

Farm women and seeds: strengthening relation for sustaining agricultural productivity

Inception of agriculture has witnessed the pivotal role of women in perceiving how seeds sprouted and grew into plants. Since the birth of farming, women have been the backbone of the agricultural work force. Today, they represent 43% of the global agricultural labour force. There has been 24% increase in the number of female agricultural labourers¹, from 49.5 million in 2001 to 61.6 million in 2011. The percentage of women who depend on agriculture for their livelihood is as high as 84. In India, 79% of women continue to be engaged in agriculture and allied activities, as against only 63% of men. Women cultivators and agriculture labourers perform 70% of all the agriculture activities². Even though women are the major producers of food, they lag well behind men in access to and control over productive resources and farm income. If women had the same access to productive resources as men, they could boost their yields by 20–30% raising overall agricultural output in developing countries by 2.5–4% (ref. 3).

With alarming numbers of male farmers stepping out of farming, women farmers are the present and future of farming. Increased suicides by male farmers and their migration to non-farm activities are forcing women to shoulder household as well as farm responsibilities. About 12% of all rural households in India are now managed by women with small holdings². Still, women are the invisible faces of Indian agriculture. Hence, our endeavours should address marginalization of women in agriculture.

Farm women are mostly dependent on the natural resources for their livelihood. Hence, their livelihood is directly impacted by climate change and scarcity of natural resources. Inadequate access to productive resources limits women's livelihood options and exacerbates financial strain on them. High vulnerability to natural calamities, male-centric input supply and service system, inability to afford fresh farm inputs every year, denial to institutional credit in the absence of land rights, restricted mobility and poor participation in decision making are the major gender issues in farm women's access to productive resources. In spite

of these issues, the farm women's access to seeds is pertinent from the food security point of view.

Women's traditional roles as primary seed-producers and seed-managers are well known in society. They are the custodians of the seeds and have played an important role in seed collection, conservation and maintenance from the beginning of agriculture. They emphasize on self-reliance on seeds and family nutrition⁴. They have preserved traditional production systems of local landraces for sustaining their livelihood⁵. Farm saved seeds cater to more than 50% of land in India. But after the green revolution, its importance diminished due to the use of high-yielding varieties. Male farmers took control over seed procurement and management. In this way, women moved away from the seed production system and got engaged in drudgery-prone farm activities like transplanting, weeding, etc. Men and women farmers have different needs regarding seeds depending on what they do along the food chain.

As globalization shifted agriculture into a capital-intensive mode, women had to bear the unequal costs of both displacement and health hazards. They carry heavier work burden in food production and get lower returns and recognition. The new opportunities offered by globalization have not reached farm women because of their under-representation in decision-making at all levels. The new Patent Law, Seed Act 2004 and Genetic Use Restriction Technology (GURT) are taking away the farmers' control over seeds by denying their traditional role in seed saving and making seed a corporate monopoly. This has threatened nutritional security, agrobiodiversity and traditional seed-making processes in the villages.

Presently, we are losing local varieties which are suited to the local climate and have the capability of giving good returns using less input. Hence, creating an inventory of the local varieties still being cultivated and conferring legal rights to the local people for production and distribution of these cultivars are necessary. According to the Protection of Plant Varieties and Farmer's Rights Act

(PPV&FRA, 2001), farmers can produce, sell and exchange their produced seeds. Hence, women's inherent capability of nurturing seeds can be revived by bringing them back to seed production. We can convert the seed problems of farm women to an opportunity for being seed producers. Capacity building of women will improve their skills for undertaking production and management of high-yielding varieties and conservation of landraces. Trainings on package of practices for seed production will help them to be seed entrepreneurs. Women Self Help Groups can be strengthened to produce seeds on a large scale, thus facilitating distribution and marketing. Collective production of certified seeds can also be taken up with collaboration of State Seed Corporations. Contract seed production may be an effective way to involve farm women in quality seed production through public–private partnership mode. Development of lesser seed standards for labelling and authorized mini seed testing laboratories in every block or panchayat for farmer-cultivated varieties will boost value-added seed production at the grassroots level. It will protect farm women from economic exploitation due to use of GURT in seed sector and maintain seed sufficiency in their vicinity. Introduction of farmer notifications of landraces can further help them against corporate monopoly. Seed fairs involving stakeholders like seed-producing farmers and farm women, distributors, germplasm conservers and facilitating institutions can be organized for effective seed exchange using seed vouchers³. Establishment of women-managed community seed banks using scientific storage methods will re-establish the seed tradition in the villages⁶. In this way, farm women can enjoy easy and immediate access to quality seeds along with exchange option in the absence of working capital.

Achieving gender equality and women empowerment is one of the Sustainable Development Goals by 2030. It emphasizes to undertake reforms to give women equal access to and control over productive resources. Hence, prioritizing seed-related needs and challenges of

farm women through innovative strategies by considering their vulnerability and closeness to nature will strengthen farm women and seed bonding for sustaining agricultural productivity. It provides an unprecedented opportunity to refocus women's role in seed production and management. Hence, developing well-trained, self-reliant, self-motivated and visionary women seed producers who can contribute to reduce the quality seed scarcity of our country is the greatest challenge ahead.

1. Census of India, Ministry of Home Affairs, Government of India (GoI), 2011.

2. NSSO, Situation assessment survey of farmers, Ministry of Statistics and Programme Implementation, GoI, 2010.
3. FAO, The state of food and agriculture 2010–11, women in agriculture: closing the gender gap for development, Food and Agriculture Organization of the United Nations, Rome, 2011.
4. Salini, P., Women reclaim our seeds, Pesticide Action Network Asia and the Pacific, 2013.
5. Wilson, J. L., Organizing seed fairs in emergency situations: Improving the efficiency of seed distribution, International Crops Research Institute for the Semi-Arid Tropics, Hyderabad, 2003.
6. Mallik, S. K. *et al.*, Community seed banks: Operation and scientific manage-

ment, National Bureau of Plant Genetic Resources, New Delhi, 2013.

LAXMI PRIYA SAHOO^{1,*}
SHIVAJI ARGADE¹
ANANDA CHANDRA SASAMALA²

¹ICAR-Central Institute for Women in Agriculture,
Bhubaneswar 751 003, India

²Directorate of Agriculture and Food Production,
Government of Odisha,

Bhubaneswar 751 001, India

*e-mail: laxminrcwa@yahoo.co.in

Tea mosquito bug (*Helopeltis theivora*) and mealy bug (*Paraputo theaecola*) – new threats to large cardamom

Large cardamom (*Amomum subulatum*), a member of the family Zingiberaceae under order Scitaminae, is the most important cash crop in the eastern Himalayan region including Sikkim and the Darjeeling hills in India, the eastern part of Nepal and southern Bhutan¹. Sikkim is the largest producer covering 16,010 ha area, with a production of around 3842 MT and productivity of 240 kg/ha. It is the second largest producer in the world, next only to Nepal². Large cardamom is a perennial, shade-loving crop found at elevations between 600 and 400 m amsl. It requires a high level of humidity (>90%) with annual rainfall of 2000–4000 mm (ref. 1). Large cardamom forms a substantial part of people's livelihood and food security. It is the only source of cash income for many families in the Sikkim Himalaya. Recently, large cardamom cultivation in Sikkim has been facing threat due to several factors, viz. pests and diseases, soil erosion and climate change, presence of old and senile plantations, lack of quality planting materials, drought during winter, preference of government job among youth, lack of migratory labour, lack of proper management, etc. Among these, occurrence of insect pests and diseases is the major factor for low production and productivity of the crop. Stem borer (*Glyphipterix* spp.), shoot fly (*Meroplotops dimorphus* Cherian), leaf eating caterpillar (*Artona chorista* Jordon) and white grub

(*Holotrichia* spp.) are considered as destructive pests of large cardamom³. Since 2014, infestation of tea mosquito bug, *Helopeltis theivora* Waterhouse (Hemiptera: Miridae) and mealy bug, *Paraputo theaecola* (Green) has been recorded in Sikkim. If not addressed properly, they can become a major threat to large cardamom industry.

H. theivora is a major pest in tea plantations. In recent years it is seen damaging large cardamom plants by sucking the sap from the leaves. The affected parts of the plant develop a streak stain that is dark brown (Figure 1). The young shoots become curled, dried and black, thus slowing down the growth of the plant and ultimately affecting the yield. Badly damaged plants produce less shoots and thus the plant loses vigour and becomes stunted. The female lays eggs inside the tender stem, petiole and midrib. After hatching, nymphs complete their nymphal period through four instars. The size of spots increases gradually with the development of instars. First or second instar nymphs can produce more than 140 spots in a day. The fully mature nymph or adult can produce at least 100 spots/day. The first and second instar nymphs prefer mostly the shoots and younger leaves, whereas the later instars and adults prefer comparatively mature leaves. The abundance of the pest is seen from April to November; but in Sikkim it causes major damage

during June–September. Initially the damage starts from a small area and then spreads to the entire area. It causes 30–35% damage in the leaves with symptoms resembling the leaf streak disease. Tea mosquito bug is a destructive polyphagous pest and has wide host range, viz. cashew nut (*Anacardium occidentale*), guava (*Psidium guajava*), mango (*Mangifera indica*), bitter vine (*Mikania micrantha*), kadam (*Anthocephalus cadamba*), jasmine (*Gardenia jasminoides*), Malabar melastome (*Melastoma malabathricum*), jambu (*Eugenia jambolana*), rose (*Rosa sinensis*), etc.⁴. Recently, besides large cardamom, 13 more hosts have been identified in Sikkim, viz. red cherry pepper (Dalle Khorsani), red hibiscus (*Hibiscus* spp.), *Dahlia*, *Solanum* spp., *Salvia* spp., *Duranta* (*Duranta* spp.), ornamental sweet potato (*Ipomoea batatas*), bathua (*Chenopodium album*), *Chlerodendron* spp., *Houtoena cordifolia*, *Chrysanthemum* spp., *Ficus hookeri* and ridge gourd (*Luffa acutangula*).

P. theaecola (Green) has been recorded in Kerala on small cardamom plant, *Elletaria* spp. as a destructive pest (Figure 2). It was recorded for the first time in large cardamom in 2014 at ICAR Research Complex, Sikkim Centre, Tadong. The specimen of mealy bug has been identified at ICAR-NBAIR, Bengaluru. The body of mealy bug is round, orange-brown and covered by a thin layer of white mealy wax allowing body segmentation