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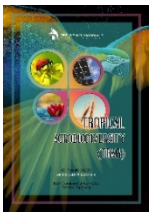

RESEARCH ARTICLE

THE ROLE OF GENDER IN AGRO-BIODIVERSITY CONSERVATION IN MADHYABINDU MUNICIPALITY OF NAWALPUR DISTRICT

Subash Basnet*, Dhirendra Man Thapa, Hari Prasad Subedi, Lokendra Man Khadka

School of Agriculture and Forestry, Mid-West University, Surkhet, Nepal.
****Corresponding author Email: subashbasnet772@gmail.com***

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ABSTRACT

A study was carried out in the Madhyabindu municipality of Nawalpur district, from August to September 2020 to evaluate the gender roles in agro-biodiversity conservation and use. A simple random sampling technique was used to select 50 households for the study. An individual interview and semi-structured questionnaire survey were conducted to collect data. The gathered information was tabulated, and descriptive inferences were made to present the study's findings. Women typically worked on less difficult but time-consuming tasks, while men typically engaged in labor-intensive work. Males made decisions regarding land preparation, crop and seed selection, and the sale of agricultural products, whereas females only made decisions regarding the application of fertilizer, the planting of crops, irrigation, intercultural operations, harvesting, and value-adding procedures, etc. However, gender roles varied among different castes, ethnic groups, levels of education, and economic status of the respondent farmers, and these factors significantly influenced their attitudes toward biodiversity conservation. Women were also more active than men in conserving and using biodiversity. Therefore, being aware of these differences can help to increase the power of women and increase the agricultural system's sustainability.

KEYWORDS

Gender, Biodiversity, Agriculture

1. INTRODUCTION

The existence of life on Earth depends on biodiversity, which provides intangible services that support humankind as well as tangible resources like food, medicine, fibers, fuel, and building materials. Biodiversity is crucial for survival and an integral part of peoples' belief systems, and cultural, and spiritual values (Xu, et al. 2019). Gender issues and the conservation of biodiversity are interrelated. Gender is a fundamental organizing principle of societies and frequently regulates the processes of production, reproduction, consumption, and distribution while focusing on the relationships between men and women (Thapa and Pant, 2020). This is because gender is not determined biologically. It takes the support of the entire community—young and old, wealthy and poor, men and women, boys and girls. There must be special measures taken to ensure that women are consulted on agro-biodiversity management because they often play a limited or invisible role in the public affairs of many communities. The management of agro-biodiversity requires information, and involvement from both sexes in decision-making, management, and commitment (Von Lossau and Qingsong, 2011).

The alarming rate and extent of the loss of agro-biodiversity in recent decades has brought attention to the need for genetic diversity preservation, which is essential for the world's food security and sustainable agricultural development (FAO, 2004). The loss of biodiversity brought on by gender inequality results in monoculture, the eradication of nutritive and high-value crops, the emergence of highly resistant varieties, and the absence of diversified sources of income. Women must continue to contribute to the preservation and expansion of crop diversity. To understand agro-biodiversity management, it is crucial to analyze their role. The purpose of this study was to evaluate the gender-related contributions to the conservation of local agricultural biodiversity in the Madhyabindu Municipality of Nawalpur District. The activities that farmers (men and women) engage in to raise productivity and feed their families, then, play a significant role in preserving agricultural diversity.

2. MATERIALS AND METHODS

2.1 Selection of Study Area

The study was conducted in the Madyabindu Municipality of the Nawalpur district, which is in the middle of Nepal and has the geographic coordinates of 27° 36' 30" North, 84° 1' 12" East, with an elevation of 148m. The municipality shares a southern border with India, separated by the Narayani River. The maximum temperature in this municipality ranges from 43 degrees Celsius to 20 degrees Celsius.

2.2 Sampling Technique

A sample size of 50 respondents was used, representing both the male and female population of the study area. To choose the households for the study, a sample random sampling method was used in the Madhyabindu Municipality of the Nawalpur district.

2.3 Source of Data Collection

2.3.1 Primary Data Collection

Through an interview schedule, questionnaire, focus group discussion, key informant interview, and formal and informal meetings with various farmers, the primary data were gathered during fieldwork. To gather the necessary and pertinent primary data from the study area, the following tools were used.

2.3.2 Household Survey

Interviews with respondents were conducted by visiting their homes, usually during the day. However, the timing of the interview was chosen

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for the farmers of Local Innovator. Following the completion of the interview schedule, regular checks and validations of the data were conducted. A series of closed-ended queries were directed at the farmer. To collect data, 50 households were surveyed.

2.3.3 Focus Group Discussion (FGD)

The target groups were brought together for a discussion to learn more about gender roles in agro-biodiversity conservation and various issues that are emerging in the region with a solution. With the aid of the checklist, the household survey was completed, and focus group discussions (FGD) were held to confirm the findings. Farmers, community leaders, people from all ethnic backgrounds, and both sexes took part in the discussion.

2.4 Secondary Data Collection

Secondary data were gathered from a variety of publications, including books, journals, bulletins, and relevant articles, as well as DADO annual reports and other reports that were available at various academic and non-academic institutions. Internet browsers, the VDC profile, the Ministry of Agriculture and Cooperatives (MoAC), the Ministry of Agriculture Development, the Agriculture Services Center (ASC), and other tools were also used. These sources contain information about the site's production and demographics.

2.5 Data Processing and Analysis

After the data was gathered, it was analyzed both qualitatively and quantitatively using a variety of assistive media. SPSS and MS Excel were both used as software. Data was presented using other descriptive statistics, such as graphs, charts, and other tools.

3. Results and Discussion

3.1 Socio-Economic Features of the Respondents

Socio-demographic features include household and farm characteristics like the age of respondents, their education, ethnicity, occupation, etc. These characteristics are briefly discussed as follows.

Table 1: Socio-economic Status of Respondents

Attributes Category		Frequency	χ2 Value	p-Value
Age			29.4	6.483
	20-30	14 (28)		
	30-40	23 (46)		
	40-50	7 (14)		
	50-60	4 (8)		
	60-70	2 (4)		
Occupation			49.48	1.801
	Agriculture	40 (80)		
	Business	7 (14)		
	Services	3 (6)		
Ethnicity			11.08	0.004
	Bhraman	15 (30)		
	Chhetri	27 (54)		
	Indigenous	8 (16)		
Education			5.32	0.07
	Illiterate	21 (42)		
	Primary	20 (40)		
	Higher school	9 (18)		
Cropping System			28.91	0.26
	Mono cropping	21 (42)		
	Mixed Cropping	29 (58)		
Knowledge of Bio-diversity			10.7	0.75
	Yes	18 (36)		
	No	32 (64)		

Note: The figure inside the parenthesis indicates the percentage.

The majority of respondents (46%) were between the ages of 30 and 40. Similarly, 28% of respondents were between the ages of 20 and 30, 14% were between 40 and 50, 8% were between 50 and 60 and 4% were between the ages of 60 and 70. Agriculture was the most common occupation among respondents. According to the study, 14% of respondents were found to be involved in business, while only 6% were found to be involved in services. The majority of respondents (80%) identified their primary occupation as agriculture. Ethnic groups had a big impact on socioeconomic status, educational level, resource accessibility, and understanding of conservation and management efforts. Chhetri and Bhramin made up the majority of the total respondents (54 and 30%, respectively), with a small percentage of indigenous people (16%).

Poverty and a lack of awareness contributed to a higher illiteracy rate in the study area. The mixed farming system was found to be the most prevalent practice in the study area due to higher productivity and decreased reliance on inputs. Crop residues were used in animal husbandry and manure was used for crop production, creating a synergistic relationship between the production of crops and livestock on the farm. As opposed to monoculture, mixed cropping systems aid in biodiversity management and conservation. In the study area, mixed farming was the predominant cropping system because many farmers understood the importance and value of agrobiodiversity.

3.2 Gender Role in Animal Husbandry

Table 2: Gender Role in Animal Husbandry

Activities	Male	Female	Both	Total
Shed management	9(18)	25(50)	16(32)	100
Milking	12(24)	25(50)	13(26)	100
Marketing of milk	38(76)	10(20)	2(4)	100

Note: The figure in the parenthesis denotes the percentage

The management of animal sheds (50%) and milking (50%) activities were predominately carried out by women, whereas the marketing activities were predominately carried out by men (76%). When women were not involved in marketing activities resulted in insufficient economic empowerment.

3.3 Women's Participation in the Decision-Making Process in Agrobiodiversity Conservation

Women were observed actively participating in a variety of farm tasks which included land preparation to planting, intercultural operation, harvesting, value addition, and marketing. Acharya and Bennett (1981) estimate that women alone make 30% of the decisions in farming activities.

Table 3: Women's Participation in Crop Production Activities

Activities	Male	Female	Both
Land preparation	42(84)	8(16)	0(0)
Seed selection	15(30)	26(52)	9(18)
Intercultural operation	3(6)	29(58)	18(36)
Irrigation	8(16)	27(55)	14(29)
Decides on fertilizer application/ FYM	10(20)	30(60)	10(20)
Harvesting	4(8)	34(68)	12(24)
Marketing and value addition (grading, processing, packing, etc)	28(56)	13(26)	9(18)
Decides on cropping system	27(54)	14(28)	9(18)
Crop selection	23(46)	17(34)	10(20)

Note: The figure in the parenthesis denotes the percentage

Men participated in tasks like clearing land (84%), marketing (56%), cho osing a cropping system (54%) and choosing a crop (46%), among other things, while women were more interested in intercultural tasks like irrig ation (55%), fertilizer application (60%), seed selection (52%), and harv esting (68%) activities.

3.4 Control Over Economic Resources

The decision-making role of men is greater, particularly for tasks directly related to them. Men also control the majority of the household income (76%) while only 20% of women have decision-making authority over finances.

3.5 Agro-biodiversity in Madhyabindu Municipality of Nawalpur District

3.5.1 Diversity in Cereals

The study area produced the majority of Nepal's cereal crops. The main crop, rice, was planted in greater quantities than other cereals. Farmers in the study area also grew maize, wheat, millet and buckwheat to supplement their income.

Table 4: Cereal Crops Diversity in Madhyabindu Municipality

Common name	Local name	Scientific name	Family
Rice	Dhan	Oryza sativa	Graminae
Wheat	Gahun	Triticum aestivum	Graminae
Maize	Makai	Zea mays	Graminae
Millet	Kodo	Panicum millaceum	Graminae
Buckwheat	Phapar	Fagophyrumesculentum	Polygonaceae

Source: Field survey, 2020

3.5.2 Diversity in Vegetable Crops

Table 5: Vegetable Crops Diversity in Madhyabindu Municipality

Common name	Local name	Scientific name	Family
Bittergourd	Karela	Momordica charantia	Cucurbitaceae
Pumpkin	Farsi	Cucurbita maxima	Cucurbitaceae
Ashgourd	Kubindo	Benincasa cerifera	Cucurbitaceae
Carrot	Gajar	Dacuscarrota	Apiaceae
Cauliflower	Cauli	Brasica oleracea	Brassicaceae
Cowpea	Bodi	Vigna unguiculata	Fabaceae
Onion	Pyaj	Allium cepa	Amaryllidaceae
Potato	Aalu	Solanum tubersum	Solanaceae
Brinjal	Venta	Solanum melongena	Solanaceae
Tomato	Tomato	Solanum lycopersicum	Solanaceae
Radish	Mula	Rapahanus sativus	Brassicaceae
Cucumber	Kakro	Cucumis sativus	Cucurbitaceae
Cowpea	Bodi	Vigna unguiculata	Fabaceae

Source: Field survey, 2020

Vegetables of various varieties were grown in the study area. In nearby markets, many farmers grew vegetables on a commercial scale. The majority of tasks involved in growing vegetables, such as field preparation, cross-cultural operation, harvesting, and storage, were typically performed by women.

3.5.3 Diversity in Species Crops

The Nepalese dishes would be complete without using a variety of spices. The following list includes a number of the types of spices crops that were reported during the study.

Table 6: Species Crop Diversity in Madhyabindu Municipality

Common name	Local name	Scientific name	Family
Garlic	Lasun	Allium sativum	Amaryllidaceae
Chilli	Khursani	Capsicum annuum	Solanaceae
Coriander	Dhaniya	Coriandrum sativum	Apiaceae

Source: Field survey, 2020

3.5.4 Diversity in Fruits

The study location had a wide variety of fruits, especially tropical types. Few of the fruits were grown for commercial marketing; most were grown for human consumption. The production, general management, and fruit harvesting were all primarily done by women.

Table 7: Fruit Crops Diversity in Madhyabindu Municipality

Common name	Local name	Scientific name	Family
Lime	Kagatee	Citrus aurantifolia	Rutaceae
Lemon	Nibuwa	Citrus auratium	Rutaceae
Sugarcane	Ukhu	Saccharum officinarum	Graminae
Pear	Naspati	Pyrus communis	Rosaceae
Guava	Amba	Psidium guajava	Myrtoideae
Banana	Kera	Musa balbisiana	Musaceae
Mango	Aap	Mangiferaindica	Anacardiaceae
Jackfruit	Rukhkatar	Artocarpusheterophyllus	Moraceae
Litchi	Litchi	Litchi chinesis	Sapindaceae
Coconut	Nariwal	Cocos nucifera	Arecaceae

Source: Field survey, 2020

3.5.5 Diversity in Fodder

Shrubs and trees play an important role in Nepal's economy. A total of 136 different tree and shrub species were used as animal feed. Trees and shrubs are the primary source of fuel wood for energy needs, timber for house construction, and bedding materials. Foliage from fodder trees and shrubs was traditionally fed to cattle, buffalo, and goats, especially install. Several types of fodder shrubs/trees were noticed during the survey.

Table 8: Fodder Diversity in Madhyabindu Municipality

Common name	Local name	Scientific name	Family
China berry	Bakaino	Melia azedarach	Meliaceae
Peepal	Pipal	Ficus religiosa	Moraceae
Banaya tree	Bar	Ficus bengalensis	Moraceae
Monkey's jackfruit	Badahar	Artocarpus lakoocha	Moraceae
Kavro	Kavro	Ficus infectoria	Moraceae
Tamarind	Imali	Tamarindus indica	Fabaceae

Source: Field survey, 2020

3.5.6 Diversity in Forages

Forages are small grasses with a seasonal growth pattern that had a significant component of the diet of many animals. At the time of the monsoon, local forage species typically contribute the majority of the animal feed. Ruminants can consume forages both as a supplement and as a source of nutrition. Women were typically actively involved in gathering forages and feeding animals. The following list includes the various forage types that were identified during the studies.

Table 9: Forages Diversity in Madhyabindu Municipality		
Common name	Scientific name	Family
Stylo	Stylos anthes	Fabaceae
Siru	Imperata cylindrical	Poaceae
Oat	Avena sativa	Poaceae
Napier	Pennisetum purpureum	Poaceae
Mulato	Brachiaria ruziziensis	Poaceae
Dubo	Cynodon dactylon	Poaceae
Berseem	Trifolium alexandrinum	Fabaceae

Source: Field survey, 2020

3.6 Medicinal and Aromatic Plant (MAPS)

Pharmaceuticals, dietary supplements, natural health products, cosmetics and other personal care items, as well as culinary products, were prepared by using medicinal plants. As a result, 10-100% of the population was involved in the collection and trade of MAPs accounting for up to 50% of total annual family income (Olsen and Larsen 2003).

Table 10: Medicinal and Aromatic Plant Distribution	
Common name	Scientific name
Tulsi	Ocimum sanctum
Neem	Azadirachta indica
Pipla	Piper longum
Amala	Phyllanthus emblica
Ashuro	Justicia adhatoda
Dhupi	Juniperus indica
Harro	Terminalia chebula

3.7 Institutional Setting and Access to Technology, Information and Services

3.7.1 Participation in Groups

Majority of the respondents were found to be members of farmer's groups, community forest user groups, women groups, cooperatives, and so on. 76% of the total sampled population was a member of at least one group or community-based organization.

3.7.2 Participation in Training

The survey found that 58% of the farmers who responded had taken at least one agricultural training course. Comparatively more female respondents than male respondents received the training. This could be a result of past implementations of various programs for women's empowerment. The respondent took part in training in off-season vegetable production, cash crop cultivation, mushroom farming, local resource management, and biodiversity conservation.

3.7.3 Knowledge About Biodiversity

In the study area, 64% of respondents claimed that they were aware of the importance of preserving and utilizing biological diversity (Table 1). The majority of respondents learn about agro biodiversity conservation from various organizations, as well as from friends, the media, printed materials, and other sources.

4. Conclusion

It was found that the majority of people obtained information about agro-biodiversity conservation from their neighbors, radio, television, printed materials, and other media. Similarly, the male respondents were crucial in laborious activities like field plowing, digging, and marketing. Lower energy tasks like milking, cross-cultural work, weeding, seed sowing, harvesting, grading, processing, packaging, drying, and storage were done by the female respondents. Male respondents were involved in value addition, marketing, and decision-making. Men were the heads of households, and the majority of the female respondents were illiterate. The majority of the young people in this region were seeking work abroad due to poverty, which was a major issue. The majority of respondents were active in cooperatives, farmer groups, women's groups, and community groups for forest users. Thus, both sexes contributed significantly to the conservation and protection of agrobiodiversity.

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