



## 16.

# Empowering Women in Agriculture

The Directorate of Research on Women in Agriculture (DRWA), Bhubaneswar, with a mandate to carry out research on gender issues in agriculture, has made efforts through in-house projects and network programs. Besides, awareness programmes and developmental activities for the benefit of the farm women were carried by the Directorate under AICRP.

### Gender and work participation scenario in agriculture

The scenario of female work participation rate (WPR), gender gap in work participation rate and gender composition of agricultural researchers in ICAR were studied. A significant decline in female WPR was observed in Dadra and Nagar Haveli (13.5 points), Mizoram (11.4 points), Haryana (9.4 points), Punjab (5.10 points), Gujarat (4.5 points), Daman and Diu (3.7 points), and Jammu and Kashmir (3.3 points). Improvement in female WPR was registered in Nagaland (6.7 points), Lakshadweep (3.7 points), Kerala (2.8 points), Jharkhand (2.7 points), Odisha and Tripura (2.5 points). Ideally, gender gap should decline with development, but the data suggested that it has widened in many states, viz. Dadra and Nagar Haveli (12.7 points), Daman and Diu (9.7 points), Haryana (9.6 points), Gujarat (6.8 points), Punjab (6.7 points) and Mizoram (6.4 points).

Components and parameters of nine gender related globally-used indices were collected and reviewed. Significant dimensions considered were education, health, leadership, participation and income. In addition, the dimensions related to production, resources, time and decision were also considered in women's empowerment in agriculture index (WEAI), social institutions and gender index (SIGI) and women's economic opportunity index (WEOI). The WEAI was the most suitable for measuring empowerment of women in agriculture. Pre-testing of WEAI to study its suitability in the Indian context is being carried out in nine states having varied farming systems. Conceptual frameworks for developing new indices related to different dimensions of empowerment of women in agriculture, farming systems and gender friendly technologies have been prepared.

### Livelihood improvement of rural women through horticulture model

Under resource efficient horticultural model, various components like high density planting of banana, meadow orcharding of guava, high density planting of papaya, pineapple, lime, growing of vegetable crops in open field and protective condition, tuber crops etc. were evaluated. The model developed on 2,000 m<sup>2</sup> area by adopting recommended package of practices

and gender friendly pest management techniques gave 790 kg fruits (banana 530 kg, papaya 210 kg and guava 50 kg); 275 kg green leafy vegetables (amaranth, coriander leaves, fenugreek leaves and spinach), 280 kg roots and tuber crops (radish, elephant foot yam, yam and colocasia) and 1,490 kg other vegetables (bitter gourd, bottle gourd, cauliflower, capsicum, okra, tomato, brinjal, chilli, cowpea and cauliflower).



Horticulture model

A multistoreyed cropping model in coconut orchard was developed for efficient resource use and to enhance women's participation. Second storey crops were banana, papaya and guava; ground storey intercrops were cowpea, turmeric, elephant foot yam and pineapple in the interspaces of the main crop. The intercropping did not show any adverse effect on main crop as well as second storey crops. Among the different intercropping combinations, highest yield was recorded in turmeric (180.46 q/ha), followed by elephant foot yam (150.2 q/ha). Yield of cowpea was recorded 52.30 q/ha from July to September. Income/ha generated from the second storey and ground storey crops cultivated by women was ₹ 462,000 against ₹ 48,000 in sole crop.

### Tribal Sub Plan (TSP) Programmes

After devastating *Phailin*, the Directorate adopted two clusters of tribal villages in Mayurbhanj and Gajapati districts under Tribal Sub Plan (TSP) Scheme to assess the perceived needs, gaps and to plan interventions accordingly. These two districts were among the worst-hit by the cyclone *Phailin* and subsequent cloudburst induced flood caused heavy mortality in livestock and ruined livelihood. Further, on the basis of scientists-farm women interfaces the interventions in the forms of animal health camps, skill upgradation on scientific grain storage,





demonstration of maize de-husker-cum-sheller, awareness on drudgery reducing women-friendly farm tools and nutritional assessment were carried out. An awareness programme on scientific and hygienic storage of food grains was organized and metallic grain storage bins were also distributed on this occasion to tribal women to promote effective pest management and scientific storage for taking care of food and nutrition security of families. An awareness-cum-skill upgradation programme on 'drudgery reducing implements for farm women' was conducted in both the districts through demonstration of gender-friendly minor farm tools. Hampers of improved sickles, hand cultivator, *khurpi*, tubular maize sheller and ring cutter were distributed.

### AICRP on Home Science

The All India Coordinated Research Project (AICRP) on Home Science is in operation in ten State Agricultural Universities. The project focused on food and nutrition security in selected farming system, drudgery assessment and mitigation, mitigating occupational health hazards, capacity development of youths engaged in agriculture and empowerment of women. For characterization of nutritional diversity in selected farming systems, rural families were selected with equal representation of low, medium and high socio-economic categories. All the food groups are available in all the seasons. However, availability of various types of fruits and vegetables was more in winter as compared to summer.



Infant feeding practices varied in terms of type of food. In Parbhani, Palampur, Ludhiana, Hisar, Udaipur and Pantnagar honey was the most common prelacteal feed. Whereas, no prelacteal feed was used in Jorhat and Hyderabad. Colostrum was given by 36.66% families in Pantnagar while breast feeding was practiced by all the families in Hyderabad. Cereal and pulse based recipes and fruits were used as weaning and supplementary foods in the families. About 50 to 70% families introduced weaning and supplementary foods at various centres except at Palampur where all the families followed this practice. Age of introducing prelacteal feed ranged from just after birth to one day, for colostrums 30 min after birth to one day followed by breast milk while weaning foods were introduced at the age of 5 months and given till one year and supplementary foods from 7 months to one year. Gender discrimination was not observed in feeding practices of feeding prelacteals, colostrum, weaning foods, supplementary foods and normal family meal.

A total of 52 iron rich recipes was standardized by using non-conventional ingredients. The iron content of these recipes range between 4.5 and 41.7 mg/100g of the finished product. The iron sources were lotus

### Ergonomic evaluation of selected activities in mango and cashew nut

The data on the general profile of the orchards, working pattern, gender issues and technological gaps revealed that major manual activities of farm women were preparation of soil mixture (70%), filling mixture in poly bags (100%), plantation (60%), weeding (100%), irrigation (50%), application of fertilizer (80%), harvesting (60%) and management of mango orchard except grafting (30%). Among these filling of soil mixtures in poly bags, plantation, clipping of shoots, weeding and application of fertilizer are very tedious and hazard prone. Ergonomic evaluation of selected activities such as weeding, filling of poly bags and removal of shoots carried by the farm women were assessed in the orchards. The data revealed that the average working heart rate was highest in filling of poly bags (127 beats/min) followed by removal of shoots (121 beats/min) and weeding (110 beats/min). Based on average energy expenditure, the removal of shoots (8.9 kJ/min), filling of poly bags (7.5 kJ/min) and weeding (6.06 kJ/min) were considered as heavy work performed by the farm women.



Drudgery reducing implements/technologies

Technological interventions were made in some of the selected activities to reduce the drudgery. With the help of trowel 80–120 bags/h could be filled with soil mixture as compared to 48–60 bags/h manually. Traditionally the farm women remove shoots from mango and cashew nut plants 360–400 shoots/h, which increased to 550–600 shoots/h when small secateurs was introduced.

stem, garden cress seeds, amaranth seeds, millets, gram flour etc. Based on sensory evaluation, recipes were ranked 6.5 to 8.5 on a nine point scale indicating moderate to high acceptability of the products.

Production systems, viz. cotton, strawberry, soybean, chilly-groundnut, paddy-tea leaves, dairy, flower and potato of the operational villages were identified to characterize drudgery of women. Under the project, 13 technologies were developed and ergonomically tested and about 17 technologies were up scaled for introduction among SHG groups. These included harvest bag (back), harvest bags (front), harvest bag (basket), capron, seed bag cum fertilizer bag, seed placement tube, milking stand and stool, head load managers, revolving milking stool and stand, tailoring table, gopal khore, brinjal and okra mittens, trishul weeder, cotton picking apron, potato picker, potato digger and medium hoe. Occupational health problems of workers engaged in agricultural activities, agro-allied sector and textile sector were identified. An application for patent of head load manager was filed on 30 May 2014 vide 2667/CHE/2014.

**Protective clothing for farm workers**

Existing dress patterns of farm workers engaged in agriculture, agriculture allied and textile sector were studied to identify the occupational health hazards. Discomfort/itching of lower body parts due to wetting of clothes (88.3%) was the most common problem observed during rice transplantation, followed by fungal infection in foot (86.7%). During threshing, major occupational problems were soiling of body parts and eye irritation/itching (58.3% each), followed by running nose/sneezing (51.6%). Occupational problems of okra pickers were cuts in hands (90%), cuts in other body parts (90%), itching/irritation in hands (90%) and skin rashes (16.7%). Problems of ber pickers were cuts in hands (92.5%), cuts in other body parts (42.5%) and itching/irritation in hands (47.5%). Based on the problems reported protective clothing was designed to mitigate these and improve efficiency.

**Identification of natural plant sources as fibres and textile auxiliaries**

To evolve appropriate technologies for extraction and processing of unconventional fibres for production of woven and non-woven fabric, Palampur centre developed a composite fabric from Bhimal (*Grewia optiva*). Value-added *Grewia optiva* woven products, bags, blinds, table runners, were developed. Pantnagar

centre made value addition to *Cannabis sativa* (hemp) and processing of *Girardinia diversifolia* (bichchoo grass) fibre. Fibers were opened by separating the fibres manually and combing was done by hand and carding by machine. Hemp fibres are coarser, stiffer and have low cohesion and were thus, manually spun on *Bageshwari charkha*. Prepared hand spun yarn was dyed with hot brand reactive dye and used as weft yarns being coarser and uneven these were combined with the cotton warp for production of union fabrics. The valuable inherent properties of hemp fibres were found suitable for the production of decorative woven fabrics.

All the centres reported that the respondents used rapid, pigment, sulphur, vat and direct dyes for textile printing. Natural dyes were used for the purpose only in Udaipur. For printing, besides well known guar gum, other natural thickening agents were also being used in Rajasthan like gum acacia or tamarind seeds gum. Thickening agents removed by soaking in water and rinsing were: gum acacia (39.2%), guar gum (16.7%) tamarind seed gum (3.33%), rice starch (8.33%) and synthetic thickeners (33.3%). Respondents of Asom centre (20%) were also using the same technique for removal of synthetic thickener. All the respondents (100%) of Ludhiana removed thickening agents through steaming.

