (Carr, 2008). As a result, their responsibilities, interests, needs, access to resources and decision making powers differ in numerous cases. Therefore, a reliable understanding and analysis of the involvement of women in agricultural activities particularly participation in decision making process, is needed. In this way, a conceptualization of their particular contribution to the maintenance and utilization of agrobiodiversity would be possible.

According to Carr (2008) literature has presented compelling evidence for the argument that we cannot simply lump agricultural producers together, regardless of gender, and hope to model their behaviors, land uses and crop choices in such a way as to gain meaningful information.

In a similar vein, Howard (2003) has pointed out that rights to plant-genetic resources are not gender-neutral: "...while women constitute the majority of those gardeners, gatherers, herbalists and plant breeders who have developed agrobiodiversity and identified useful plants, they are likely to be the last to have their rights recognized and therefore to benefit from compensation schemes or rights regimes". According to Rocheleau (1989) the gender division of labor resources, knowledge, and products reflect conflict, complementarity, or coincidence of men and women's interest in land use systems.

Recently, more studies have examined specific aspects of women's work in agrobiodiversity conservation. Oakley and Henshall Momsen (2007) in their study examine women's roles in seed management of both field and home garden crops in rural Bangladesh through their participation in seed selection, processing, storage and exchange. Their study also builds upon and furthers the discussion of existing work on women's involvement in post-harvest processing in Bangladesh. More to this, there is a growing body of research from around the world on women and seed management. In much of the literature, the noted frequency of women's involvement is still explained in part by the fact that the final destination of most crops is the home (Gurung & Gurung, 2002). Other studies have put emphasis on other dimensions of women's work. Abdelali-Martini et al. (2003) reported that men perform mechanized activities while the women are more involved in manual operations. More to this, women are now involved in new activities such as herbicide spraying and roguing (Abdelali-Martini et al, 2008).

II. METHODOLOGY

Gender refers to the social construction of the roles of women and men in a given society, not to their biological differences. It is the society which assigns different roles to women and men according to the rules and sanctions of that society. This situation has led to assigning different roles to women and men in agricultural production such as the division of labor, or the decision making process. These roles differ from one society to another, which explains the importance of such a process.

Table 1: Statistical population and sample size

District	Sub district	Area (Km2)	No. of villages	No. of households	Sample size
Dinvar	Dinvar	268	32	1185	37
	Kandoleh	187	28	1376	13
	Hor	254	49	2199	22
	Total	709	109	4760	72

Variable	Categories	Frequency	%	Max.	Min.	Mean
Age	Below 30	24	13.4			
	31-40	66	36.9			
	41-50	64	35.8			
	51-60	13	7.3	85	25	43
	61-70	10	5.6			
	71 and above	2	1.1			
	Not answered	10				
Level of literacy	Illiterate	46	25.7			
	No formal education	52	29.1			
	Primary education	50	27.9			
	Secondary education	24	13.4	-	-	-
	Diploma	4	2.2			
	Tertiary education	3	1.7			
	Not answered	10				
Farming experience (years)	Below 5	18	10.1			
	6-15	35	19.6			
	16-25	84	46.9			
	26-35	27	15.1	68	2	21
	36-45	9	5			
	46 and above	6	3			
	Haven't responded	10				
Participation in Extension Programs	Classes	75	43.1			
	Out of the village	10	5.7	-	-	-
	Agricultural exhibition	3	1.7			
	None of them	86	49.4			
	Not answered	15				
Children Continue Farming in Their Parents' Footsteps	-	3	1.7			
	Very low	23	13			
	Low	65	36.7	-	-	-
	Moderate	60	33.9			
	High	24	13.6			
	Very high	2	1.1			
	Not answered	12				

Table 2: Personal characteristics of respondents

Hence, gender analysis is a guide intended to help better understand the social and economic set up of livelihoods through understanding of the gender roles, differences and relationships. It provides valuable insights to understand specific demands for specific groups in the society. Recognition that male and female responsibility for production and reproduction tasks vary among societies, races, classes has encouraged the understanding that such activities are socially or gender defined, and are mutable and responsive to other changes in the farming systems. Recording and using these gender differences in the analysis constitutes a platform for better designing and testing improved technologies (Abdelali-Martini et al., 2008).

This study was conducted in Dinvar district of Kermanshah province, Iran. Dinvar destrict comprises 4760 households living in three sub destricts of Dinvar, Kandoleh, Hor.

A survey research method was used. Face-to-face interviews were conducted to collect data with the aid of a questionnaire containing open and closed ended questions. The questionnaire was pre-tested and was improved based on the pilot study results. A panel of experts confirmed the validity of the questionnaire. The calculated Cronbach's alpha for the research instrument was 0.83. A random sample of 200 households was selected (Table 1).

III. FINDINGS AND DISCUSSION

Respondents' characteristics

On average, respondents were 43 years of age. About 25 percent of them have had no formal education and only 1.7 percent had tertiary education. Generally, a high proportion of respondents were literate (74 %).The overall average of 21 years of farmers indicates that farmers were highly experienced in farming practices. Approximately, 50 % of respondent haven't participated in any type of extension education programs. Moreover, 76 % of respondents didn't know the agricultural specialists and 94% of them haven't visited them throughout the year. About 80% didn't know the local extension agent either. About 37 % of the farmers held low opinion about this issue that their children continue farming as a job in future Table 2 reveals personal data characteristics of respondent.

Agro-biodiversity dimension in the study area

Results revealed that farmers cultivate numerous species of crop plants. In general, 19 crops and 47 varieties were cultivated by farmers which fell into four main categories as: cereals, legumes, forage crops and fruit trees. The survey identified that the main crops in the research site are wheat and barley which were planted by the highest proportions of farmers. Of these, wheat was represented by 9 varieties and barley was represented by 4 varieties. Fruit trees such as grape were grown by most of the respondents surveyed in the research site. Furthermore, many other crops such as chickpea, lentil, sunflower, sugar beet, coriander etc. as well as forage crops were grown by respondents. This is an indication of the wide range of activities performed by farmers (Table 3).

Analysis of agricultural activities based on gender

An important aspect of the study was to determine women's relative participation in agricultural activities within the fields. For the purposes of the questionnaire, agricultural activities were divided among crops in order to obtain a higher resolution analysis of gendered domains. Results revealed that women in Dinvar district of Kermanshah province perform a wide array of activities related to farming together with men and children.

Women, men and children are involved in seed selection of wheat: 58.3 %. However, men and children are more involved in fertilizer application (65.4 %) and irrigation (46.2 %). Women are less involved in agricultural activities associated with barley and if they are involved, it's together with men and children. Men and children are involved in coriander planting and irrigation. But women together with men (50%) do the harvesting. Seed selection and harvesting of clover involves all family members including the children. More to this, men and children perform other activities i.e. planting and fertilizer application. Men and children concentrate mainly on sugar beat planting (66.7 %) and in application of fertilizer (66.7 %) and irrigation (87.5%) and women join them in harvesting activities (66.7 %).

Seed selection (88 %) and harvesting (76.9 %) of lentil is shared among men, women and children while men together with children are more involved in planting (84.6%), fertilizer application (87.5 %) and irrigation (60 %). Likewise, men, women and children perform seed selection (86.5 %) and harvesting (81.1 %) of chickpea and men and children are more involved in planting (91.9 %) and fertilizer application (92.9 %). The same holds true for courgette i.e. men, women and children do the seed selection (33.3 %) and harvesting (100 %) and men together with their children perform planting (60 %) and fertilizer application (60 %) activities. Women, men and children (78.7 %) do the harvesting of alfalfa. Agricultural activities associated with sunflower crop are mainly performed by men and children. In general, women are less involved in primary agricultural activities of fruit trees but they are, together with men and children, responsible for activities such as irrigation and harvesting (Table 3).

Table 4 shows that household size is not correlated with the first variable indicating diversity (number of species cultivated by each farmer/ Total area under cultivation). Similarly, there is no correlation between household size and the second variable indicating diversity within species i.e. number of varieties cultivated by each farmer/ Total area under cultivation.

As results revealed, there exist a negative and significant correlation between level of literacy and the variable of number of species cultivated by each farmer/ Total area under cultivation ($p<0.05$). In a similar vein, there is a negative and significant correlation between level of literacy and the other variable of diversity ($p<0.05$). Number of literate members of household is not correlated with none of the variables showing diversity. Arguably, the variable of children continue farming in their parents' footsteps is significantly and negatively correlated with both the variables indicating diversity.

Variable	Correlation Coefficients	
	No. of species cultivated by each farmer/ Total area under cultivation	No. of varieties cultivated by each farmer/ Total area under cultivation
Household size	0.066	0.078
Level of literacy	-0.180*	-0.183*
No. of literate members of family	-0.006	0.001
Children continue farming in their parents' footsteps	-0.247*	-0.236**

* (P<0.05) , ** (P<0.01)

Table 4: Correlation analysis of variables indicating diversity and selective variables

IV. CONCLUSION

This study has analyzed the gender dimension in the division of labor in agricultural activities i.e. seed collection, planting, fertilizer application, irrigation and harvesting in Dinvar district in Kermanshah province, Iran.

Findings from the study have indicated that both women and men, including children have responsibilities in agricultural operations.

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Table 3.Correlation matrix of variables indicating diversity
Please refer next page

Crop	No. of Varieties	Years of Cultivation	Average yield	X Contribution to Agricultural Activities																													
				Seed selection						Planting						Fertilizer application						Irrigation						Harvesting					
				♀	♂	♀ & ♂	♀ & Children	♂ & Children	♀ , ♂ & Children	♀	♂	♀ & ♂	♀ & Children	♂ & Children	♀ , ♂ & Children	♀	♂	♀ & ♂	♀ & Children	♂ & Children	♀ , ♂ & Children	♀	♂	♀ & ♂	♀ & Children	♂ & Children	♀ , ♂ & Children	♀	♂	♀ & ♂	♀ & Children	♂ & Children	♀ , ♂ & Children
Wheat	9	30	5.5	-	8.3	8.3	-	25	58.3	-	30.8	-	3.8	65.4	-	-	15.4	-	7.7	76.9	-	-	30.8	-	3.8	65.4	-	-	7.7	7.7	-	46.2	38.5
Barley	4	18.4	5.3	-	27.3	6.1	-	21.2	45.5	-	34.9	-	-	64.1	-	-	23.8	-	-	76.2	-	-	26.3	-	-	73.7	-	-	41.5	4.9	-	29.3	24.4
Coriander	2	13.1	2.5	-	13.3	6.7	-	-	80	-	25	-	-	75	-	-	25	-	-	75	-	-	26.3	-	-	73.7	-	-	-	50	-	25	25
Clover	2	16.1	7.4	-	25	25	-	-	50	-	14.3	-	-	78.6	7.1	-	14.3	-	-	85.7	-	-	-	-	-	-	-	-	-	14.3	-	-	85.7
Sugar beet	2	18.8	71.7	-	-	-	-	-	-	-	33.3	-	-	66.7	-	-	33.3	-	-	66.7	-	-	6.3	-	-	87.5	6.3	-	-	33.3	-	-	66.7
Lentil	2	27.5	0.5	-	4	8	-	-	88	-	11.5	3.8	-	84.6	-	-	12.5	-	-	87.5	-	-	40	-	-	60	-	-	3.8	11.5	-	7.7	76.9
Chickpea	1	18.1	0.5	2.7	2.7	8.1	-	-	86.5	-	8.1	-	-	91.9	-	-	7.1	-	-	92.9	-	-	-	-	-	-	-	-	2.7	5.4	-	10.8	81.1
Courgette	1	9.1	0.52	-	33.3	-	-	33.3	33.3	-	40	-	-	60	-	-	40	-	-	60	-	-	-	-	-	-	-	-	-	-	-	-	100
Alfalfa	1	15	6.5	-	-	-	-	-	100	-	-	-	-	100	-	-	-	-	-	-	-	-	-	-	-	-	-	10.6	-	8.5	2.1	-	78.7
Sunflower	2	20	2.3	-	7	2.3	-	-	90.7	-	21.3	-	-	78.7	-	-	21.7	-	2.2	76.1	-	-	26.1	-	-	73.9	-	-	-	40	-	-	60
Grape	6	18.6	12	-	100	-	-	-	-	-	-	-	-	-	-	-	50	-	-	-	50	-	11.8	-	-	88.2	-	-	-	12.5	-	-	87.5
Walnut	2	19.1	2..5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-	-	90	-	-	-	7.7	-	-	92.3
Apple	3	15	14.1	-	100	-	-	-	-	-	-	-	-	-	-	-	100	-	-	-	-		5.6	94.4	-	-	-	-	-	-	-	-	100
Apricot	3	17.2	4.5	-	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100	-	8.3	-	-	91.7	-	-	-	-	-	-	100
Pomegranate	1	14.5	12.6	-	100	-	-	-	-	-	-	-	-	-	-	-	50	-	-	-	50	-	16.7	-	-	83.3	-	-	-	28.6	-	-	71.4
Almond	1	16	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100	-	14.3	-	-	85.7	-	-	-	7.7	-	-	92.3
Peach	1	10	9.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100	-	-	-	-	-	-	100
Cherry	1	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	-	-	50	-	-	-	-	-	-	100
Plum	3	20	6.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100	-	12.5	-	-	87.5	-	-	-	12.5	-	-	87.5

Table 3.Correlation matrix of variables indicating diversity