***Review Article***

**FARM WOMEN AND POST-HARVEST PRACTICES: AN ANALYTICAL REVIEW**

**ABSTRACT**

The current paper conducts a literature review on women in post-harvest activities in India. It aims to investigate the status of women in agriculture by highlighting various post-harvest activities that are primarily performed by women. Agriculture is the backbone of the global economy for developing countries. India, for example, is heavily reliant on agricultural resources, with women making up the majority of the agricultural workforce. Women were found to perform the majority of agricultural and post-harvest activities such as sowing, transplanting, manure application, weeding, thinning, gap filling, harvesting crop and grass cutting, picking, winnowing, drying grains, storage, grading, and so on. Women are unquestionably the backbone of agriculture workforces. They not only contribute physical output but also ensure quality and efficiency. Despite their significant contribution, workforces are often overlooked and undervalued.

**Keywords :** Post-harvest activates, Farm women, Participation**,** Knowledge

**INTRODUCTION:**

Agriculture is the backbone of rural economies, and women are pivotal contributors, especially in post-harvest activities. These tasks include cleaning, drying, grading, storage, processing, and marketing. Although women constitute a significant proportion of the agricultural workforce, their roles are often undervalued and under-documented. In Indian society, women play multidimensional role such as supervisors or as cultivators or as agricultural labourers and largest number of them were engaged in post harvest activities. Aggarwal *et al*. (2013) reported that 20 -70 % of the rural women are involved in agricultural harvest and post-harvest activities. Agricultural feminization refers to a significant increase in the participation of women in agricultural labour force, especially in the developing world. Throughout 2009, FAO, IFAD and World Bank reported that 80 per cent of rural small holder farmers worldwide were women. UN estimated that 45 -80 percent of the women work in agriculture. Rural women in India are extensively involved in various agricultural activities and it varies with crops and regions. Women play numerous intensive jobs in post-harvest operation especially in the activities like drying, storage, cleaning, grading, processing and marketing as reported by Kiranjot (2007).

**METHODOLOGY**

Review of literature is a vital judgment because it explains how the research proposed applies to previous study in a specific research area and the originality and importance of the subject under investigation. This work is based on a review of peer-reviewed research articles and reports for various international organizations, agricultural universities. Secondary data was used to write the results and with the help of articles related to post-harvest activities were downloaded and finally more than 45 papers were taken into consideration and discussed in detail about role of women in post-harvest activities. With this background various research studies relevant to the post-harvest activities have been reviewed and are discussed under the following headings.

1. Socio-personal characteristics of women involved in post–harvest activities.
2. Knowledge and participation of women in post-harvest activities.
3. Training needs of women in post-harvest activities.
4. Constraints and health problems faced by women in post- harvest activities.

**RESULTS**

1. **Socio-economic characteristics of women involved in post–harvest activities.**

Santhi and Kalirajan (2019) revealed in their study on personal characteristics of farm women with reference to decision making behaviour and revealed that a little less than half (46.67%) of the women farmers belonged to middle age category and a little more than one third (37.50%) of them were studied up to high school. A majority (87.50%) of them belonged to nuclear family and a great majority of them (97.50%) had agriculture as primary occupation. Half of the respondents (50.00%) had 13-24 years of farming experience. Majority (80.00%) of them had low extension contact and a little more than half (55.83%) of the farm women had a strongly favorable attitude towards farming. Chamandeep (2017) conducted a study on perception and adoption of improved post-harvest technologies of maize by farm women. The findings found that, little more than two third (40.00%) of farm women belonged to the age category of 46-60 years. Cent per cent of them were married and (40.00%) belonged to backward cast. Cent per cent of farm women belonged to joint family and their main occupation was farming. Half of them (50.00%) had dairy as subsidiary occupation. A majority of them (83.33%) were illiterates. Great majority (93.33%) of them had less organizational participation and equal number (33.33%) of respondent belonged to the marginal, small and large farmer groups respectively. The findings have showed that more than of the women farmers (56.67%) belonged to low socio-economic status and (23.89%) of farm women belonged to medium socio-economic status and very few (19.44%) of them had high socio-economic status.

Hada and Bansal (2017) in their research on rural women’s involvement in fruit preservation and processing revealed that, 43.00 percent of the farm women belonged to 18-30 age group. Very few of them (29.00%) were illiterates. A large majority (89.00%) of the respondents were farmers out of which 43.00 per cent had small holding (2.6 to 5.0 acres) of land. More than half (63.00%) belonged to nuclear family type. The findings also showed that majority (80.80%) of respondents belonged to the low socio-economic class. Gwivaha (2015) conducted a study on factors impacting agricultural extension training programmes for women farmers. The findings indicated that, a little less than half (45.00%) of the women farmers belonged to the middle age category and 65.00 per cent married. A majority (80.00%) of them were educated up to primary school. A little less than half (48.00%) of them had nuclear family. Majority of women farmers (73.00%) had land size between 1 -2 acres. A little more than half (54.00%) had inherited land acquisition and 61.00 per cent works manually in field. A very few (38.00%) of the farm women family members were also involved in farming activities. Around (53.00%) of them had extension contact and majority (73.00%) of them had participated in village meetings conducted by extension experts. Patil and Nagnur (2015) studied on empowerment of farm women involved in cultivation of chilli. The study showed that 45.30 per cent of the farm women belonged to middle age category and studied up to (45.33%) primary school (class 1-4) and more than half (56.70%) belonged to joint family. A majority of them (80.00%) had medium family size. More than half (59.33%) of them had low annual income, whereas cent per cent belonged to agriculture occupation and 36.00 per cent of them were small farmers.

Ansari and Sunetha (2014) studied agricultural information needs of farm women and reported that more than half (57.50%) of the farm women belonged to middle age group and cent per cent of the respondents had marginal land holdings. A little more than one third of the women (35.00%) educated up to primary school. Equal per cent of them (71.67%) belonged to nuclear family type and small family size, whereas cent per cent of the respondents had informal contact with the extension agents. Yasmeen and Gangaiah (2014) carried out a study on empowerment of women through micro-enterprises and observed that, 61.07 per cent of the women belonged to the middle age category. A little higher than one third of them (38.03%) were studied up to higher secondary school. Majority (75.00%) of them married. Whereas (68.03%) belonged to nuclear type of family and agriculture was the main occupation for 66.07 per cent of them. Girade and Shambharkar (2012) studied participation of women in farm and allied activities. The results of the study showed that, 42.50 per cent of the farm women were studied up to high school. A little more than half (54.17%) of them had medium size family whereas, (56.67%) had nuclear type of family. One third of the women (30.00%) had small land holding. Half of the women respondents (51.66%) had medium annual income level. A majority (70.84%) had medium farming experience and 67.50 per cent of women spent time moderately in field. Most of them belonged to (64.17%) medium source of information category.

Jadhav *et al*. (2010) assessed a study on the level of awareness of farm women about mango post-harvest technologies. The study revealed that, 65.83 per cent of the respondents belonged to middle- aged group and just over half of them (55.00%) educated up to high school. Most of them (68.34%) belonged to middle- income group. Although 41.67 per cent had semi-medium holdings of land. Most of them (67.05%) had medium social participation and 60.00 per cent had lower -middle socio-economic status. Bora *et al*. (2008) carried out a study on farm women information needs related to vegetable cultivation. The study concluded that, a little more than one third of the (39.02%) women belonged to middle age group. Majority (84.02%) of them married. Only 37.05 per cent educated up to high school. Whereas, 36.08 per cent had less landholding. Half of the (50.00%) of the respondents were members of one orginatization and had (51.07%) occasional contact with extension agent. Mande *et al*. (2007) in their study farm women’s awareness regarding post-harvest technology and indicated that, majorities (80.00%) of the farm women were middle age. More than two third (40.00%) of them were illiterate. More than half of them (57.00%) had small land holding and 53.00 per cent of the farm women had medium socio-economic status. More than half of them had low social participation (57.33%).

Mondal *et al.* (2003) carried out a study on farm women’s training needs regarding post- harvest activities of rice. The study concluded that, a little more than half (52.62%) of the women belonged to middle age category and 51.08 per cent of the respondents can do their signature only. Few of them (28.02%) belonged to small family. Majority (85.50%) had small land holding. More than half (58.02%) of them had medium annual income. Less than half of them (42.72%) had medium decision making role and (53.63%) had adequate family co-operation. Little over than half of them (52.72%) had medium extension contact and (66.04%) of them had no training experience. Humayera *et al.* (2003) carried out a study on participation of farm women in post- harvest activities of rice and concluded that a little more than half (52.62%) of them belonged to middle age category and (51.08%) can only do their signature. More than half (56.03%) of the farm women had medium family size. Majority (85.50%) of them belonged to marginal land holding. More than half (58.02%) of them belonged to medium annual family income. The study also concluded that a little over than two third of the farm women had low extension contact.

**2. Knowledge of women about post-harvest activities**

Khatri (2017) studied on technological needs of farm women in post- harvest activities and concluded that in post-harvest activities, women had less awareness about adoption of post-harvest practices with overall (28.96%) score. The overall gap in knowledge and adoption of post harvest practices was found high. Chamandeep(2017) conducted a study on farm women’s knowledge on improved post-harvest maize technologies of Rajasthan’s agro climatic zone IV A. The study findings showed that more than half (60.00%) of the women had low knowledge and a littile more than two third (40.00%) had average knowledge of improved post - harvest technologies of maize. Hada and Bansal (2017) studied involvement of rural women in processing and preservation of fruits. The study concluded that, most of the women (70.66%) had good knowledge on fruit preservation activities and processing namely fruit selection and (56.75%) of the women had knowledge on washing. About 36.75 per cent women had poor knowledge in grading and packaging (26.29%), marketing (22.00%) and storage (16.30%). Patil and Nagnur (2015) carried out a study on farm women’s role in chilli cultivation. The study showed that a little more than half (53.30%) of the women had medium knowledge on chilli cultivation. A little more than one third (35.40%) of them belonged to high and very few (11.30%) of them had low knowledge on chilli cultivation.

Jadhav *et al.* (2010) studied farm women’s knowledge regarding mango post-harvest technology. The study revealed that, most of the respondents (59.17%) had medium knowledge about post-harvest technology. Few of them (20.83%) had high knowledge followed by (20.00%) had low knowledge. Education, annual income, land ownership, social involvement, information source and risk orientation had a strongly positive and significant relationship with knowledge. Whereas, age showed negatively significant relationship with the farm women’s knowledge. Mande *et al.* (2007) studied farm women’s knowledge regarding post-harvest technology. The results indicated that, majority (86.00%) of farm women had low knowledge on safe storage methods, storage pests (80.67%) followed by extent of damage (80.00%), drying time (67.33%) and low cost storage systems (66.66%). The study also indicated that half (50.00%) of the female farmers possessed medium to high knowledge in grading, packing and transporting. Swetha *et al.* (2006) studied about knowledge of farm women beneficiaries on farm demonstration (OFD) on paddy cultivation in Karnataka. The study revealed that a little more than half (54.44%) of the farm women had medium level of knowledge whereas, one fourth of them (25.56%) had low level of knowledge and few of them (20.00%) had high knowledge on paddy cultivation.

Priya *et al.* (2006) carried out a study on the level of knowledge of tomato cultivation by farm women participation of farmers field school (FFS). The study showed that half of the (50.80%) farm women had medium level of knowledge, very few (27.50%) of them had high level of knowledge and (21.70%) had low knowledge on tomato cultivation. Humayera *et al.* (2003) conducted a study on involvement of farm women in post-harvest activities of rice. The results in the study indicated that, more than half (65.05%) of the farm women had medium level of knowledge, whereas few of them (26.05%) belonged to high knowledge category and only 08.00 per cent of them belonged to low knowledge category.

**3. Participation of women in post-harvest activities**

Adejo (2019) conducted a study on farm women’s participation in post-harvest management of maize in Kogi state. The results in the study indicated that 42.26 per cent of women farmers were highly involved in storage whereas, 41.67 per cent of women farmers were engaged in marketing of maize and low involvement was observed in transportation, grading, packaging and processing activities. Yadav *et al.* (2018) studied involvement of rural women in post-harvest activities in Jaipur, Rajasthan. The results in the study indicated that majority (85.00%) of the respondents involved in threshing whereas, most (68.33%) of them were involved in winnowing and cleaning, transporting to threshing floor (66.66%), storing and treating grain (60.55%), loading of fodder and food grains (45.55%) into the carts followed by weighing and bagging (46.38%) activity. Hada and Bansal (2017) carried out a study on participation of rural women in processing and preservation of fruits. The findings in the study revealed that, poor participation of rural women was observed in fruits processing and preservation practices with an overall weighted mean score of 0.49. The research outcome also indicated that cent per cent of the respondents engaged individually or jointly with male participants in fruit selection.

Patil and Nagnur (2015) conducted a study on role of farm women in chilli cultivation. The results indicated that majority (72.49%) of the women participated in harvesting and post-harvesting operations, followed by pre – sowing and sowing operations (61.63%) and in inter-culture operations by (62.96%). Aggarwal *et al.* (2013) conducted a study on agricultural activities performed by rural women. The results reported that, great majority (96.00%) of the rural women were involved in drying and cleaning of grains. Majority (85.03%) of them involved in transplanting followed by (84.06%) winnowing, harvesting of crop and cutting of grass (78.06%) picking (77.03%) and sowing (74.06%). Most of them (68.00%) involved in cleaning of field and gap filling. Raising nursery for seedling by 65.05 per cent, thinning by 60.06 per cent, weeding by 58.00 per cent, manure application (56.00%), grading (55.03%), processing (39.03%), leveling of field (23.03%), irrigation (20.06%) and fertilizer application (12.00%). Whereas, equal percentage (08.06%) of them were doing plant protection activities, marketing and threshing, shifting produce to threshing floor. Only 02.00 per cent were involved in ploughing the field. Ojha *et al.* (2012) carried out a study on work pattern of farm women in post-harvest activities. The study concluded that, majority (85.52%) of the respondents were involved in performing various harvest and post-harvest activities such as cutting/uprooting, (79.32%) weeding, bundling (74.20%) picking (72.79%) removing of stalk and stubble respectively (70.81%).

Ragumamu (2009) conducted a study on assessment of women in post-harvest technology of maize. The study concluded that, women’s involvement in post-harvest activities was observed in seven operations i.e., winnowing (98.00%), drying of grains (90.00%), application of pesticides (70.00%), grinding (65.00%), drying of cobs (40.00%), storage (30.00%) and de-sheathing, packing and stacking (29.00%). The results in the study also concluded that man’s participation in larger proportions was observed in transportation (92.00%). Mishra *et al.* (2009) studied participation of women in decision making related to agricultural activities. The study revealed that, rural women were involved more in activities such as nursery management (63.50%), seed storage (52.50%), transplantation (41.50%), grading and weeding (40.50%).Whereas, less participation of rural women (12.50%) was observed in plant protection (07.50%) and (04.50%) marketing.

Soumya *et al.* (2009) conducted a study on involvement of rural women in harvest and post- harvest activities. The study revealed that cent per cent of the rural women were involved in cleaning. Majority (89.17%) of them involved in collecting the straw followed by harvesting (86.67%), filling the produce into the basket/ bag (79.17%), drying activity (74.17%), grading (64.17%), winnowing (52.50%). Jethi (2008) studied farm women’s participation in potato production in Punjab and revealed that the highest mean scores of farm women’s manual participation were observed in digging ( 01.32), storage (01.32) and grading (01.29) operations respectively. Kiranjot (2007) conducted a study on participation pattern of women in post-harvesting. The results in the study indicated that, drying and storage was the main activity carried out by most of the farm women and ranked first followed by cleaning which ranked second. Most of the women served with male leaders in other tasks. However the least participation in processing and marketing activities was reported. Singh and Sharma (2002) carried out a study on involvement of women in hill agriculture. The results in the study indicated that, women participation in agriculture was observed high in ten operations viz., seed storage, threshing and winnowing, harvesting, care of animals, weeding, seed bed preparation, transportation, marketing of produce and using tools and implements.

**4. Training needs of women in post-harvest activities.**

Guivaha (2015) carried out a study on impact of agricultural training programs for women farmers and concluded that women farmers opined that, 24.00 per cent wanted more information on development and handling of the produces followed by 23.00 per cent of women wanted to attend agricultural seminar. Few of them told that (17.00%) training needed to be strengthened and 16.00 per cent suggested to develop farmers field school at village level. Chawang and Jha (2010) in Nagaland assessed the training needs of paddy growers. The study findings revealed that more than half (62.53%) of the farmers had medium level of training needs. Only 19.69 per cent belonged to high training need category followed by low ie, 17.78 per cent. The study also concluded that plant protection initiatives, loan-related to subject matter and intercultural activity were the farmer’s important training needs. Less training needs was observed in land preparation and nursery raising. Rahman *et al.* (2010) in their study on performance of farm women in post-harvest activities of Guava reported that, majority (86.00%) of the women were in great need to get training to improve management skill followed by (82.00%) access to support service. A majority (74.00%) of them needed to gain financial ability followed by decision making skills (70.00%). The study also revealed that 76.00 per cent of respondents had a high degree of need for capacity building in post - harvest activities.

Bajpai *et al.* (2007) conducted a study on training needs of rice growers with a sample size of 100 rice producing farmers. The findings of the study revealed that the major areas of the training needs of the rice growers were seed treatment, improved varieties of seeds, plant protection measures, fertilizer management, storage and marketing. Uplap *et al.* (2010) conducted a study on farm women’s needs for training in food grain storage practices. The study concluded that more than half (65.89%) of the respondents expressed the need to get training on scientific storage structures. Study findings also revealed that great majority (98.00%) of the farm women expressed the need to organize training at village level and majority (78.24%) of them preferred one day training. Humayera *et al.* (2003) carried out a study to identify training needs of farm women involved in post-harvest activities of rice. The results in the study concluded that more than half (66.04%) of the farm women had no training experience and one third (33.06%) of them had low training experience. The study also found that (71.00%) of the respondents had medium to high training needs and it indicates that more than half (64.54%) of the women expressed the need to get training on conception about the insect pest of stored rice. Whereas, a little more than two third of them expressed the need of training on preservation and care taking of seed rice and 36.36 per cent of them expressed the need to get training on selection and collection of seed rice.

**5. Constraints and health problems faced by women during post-harvest activities**

Malek and Sisodia (2019) studied the constraints faced by female farmers in participating in agricultural activities shows that duel responsibility at farm and home ranks first with weighted average score of 1.990 followed by unavailability of farm machinery and farm implements ranked second with 1.896 weighted mean score. Lack of physical abilities to carry out some agricultural works ranks third with weighted mean score of 1.693 and social barriers with 1.527 score. Naik *et al.* (2019) conducted a study on constraints faced by chilli growers and revealed that, great majority (91.07%) expressed high labour charge as a constraint. Majority (83.03%) said high cost of agricultural input, cent per cent expressed chilli has low market price, lack of training programmes regarding technology recommended for chilli production and electricity problems. Majority (80.35%) said lack of knowledge regarding insects, pests and diseases as a constraint.

Roy *et al.* (2017) reported that great majority (96.00%) of women respondents expressed low wage as the major constraint. Majority (84.00%) said that lack of resources as a second major constraint followed by 64.00 per cent of them expressed lack of training as a third major constraint. Nearly one third of them (30.00%) said low productivity as a constraint. Few of them (20.00%) felt physical weakness while doing farming activities and 16.00 per cent were facing social problems while participating in farm activities. Abrol *et al.* (2015) carried out a study on role of farm women in agriculture. The results in the study indicated that majority (84.00%) of the respondents felt they faced difficulties in conducting farm operations followed by 78.00 per cent of women experienced health problems such as tiredness, fatigue, restlessness. Majority of them (74.00%) said disturbed social life was a major problem. Unhygienic conditions as a problem was expressed by 42.00 per cent. However 38.00 per cent of the women were unable to mange time between farm and household works.

Dangore *et al.* (2015) studied constraints faced by chilli growers and stated that majority (84.44%) of the dry chilli farmers reported lack of market intelligence ranked as first major constraint. More than half (65.55%) of them expressed that high cost of transport as a constraint and ranked second. Half of them (50.50%) expressed high commission charges were a big problem and ranked III. Lack of storage facilities ranked fourth by 44.66 per cent followed by 38.88 per cent reported irregular payments due to intermediater as a problem which was ranked V. A little more than one third (35.55%) farmers expressed lack of financing as a constraint and it ranked VI in the marketing of dry chilli. Patil *et al*. (2015) conducted a study on role of women in chilli cultivation and revealed health problem as a constraint faced by women in chilli cultivation. Majority (82.66%) had body ache, joint pain (76.66%), shoulder pain (74.66%), respiration problem (55.33%), skin problem (52.00%), back ache (45.33%), head ache (40.66%), neck ache (22.00%), and 17.33 per cent said fatigue as a health problem.

Aggarwal *et al*. (2013) carried out a study on problems faced by rural women while performing agricultural activities. A great majority (95.03%) of the rural women faced health problems such as backache, headache, fatigue/restlessness. Majority (80.00%) expressed need for healthy diet, more than half (60.06%) said that unhygienic conditions in the field. With respect to management problems, farm women faced difficulty in managing time between farm and home (71.03%), difficulties in carrying major operations like crop harvesting /transplanting, cultivation /sowing (53.03%). With regard to social problems farm women expressed that they feel shy to work with in-laws in the field (32.00%), veiling problem (64.06%) and lack of finance (76.00%) whereas lack of resources (70.06%) were the financial problems. Girade and Shambharkar (2012) carried out a study on constraints faced by farm women in participation of farm and allied activities. The results in the study revealed that majority (82.50%) of the respondents major constraints was burden of family work. More than half (57.50%) of them expressed low technical knowledge about farm activities as a constraint. Half of them (50.00%) said that health related problems as a constraint. Secondary status in decision making was a problem for 45.83 per cent women. Poor economic conditions (41.67%) and working under unfavorable (40.00%) expressed conditions as a constraint respectively by the respondents.

Sharma *et al.* (2012) conducted a study on rural women participation in agricultural activities in Marh block of Jammu district. The study concluded that most of them (64.00%) were facing health related problems viz. headache, backache, restlessness and fatigue. More number (64.00%) of the respondents said that they were unable to manage time between household activities and farm. whereas, 42.00 per cent felt unhygienic conditions in field as a problem, (42.00%) of the farm women expressed that they feel shy to work with their in laws. Rahman *et al.* (2010) conducted a study to identify problems faced by women in post-harvest activities and revealed that more than half (60.00%) of them had less knowledge on post-harvest activities whereas, 35.00 per cent expressed that less skills and experience as a problem. Lack of training as a problem by 35.00 per cent and 20.00 per cent said less co-operation at work. For 20.00 per cent of the women lack of local female staff is a problem. Few of them told (15.00%) no processing unit and very few (05.00%) felt lack of capital as a barrier in post - harvest activities.

Baba *et al.* (2008) carried out a study on role of women in agricultural and income generating activities. The study revealed that, majority (85.71%) of the farm women indicated lack of proper training was a major problem. Whereas, 65.71 per cent of them indicated marketing problems followed by lack of ware house and storage facilities (64.28%). More than half (61.42%) of the respondents indicated high cost of production and a little more than half (51.14%) of them were facing financial problems as well as social problems as a major obstacles in income generating activities. Dangore *et al.* (2015) conducted a study on marketing and production constraints faced by dry chilli growers. The results in the study concluded that, great majority (90.00%) expressed lack of technical knowledge in production was the major constraint. Majority of them said lack of financial facility (87.77%), lack of drying space for dry chilli (86.66%). With respect to the marketing of dry chilli majority (84.44%) of the respondents expressed that lack of marketing intelligence as a major constraint. Most of them (65.55%) said high cost of transport charges and half of them said (50.50%) heavy commission charges as a constraint.

**Suggestion:** In addition, you may consider expanding your review to include other relevant subtopics, such as the economic impact of women’s roles in post-harvest activities, cultural and social perceptions of women in these activities, technological adoption and innovation, and policy and institutional support for women in post-harvest activities.

**CONCLUSION**

Agriculture is the backbone of the global economy for developing countries. India, for example, is heavily reliant on agricultural resources, with women making up the majority of the agricultural and post-harvest workforce. Women handled the majority of household chores as well as farm and agricultural work. Women are undeniably the backbone of agriculture workforces. They not only contribute physical output but also ensure quality and efficiency. Despite their significant contribution, workforces are often overlooked and undervalued. On the other hand, women's participation in agricultural decision-making is a critical component of overall development. The already overburdened domestic household chores and other allied activities that women performed posed enormous challenges to their health, well-being and development.

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**DISCLAIMER (ARTIFICIAL INTELLIGENCE)**

**CONFLICT OF INTEREST**

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