



Women in Chinese potato cultivation in Tamil Nadu: A multidimensional analysis

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Abstract

Women's contribution in agriculture is witnessed throughout the globe and their participation is contributing for the growth and development of the economy either directly or indirectly. Women tend to participate in major agricultural activities such as transplanting, weeding, irrigation, harvesting and post harvest activities. Chinese potato is a minor tuber crop grown on a commercial scale mostly in Kerala and Tamil Nadu. Farmers along the belt of Tirunelveli and Tenkasi districts in Tamil Nadu are cultivating Chinese potato due to its high demand and adaptability to the local climatic conditions. Women also play an important role in Chinese potato cultivation and hence a multidimensional analysis was conducted in Tenkasi and Tirunelveli districts. Household survey was conducted using simple random sampling with the help of an interview schedule. The data collected were analysed using appropriate statistical tools. The study revealed that 30.30 percent of women had more than 20 years of experience in Chinese potato cultivation. Majority (87.88%) of the women cultivated Chinese potato in marginal farms of less than 2.5 acres. Majority of the women's level of aspiration and innovativeness were medium with 72.73% and 63.64% respectively. The needs, preferences, opportunities and constraints of the farm women were assessed to formulate strategies and action plan to empower women in Chinese potato cultivation.

Keywords: Chinese potato, Women, Profile characteristics, Needs, Preferences, Opportunities, Constraints

Introduction

Women are the backbone of agriculture in India as well as around the globe. Their valuable contribution in agriculture is witnessed throughout the world and their participation is accounting to the growth and development of the economy either directly or indirectly. In the recent years, different parts of the world have provided credible evidences on the role and participation of women in agriculture and the relationship between women and agriculture. In rural areas agriculture open opportunities for women to earn a living and it provides them with food and livelihood security. According to Food and Agriculture Organization (FAO, 2011) women

produced 60 to 80 percent of food including staple food such as rice and maize in developing countries.

Women involvement in agriculture in developing countries was about 43 percent. Women tend to participate in major agricultural activities such as transplanting, weeding, irrigation, harvesting and post harvest processing. Men and women have discrete sets of tasks and varied levels of control over these crops (Kakuru et al., 2018; Okonya Kroschel 2014; Iradukunda et al., 2018; Rietyeld and Farmoth, 2018). In many countries, certain crops have been earmarked as either a 'male or a 'female crop' based on the gender of the household head or the owner of the land, or the gender of the person who has the right over

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the crop sales (Doss, 2001). Research evidence suggests that women are more likely to control the production and output of the subsistence crops for home consumption, whereas men may have more decision-making power over the production and output of the household's cash crops (Doss, 2001; Nakazi et al., 2017). In India, women are mostly found to be involved in tuber crops cultivation whereby they earn a living. Women's role in tuber crops cultivation is mostly witnessed in Tamil Nadu, Kerala, Andhra Pradesh, Odisha and Northeastern states. Chinese potato (*Plectranthus rotundifolius* (Poir) Spreng) is a well-known minor tuber crop which is extensively grown on a commercial scale in some pockets of Kerala and Tamil Nadu. Farmers along the belt of Tirunelveli and Tenkasi districts are doing Chinese potato cultivation due to its high demand among the consumers and traders. Chinese potato is a delicious tuber crop which is native to tropical Africa. It has an aromatic flavour and delicious taste on cooking. The tubers are rich in minerals like calcium, iron and certain vitamins including thiamine, riboflavin, niacin and ascorbic acid (Jayapal et al., 2015). It is preferred as a vegetable because of its aromatic flavour and it has medicinal properties due to the presence of flavanoids. Women play an important role in Chinese potato cultivation and hence a study was conducted to analyze their profile characteristics, needs, preferences and opportunities in Chinese potato cultivation and also the constraints faced by them.

Materials and Methods

The study was conducted using ex post facto research design during August-December 2021. Two districts namely Tirunelveli and Tenkasi in Tamil Nadu were selected for the study as these districts have more area under Chinese potato cultivation. A cluster of villages comprising two to three villages each from Tirunelveli and Tenkasi districts were selected and a total sample of 66 respondents were selected. The farm women who were having own land and working in their farm were selected as respondents. A structured interview schedule, focus group discussion and case study were used to collect data from the respondents. Statistical tools namely percentage, mean, standard deviation and chi square were used for interpretation of the results.

Results and Discussion

Profile characteristics of the respondents

The profile characteristics of the farm women were analyzed using standard procedures and the details are given in Table 1. Majority of women (77.27%) doing Chinese potato cultivation were middle aged. This indicated that the middle aged farm women were comparatively more aware about the emerging prospects of Chinese potato cultivation. It was observed that medium aged farm women were more likely to be

involved in agricultural activities (Kumari et al., 2022). Majority (36%) had high school education. Only about 4 percent of women had under graduation degree. This shows the active involvement of women in agriculture. This may be due to the continuation of ancestral occupation of agriculture. Nuclear family system was dominating (65.15%) in the study area. Only 23 percent of women were from joint families. The reason might be the joint family system is withering away in rural areas due to changing values of family system. Most (69.70%) of the women had 4-6 members in their family. Only 9.09 percent of women had large families showing the decline of big families in the present society.

Forty percent of women had more than 20 years of experience in farming. The reason for the experience might be that basically the livelihood of families in the area depends on agriculture and whoever takes birth in the family will start acquiring experience in agriculture from childhood. Majority (54.55%) had 10 to 20 years of farming experience in Chinese potato cultivation. About 30.30 percent of women had more than 20 years experience in Chinese potato cultivation. The probable reason for the experience is due to shift towards large scale Chinese potato cultivation in the area because of the commercial importance of the crop. Farming experience increases the knowledge about agricultural activities and similar results have also been reported by Kumar (2010).

The mean size of holding was 4.33 acres. The reason for small farm size is due to fragmentation of ancestral land because of division of families. Majority (87.88%) of the farm women cultivated Chinese potato in marginal farms of less than 2.5 acres. The mean area under cultivation of this crop was 1.54 acres. Majority of the rural women belonged to marginal to small category of land holdings. Similar result has also been reported by Vanitha (2002). Majority (51.52%) of them had livestock at their backyards as they have their own farm land for rearing livestock and these are maintained since they provide additional income to the farm families. Majority (74.24%) of the women had no access to credit facilities.

Table 1. Profile characteristics of the respondents (n=66)

| Sl. No. | Profile characteristics | F (%) |
|---------|---|------------|
| 1 | Age | |
| | Young | 12(18.18) |
| | Middle | 51(77.27) |
| | Old | 03(04.55) |
| | Total | 66(100.00) |
| | Mean: 42.42; SD: 9.15 | |
| 2 | Education | |
| | Functionally literate (Read, write & speak) | 09(13.64) |
| | Primary education (Upto V) | 25(37.88) |

| | | |
|----|---|------------|
| | High school education (VI to X) | 24 (36.36) |
| | Higher secondary education (XI to XII) | 03(04.55) |
| | Undergraduate | 03(04.55) |
| | Postgraduate and above | 02(03.03) |
| | Total | 66(100.00) |
| 3 | Occupation | |
| | Agriculture as main occupation | 64(96.97) |
| | Agriculture as subsidiary occupation | 02(03.03) |
| | Total | 66(100.00) |
| 4 | Family type | |
| | Nuclear | 43(65.15) |
| | Joint | 23(34.85) |
| | Total | 66(100.00) |
| 5 | Family size | |
| | < 4 members | 14(21.21) |
| | 4-6 members | 46(69.70) |
| | >6 members | 06(09.09) |
| | Total | 66(100.00) |
| 6 | Farming experience | |
| | < 10 years | 05(07.58) |
| | 10-20 years | 34(51.52) |
| | >20 years | 27(40.90) |
| | Total | 66(100.00) |
| | Mean: 21.65; SD: 10.61 | |
| 7 | Farming experience in Chinese potato cultivation | |
| | < 10 years | 10(15.15) |
| | 10-20 years | 36(54.55) |
| | >20 years | 20(30.30) |
| | Total | 66(100.00) |
| | Mean: 19.09; SD: 10.44 | |
| 8 | Farm size of Chinese potato farmers | |
| | Marginal (< 2.5 acres) | 58(87.88) |
| | Small (2.5-5 acres) | 07(10.61) |
| | Semi medium (5-10 acres) | 01(1.52) |
| | Total | 66(100.00) |
| | Mean: 1.54; SD: 1.10 | |
| 9 | Livestock possession | |
| | Yes | 34(51.52) |
| | No | 32(48.48) |
| | Total | 66(100.00) |
| 10 | Availed credit facility | |
| | Yes | 17(25.76) |
| | No | 49(74.24) |
| | Total | 66(100.00) |

Level of aspiration

Level of aspiration means reflecting a person's or group of persons' orientation towards a goal. High level of aspiration is used to indicate relative level of goal specification. Based on the scores, the respondents were categorized as low, medium and high using mean and standard deviation.

Table 2. Distribution of farm women according to level of aspiration (n = 66)

| Sl. No. | Category | Frequency | Percentage |
|---------|-----------------------|-----------|------------|
| 1. | Low (<5.31) | 13 | 19.70 |
| 2. | Medium (5.31 to 8.05) | 48 | 72.73 |
| 3. | High (>8.05) | 5 | 7.58 |
| | Total | 66 | 100 |

$$X^2 = 47.55; p < 0.001$$

Aspirations of the rural poor play a significant role in shaping their activities and investments. If the well being of the women is to be made better off, it is imperative to understand and nurture their aspirations. Majority of the women's level of aspiration was medium and only 7.58 percent had high aspirations (Table 2). The medium level of aspiration may be due to their education.

Innovativeness

Innovativeness indicates behavioural changes and may refer to the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than any other member of the system.

Table 3. Distribution of farm women according to innovativeness (n = 66)

| Sl.No. | Category | Frequency | Percentage |
|--------|-----------------------|-----------|------------|
| 1. | Low (<2.16) | 24 | 36.36 |
| 2. | Medium (2.16 to 3.12) | 42 | 63.64 |
| 3. | High (>3.12) | - | - |
| | Total | 66 | 100 |

$$X^2 = 4.10; p < 0.05$$

Majority (63.64%) had medium level of innovativeness (Table 3). The women may be independent, and they have the ability to think wider and that is the reason for their innovativeness. This study is in accordance with the report given by Kiran et al. (2022) who stated that when it comes to innovativeness, the mean score was 1.99 with majority of the farmers in medium level category, followed by low and high.

Needs of farm women in Chinese potato cultivation

A need is something required for a safe, stable and healthy life. Women are key players in Chinese potato cultivation and their needs must be met to succeed in

their activity. Needs differ between both the gender as they involve in different type of activities. The needs of farm women were collected on a three point continuum *viz.*, most important, important and least important with a score of 3, 2 and 1 respectively. The frequencies of each response categories were worked out and respective frequencies were multiplied by the score allotted to it, then they were added and divided by the number of the respondents which gave the mean score for different needs of farm women for ranking.

The analysis of the needs of women in Chinese potato cultivation (Table 4) revealed that their first and foremost requirement was quality planting materials (mean value - 2.73). Even though new improved varieties were developed by research organisations, farm women are not able to get the planting materials, due to lack of awareness and access. If the planting materials are of good quality, they will get assured yield. As stated by Almekinders and Louwaars (2002), seed availability and quality are the two key issues that farmers are concerned with for the success of the crop. The second need reported was demonstration on improved technologies with a score of 2.61. Demonstrations help farm women to see and learn about the technologies. By participating in demonstrations, they can realise the value and success of the technology and it will be easy for them to adopt the improved practices. Egziabher et al. (2013) concluded that an extension programme featuring demonstration plots contributed to statistically significant increases in household income and investment. Pre- and post-harvest machineries for drudgery reduction (2.58) was perceived as their need and it was ranked third. Women are mostly involved in harvesting and processing of Chinese potato tubers. Harvesting and grading are tedious jobs and hence if they can be provided with women friendly machineries it will reduce their drudgery and save time and labour. Bahl et al. (1994) reported that farm women use traditional technologies and implements which do give the desired results. It calls for the introduction of improved implements. Training on improved technologies (2.53), and subsidies/critical inputs (1.98) were the other needs reported by the farm women. These needs are to be considered to increase the involvement of women in Chinese potato cultivation.

Table 4. Needs of farm women in Chinese potato cultivation (n = 66)

| Sl. No. | Needs of women | Mean Score | Rank |
|---------|--|------------|------|
| 1 | Training on improved technologies of Chinese potato cultivation | 2.53 | IV |
| 2 | Quality planting materials of improved varieties of Chinese potato | 2.73 | I |

| | | | |
|---|---|------|------|
| 3 | Subsidies/Critical inputs for Chinese potato cultivation | 1.98 | V |
| 4 | Pre and Post-harvest machineries to reduce drudgery | 2.58 | III |
| 5 | Demonstrations on improved varieties/technologies of Chinese potato | 2.61 | II |
| 6 | Credit/Loan facilities | 1.83 | VI |
| 7 | Marketing facilities | 1.79 | VII |
| 8 | Crop insurance scheme | 1.29 | IX |
| 9 | Self Help Group (SHG) for Chinese potato-based agribusiness | 1.45 | VIII |

$$\bar{x} = 2.09; \sigma = 0.54$$

Preferences in Chinese potato cultivation

The preferences for Chinese potato varieties as perceived by farm women were collected on a three point continuum *viz.*, most important, important and least important with a score of 3, 2 and 1 respectively. The frequencies of each response categories were found out and respective frequencies were multiplied by the score allotted to it, then they were added and divided by the total number of the respondents to get the mean score for the different preferences of farm women.

The results are given in Table 5 which revealed that the first preference was given to high yielding potential (2.97). The adoption of high yielding and climate resilient varieties has the potential to bolster the economic prosperity of farmers. High yielding potential is a preferred trait because if they get more yields per unit area, they can realise more income and it will become more profitable. Moreover, the high yield can increase productivity for the same amount of labor. Most of the women have only marginal and small farms and hence if the yield is more, they get better profit from their land. The second preference was given was pest and disease resistant varieties (2.71). The variety which they are cultivating is susceptible to nematode. Nematode is the major problem faced by them and the affected tubers have very less market preference. They should be trained to select tubers free of nematodes. Good keeping quality (2.36) of the tubers is also their preference. As reported by Piet et al. (2011) agricultural products cannot be stored indefinitely. The maximum storage duration (the shelf life) of agricultural products varies and can be a couple of months for most tubers except cassava. If the quality is not deteriorated the farm women can get good market price even after storage and sell them when they realise market demand. Short duration varieties (2.18), suitability to cropping system (1.80) good cooking quality (1.71) and uniform size and shape (1.71) were their other preferences. If the keeping quality is good, they can store it for more days. If short duration varieties are available, they can take up one more crop in their

area which again adds to their income. As Chinese potato is used as a vegetable, consumers prefer varieties with good cooking quality. Uniform size and shape (1.71) are preferred because it will be easy to peel the tubers.

Table 5. Preferences in Chinese potato cultivation

| Sl. No. | Preferences | Mean Score | Rank |
|---------|---|------------|------|
| 1 | Short duration varieties | 2.18 | IV |
| 2 | Good cooking quality | 1.71 | VI |
| 3 | Uniform size and shape of tubers | 1.71 | VI |
| 4 | High yielding potential | 2.97 | I |
| 5 | Good keeping quality | 2.36 | III |
| 6 | Pest and disease resistant varieties | 2.71 | II |
| 7 | Suitable for cropping system | 1.80 | V |
| 8 | Climate resilient/Drought resistant varieties | 1.67 | VII |
| 9 | Suitable for organic farming | 1.48 | VIII |

$$\bar{x} = 2.07; \sigma = 0.52$$

Opportunities in Chinese potato cultivation

The opportunities in Chinese potato cultivation as perceived by farm women were collected on a three point continuum viz., most important, important and least important with a score of 3, 2 and 1 respectively. The ranking was done based on the mean score values obtained for different opportunities as perceived by farm women.

From the Table 6, it is observed that the opportunities in Chinese potato cultivation as reported by farm women were, enhancing yield by adoption of improved technologies (2.53). By adopting improved technologies and varieties in Chinese potato the efficiency, sustainability, and productivity could be increased. Adoption of modern agricultural technologies (improved varieties and inorganic fertilizers) and integrated farm management system are considered as essential components of productivity growth for the agriculture sector (Assayae et al., 2023). The other opportunities were agro climatic and edaphic conditions (2.48) and suitability for cropping/integrated farming systems (2.0). The Chinese potato is a well suited crop in these areas and it grows well and gives good yield. Marketing factor is also favourable for the women. The crop suits well with the existing cropping system adopted by the farmers. Scope for post harvest processing is also reported as an opportunity by women and assigned fifth rank.

Table 6. Opportunities in Chinese potato cultivation

| Sl. No. | Opportunities | Mean Score | Rank |
|---------|--|------------|------|
| 1 | Suitable for cropping systems/ integrated farming systems | 2.00 | III |
| 2 | Scope for post-harvest processing in Chinese potato by linking women SHGs/FPOs | 1.23 | V |
| 3 | Linking crop insurance scheme for Chinese potato | 1.26 | IV |
| 4 | Enhancing yield by adoption of improved technologies | 2.53 | I |
| 5 | Suitable for different agro climatic and edaphic conditions | 2.48 | II |

$$\bar{x} = 1.90; \sigma = 0.63$$

Constraints in Chinese potato cultivation

The constraints in Chinese potato cultivation as perceived by farm women were collected on a three point continuum viz., most important, important and least important with a score of 3, 2 and 1 respectively. The ranking was done based on the mean score values obtained for different constraints as perceived by farm women. The major constraints as reported by the farm women (Table 7) were price fluctuation (2.65), non-availability of quality planting materials of improved varieties (2.30), pest and disease incidence (2.23), erratic rainfall/weather aberrations (2.06), lack of marketing facilities (1.94), lack of knowledge and access to crop loans and subsidies (1.71), less access to extension/training programmes (1.42) and high labour cost (1.41). Price fluctuation is common in agricultural crops and the same is reported in Chinese potato also. Similar results were reported by Mona Lisa et al. (2017) that access to land, water, credit and other agricultural inputs, technology, new practices and extension services are the major constraints faced by rural women. Tiwari (2010) has also reported that one of the major constraints for women in agricultural production is inadequate information about the improved technologies in agricultural production. Very few women are benefited from extension services i.e., only 5 percent are providing due recognition to women's work as well as access to education, extension services, information, land, credit facilities, resources, modern technologies and other relevant agricultural innovations. Moreover, gender norms also influence decision-making processes in the home, which, in turn, affect the ability of women to access training opportunities (Mudege et al. 2016). According to Anderson and Feder (2004), agricultural extension is assumed to lead to better decision-making, improved agricultural performance and better outcomes. Women are not able to get access to good quality planting materials of improved varieties. This can be addressed by establishing seed villages by supplying quality planting

materials from research institutes like ICAR-CTCRI. Farmer Interest Groups for Chinese potato for collective decisions for production and marketing of the produce need to be mobilized.

Table 7. Constraints in Chinese potato cultivation

| Sl. No. | Constraints | Mean Score | Rank |
|---------|--|------------|------|
| 1 | Non availability of quality planting materials of improved varieties | 2.30 | II |
| 2 | Pest and disease incidence | 2.23 | III |
| 3 | Pressure by households chores | 1.29 | IX |
| 4 | Less access to extension/training programmes | 1.42 | VI |
| 5 | Price fluctuation | 2.65 | I |
| 6 | Lack of knowledge and access to crop loans and subsidies | 1.71 | VII |
| 7 | High labour cost | 1.41 | VIII |
| 8 | Wild animals attack | 1.41 | VIII |
| 9 | Erratic rainfall/Weather aberrations | 2.06 | IV |
| 10 | Lack of marketing facilities | 1.94 | V |

$\bar{x} = 1.84$; $\sigma = 0.46$

Conclusion

Women play a major role in Chinese potato cultivation in the selected study areas. Gender equality contributes to the growth and development of the economy. Providing due recognition to women's work along with access to education, extension services, information, land, credit facilities, resources, and modern technologies will entice many women to involve in agricultural production which will empower them. Women's needs, preferences, opportunities and constraints in Chinese potato cultivation are to be considered while developing policies and programmes for women empowerment. As the involvement of women in Chinese potato was observed to be more, efforts may be made to expand the area of its cultivation so that women can get more employment and income. Holistic efforts are warranted from research organizations, developmental departments, marketing agencies, credit organizations and other stakeholders for empowering women in Chinese potato cultivation in Tamil Nadu.

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