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AQUACULTURE: WOMEN'S ROLE IN FOXNUTS CULTIVATION

KEY WORDS: women, foxnut

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ABSTRACT

BACKGROUND: *Euryale ferox* is known as Makhana and Gorgon nut or Foxnut. Foxnut (*Euryale ferox*) is considered an aquatic cash crop in India. In India, Makhana is grown as a natural crop in stagnant water pools, mostly lakes, and tanks. Bihar is one of the important states of India for the production of foxnuts. The possession of unique skill by the fisherman community in the arduous task of harvesting and collecting foxnuts seeds from the deep water beds by making heaps on the beds through countless diverse and processing these seeds into kernels and pops endows this region in commercial cultivation and processing of this crop.

METHODS: The study is carried out in the north-western region of the Kosi Basin of Bihar. For the sample selection, the Saharsa district was selected. Two blocks from Saharsa district comprising fishing community were selected purposively. One hundred households one hundred households were randomly selected and interviewed with a structured schedule. The data was collected, suitably coded, and interpreted as per need to draw inferences.

CONCLUSION: This study concluded that women contribute far more to production and processing. Women are occupied for generations and have acquired unique skills in processing which determines the quality of Makhana pop. Women also perform numerous labor-intensive activities such as weeding, collections, cleaning, drying, gradation, roasting, frying, popping, rubbing, storage, and transportation. After processed seeds, women spread nuts over the mat for drying. They engage in sieving all the processed seeds for gradation. They execute continuous work of first frying to second frying of makhana seeds to pop and thrash to grading. They also help in removing the kernels from Makhana pop. Thus, the contribution of women needs to be acknowledged.

INTRODUCTION

Foxnut (*Euryale ferox*) is a flowering plant native to eastern Asia and a unique aquatic cash crop of Bihar. In Bihar, an area under makhana cultivation is about 13,000 ha and accounts for a total yield of 85 percent. More than 85 percent of Makhana produced is from Madhubani, Darbhanga, Sitamarhi, Saharsa, Katihar, Purnia, Supaul, Kishanganj, and Araria. Besides water bodies, foxnut is also cultivated in fields, low-lying areas, and ponds at a water depth of 1.5 to 2 ft or 4 to 6 ft through direct seed sowing or transplanting. Foxnut is cultivated traditionally, and the farmers still follow old-age cultivation practices. It grows in water, producing large floating leaves with a quilted texture, bright purple flowers, and starchy white seeds. Foxnut seeds are also called 'Black diamonds' and are mainly marketed as pop with limited value addition. However, this sector holds immense potential for value addition and production.

Most unfortunate is that the women in foxnut production constitute limited data. However, with a large population, about 2.3 lakh fishing communities, livelihood depends solely on foxnut cultivation and processing, having the main employment source. Foxnut is mainly cultivated and processed by the fishing community. They mostly migrate with their family members from one place to another during foxnut harvesting and processing season. The whole family members are occupied for generations and have acquired unique processing skills, which determine the quality of Foxnut pop. According to Mandal *et al.* (2010), women spent 40 percent of labor in foxnut production. Women are mostly involved in processing while women do not harvest. In contrast, according to Baruah (2015), seeds are harvested by rural women. They also engaged in guris and foxnut pop trading daily wages labour laborers. Women play a significant role in foxnut processing and allied field activities, including crop production, post-harvest operations. The involvement of women in foxnuts production varies from region to region. However, regardless of these activities, there is hardly any activity in foxnut production, except planting and seed collection in which a few women are actively involved. Their contribution to foxnut is two folded: first in the home, second outside the home. However, both women are involved in

foxnuts, although they have separate roles at different production cycles.

MATERIALS AND METHODS

The study was conducted in the north-western region of the Kosi Basin of Bihar. For the sample selection, Saharsa district was selected. Two blocks, *i.e.*, Mahisi and Simri Bakhtiyarpur from the Saharsa district comprising women of the fishing community, were selected purposively. One hundred households selected randomly were interviewed with a structured schedule. The data was collected, suitably coded, and interpreted as per need to draw inferences.

RESULTS AND DISCUSSION

The research findings are based upon responses of women foxnuts cultivars in the studied area encompassing cultivation, processing, storage, and marketing. The results about aqua farm operations in fox nut cultivation are specifically selecting land or pond, cleaning of land or pond, sowing seeds, thinning, transplanting, fertilizer use, irrigation, weed control, pest control, harvesting, and processing. The study finds out the participation of women in fox nut cultivation, and data in Table 1 clarified that most women never participated (76%) in the selection of land or pond. In other operations majority of respondents were always involved in the cleaning of land or pond (47%), sowing of seeds (46%), thinning (39%), transplanting (39%), followed by sometimes engagement. Some women from the selected sample sometimes engaged in the use of fertilizer (47%), irrigation (32%), weed control (29%), and pest control (26%). Women never participate in harvesting. At the same time, mostly women were always involved in cleaning and storage (51%), followed by sometimes engagement 44 percent. The majority of respondents were never involved in drying (67%) followed by always (29%) and sometimes (4%), and in the grading of seeds also respondents never occupied (67%) followed by always (27%) and sometimes (6%). An equal percentage of women (67%) never participated in first roasting, tempering, popping, polishing, grading of pop, packaging, and storage, followed by 33 percent always involved respectively in these activities. In contrast, they did not participate in pricing and marketing.

The findings of these results confirmed that women never participated in the selection of land or pond. Most respondents were involved in cleaning land or pond, sowing of seeds, thinning, and transplanting in other operations. Some women sometimes engaged in the use of fertilizer, irrigation, weed control, and pest control. This study is lined with previous research of Kumari et al. (2014), who observed that women have started to participate in spraying fertilizers and weeding operations. The study also revealed that in seed sowing, thinning, women operate gap filling and pest management. After harvesting, they bring the processed seeds to their hut and keep them overnight. Women never participate in harvesting. They are involved in cleaning and storage. The results of this study supported by Jalaj et al. (2019), women handpicked the snails and other debris from the seed and, after cleaning, spread the seeds for sun-drying on a bamboo or plastic mat. They engage in sieving all the processed seeds for gradation. Some of respondents were involved in drying and grading seeds. Women spread nuts over the mat for drying. These results also confirmed involvement in first roasting, tempering, popping, polishing, grading of pop, packaging and storage. In general, women are involved in size grading, pre-heating and popping, polishing and grading, and packaging. Women spread processed seeds over mat or cloth for drying before roasting (Mandal et al. 2010). Women also perform numerous labor-intensive activities such as roasting, frying, popping, rubbing, storage, transportation. They execute continuous work of first frying to second frying of foxnut seeds to pop and thrash to grading with their family members at home as they are pioneers in converting guri into pop (Soam and Chaitanya). During frying, women generally take out 5-10 nuts and hand them over to the second person (Jalaj et al., 2019). In this regard, Atal et al. (2020) present women's participation as significantly high in grading (62.36%), first roasting (74.45%), and second roasting (72.19%). The hitting step is labor-intensive work also carried out by these women. Also, help in removing the kernels from foxnut pop. Then they poured seeds to rub the seed coat. Women with their family members mostly engaged in frying nuts, thrashing, rubbing, grading, packing, and storage. They did not participate in pricing and marketing as their husbands sell pop to the wholesalers because there is no local trade or market availability.

Table No. 1. Distribution of women in fox nut cultivation activities

Indicators	Never	Sometimes	Always
Selection of land or pond	73 (73.00)	27 (27.00)	
Cleaning of land or pond	15 (15.00)	38 (38.00)	47 (47.00)
Sowing of seeds	10 (10.00)	44 (44.00)	46 (46.00)
Thinning	17 (17.00)	44 (44.00)	39 (39.00)
Transplanting	41 (41.00)	25 (25.00)	39 (39.00)
Use of fertilizer	46 (46.00)	47 (47.00)	7 (07.00)
Irrigation	68 (68.00)	32 (32.00)	
Weed control	62 (62.00)	29 (29.00)	9 (09.00)
Pest control	74 (74.00)	26 (26.00)	
Harvesting	100 (100.00)		
Cleaning & storage	5 (05.00)	44 (44.00)	51 (51.00)
Drying	67 (67.00)	4 (04.00)	29 (29.00)
Grading of seeds	67 (67.00)	6 (06.00)	27 (27.00)
First roasting	67 (67.00)		33 (33.00)
Tempering	67 (67.00)		33 (33.00)
Popping	67 (67.00)		33 (33.00)
Polishing	67 (67.00)		33 (33.00)
Grading of pop	67 (67.00)		33 (33.00)
Packaging	67 (67.00)		33 (33.00)
Storage	67 (67.00)		33 (33.00)
Pricing	100 (100.00)		
Marketing	100 (100.00)		

Note: Parentheses indicate the percentage

CONCLUSION

Women predominate in contribution to foxnut. Despite the importance of post-harvest roles, they are also engaged directly in farming and processing. Women's involvement in processing is widespread, along with the cleaning and processing activities. Their role is often viewed to be small-scale and home-based. As they never participated in the selection of land or pond. Their participation was viewed in cleaning land or pond, sowing of seeds, thinning, transplanting, and sometimes engaged in fertilizing, irrigation, weed control, and pest control. They involved in cleaning and storage or processed seeds, drying and grading seeds, first roasting, tempering, popping, polishing, grading of pop, packaging, and storage. Women also perform numerous labor-intensive activities such as roasting, frying, popping, rubbing, storage, transportation. Women with their family members mostly engaged in frying nuts, thrashing, rubbing, grading, packing, and storage. They did not participate in pricing and marketing as their husbands sell pop to the wholesalers because there is no local trade or market availability. Thus, women need skills to be developed to adapt to the technological changes to overcome the burden of already existing roles.

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