



Gender Issues for Technological Empowerment of Women in Agriculture

The National Research Centre for Women in Agriculture has been established to identify gender issues and test appropriateness of available farm-technologies/programmes/policies with women perspective, for promoting gender mainstreaming in research and extension for empowerment of farm women and capacity building of scientists, planners and policy makers to respond to the needs of farm women. Accordingly research projects and activities were taken up during the year under report.

The broad areas of activities related to research and extension were focused on developing database on gender, training modules on engendering research and extension, resource management by women agricultural labourers, mobilization of rural women through women Self Help Groups, ergonomical evaluation of farm equipments, ecofriendly weed and pest management, standardization of weaning mix for children, introduction of low cost structure for storage of vegetables and fruits, farm tools and implements, training of trainers in emerging areas of agriculture, and training of farm women.

Research

One of the important research thrusts of the NRCWA is to develop **database on various gender issues**. Data collected from 130 households in five villages indicated different pattern of gender participation in five agriculture of scheduled caste (SC) and non scheduled caste (non-SC) families. In case of SC families, young

- Access and control over resources were studied in SC and non-SC families
- A training module for gender sensitization in agriculture prepared
- Skill training needs and interests of women SHGs were identified for their entrepreneurial development
- Eco-friendly pest management resulted in maximum benefit : cost ratio
- Zero energy cool chamber proved very useful during summer
- Different trainings were provided to farm women to upgrade their knowledge and skills in agriculture technology

and middle aged men–women, and elderly women were mostly engaged in agricultural works both as family labourers and wage labourers. The elderly men who were not involved in any economic pursuit looked after the livestock and homestead activities. In non-SC families, men had higher participation in farm related activities, compared to women. While the elderly women looked after the livestock and other activities related to household and homestead, the elderly men were involved in different social, economic and political activities. As far as the access and control over resources is concerned, it was found that majority (68.5%) of the wage earning SC women deposited their earnings with their male counterparts, many of whom did not have any say in the way their income was spent. In non-SC families, majority of the women (84%) who in spite of not having any direct involvement in income generating activities had access and control over part of the earnings of their men counterpart. About 68% of the men respondents had joint accounts with their wives. Majority of women from land owning households could manage to retain part of the income from sale of farm produces which gave them the control over financial resources.

As a part of the **Network Project on Approaches to Engendering Agricultural Research and Extension** data have been collected from 380 households of Orissa, Kerala and Haryana. A training module for Gender Sensitization in Agriculture has been prepared and published for use of the stakeholders. The findings of respondents from Orissa engaged in rice, vegetable and livestock based farming systems indicated that the farmers in rice based farming systems spent 16 hours 53 minutes per day for farming

Training of rural women on use of improved farm implements





Women friendly farm tools and equipment

Farm women (250) from villages, Nipania Jat, Aadampur Chhawani, Dobra Jagir and Sagonikala of Bhopal district, were identified for introduction of women friendly farm tools and equipment. Training programmes on women friendly improved farm tools and equipment were carried out with the participation of 200 farm women. Tubular maize shellers and improved sickles were provided as training material so that they can use these equipment. A set of manually operated improved farm tools and equipment, viz. seed treatment drum, hand ridger, seed drill, fertilizer broadcaster, wheel hoe, grubber weeder, hanging type cleaner were provided to identified group leaders for use by trained farm women of these villages.

Evaluation of CIAE Cono Weeder, improved sickle, and rice transplanter for drudgery reduction in farm women. →



activities compared to 8 hours 32 minutes by the farmers in vegetable-based farming systems. The women in livestock based farming systems spent more time in farming activities than women of other two systems; however the women from all farming systems were exclusively responsible for home management activity.

The access of men as well as their control over the productive resources was much higher than women in most of the farming systems. The situation for women in vegetable and livestock based farming systems was better than that of rice based. The fairly accessible resources to women were the income from FYM (farm yard manure), animal produce, vegetable produce and being members of SHGs and Mahila Mandals. Men had full involvement in feed collection, cutting of fodder, preparation of feed, collection of feed, transportation, chaff cutting in rice based farming systems. Whereas both men and women were involved in vegetable and livestock based farming systems and women had greater role in preparation of feed. In livestock based farming system chaff cutting was done more by women than men.

To understand the differences in nature and extent of engagement of women agricultural labour in Orissa and Andhra Pradesh, project was undertaken on **Efficient Resource Management of Women Agricultural labourers**. Data were collected from 200 women agricultural labourers, 100 each from two states. Comparative analysis showed that women agricultural labourers in non-irrigated districts of Orissa were less involved in

agricultural work in a year compared to their counterparts in Andhra Pradesh. During a pilot study, 16 preferences were identified which may influence agricultural labour employment. In Orissa 42% women agricultural labourers wanted training in livestock management, vegetable production, backyard poultry farming and tailoring and stitching. In Andhra Pradesh, however, 44% women agricultural labourers perceived need for training on vegetable production, improved agricultural practices, livestock management and vocational training for self-employment.

Under the project **Development of Modules for Mobilization of Rural Women for Sustainable Livelihood through Women Self Help Groups**, the entrepreneurial activities of women SHGs were investigated by strength-weakness-opportunity-threats (SWOT) analysis. This analysis of the successful groups showed that that the group having good inter-linkages with other SHGs, government departments, and local businessmen found it easier to sustain and increase the business. Besides, a group with the ability to form partnerships for marketing, product information and technology backstopping was in a better position to develop its business. Skill training needs and interests of women of SHGs were identified for their entrepreneurial development through participatory approach.

Under the project on **Ergonomical Evaluation of Rice Farming Equipment for Farm Women**, CRRRI two row rice transplanter, CIAE-IEP cono weeder, and improved sickles, were



SUCCESS STORY

Empowerment of Women

- Bhopal sub-centre of National Research Centre for Women in Agriculture (NRCWA) conducted a survey to assess the involvement of women in agriculture and found that women devote 43.7% of their time in agriculture.
- Ergonomical evaluation of manually operated two-row drum seeder, TNAU four row drum seeder and CRRRI four row rice transplanter was carried out with women workers. It was found that the physiological load in terms of heart rate and pulse rate was higher than the acceptable limits of 110 and 40 beats/min, respectively. The working heart rate and pulse rate for operation of CIAE sickle, KKV Dapoli sickle, improved sickle and local sickles were within the acceptable limit.
- Training of woman workers on woman-friendly tools and implements were conducted at Village Chawani Pathar, Adampur and Nepania Jhat, attended by 52 and 103 women workers, respectively. The training was imparted on fertilizer broadcaster, 2-wheel seed drill, one-wheel seed drill, twin-wheel weeder, groundnut decorticator, hanging type grain cleaner, naven dibbler, seed treating drum and furrow and bund makers.
- During September 2005 to October 2006, the SPU centre of CIAE organized seven training programme for 115 rural women from nearby Bhopal district of Madhya Pradesh on various aspects of soybean processing and production soy milk, soy paneer, bakery items and soy snacks for use of soy foods in daily diet for nutrition and health benefits. Awareness camps and demonstrations were also held at different places like Seoni, Guna, Shajapur and Baramati.

evaluated. The mean heart rate of women workers in operation of CRRRI two row rice transplanter using mat type nursery was 148.1 beats/min and the increase in heart rate over rest was 61.5 beats/min. The area covered per hour was 96 m² at an operating speed of 0.26 km/h. The equipment needed refinement with regard to mounting of seedling tray so as to provide trouble free movement. Women workers could operate this equipment with suitable rest pauses during day long work.

Mean heart rate of women workers in operation of CIAE-IEP cono weeder was 153 beats/min and the increase in heart rate over rest was 70 beats/min. Through this weeder, the area covered per hour was 160 m² at an operating speed of 1.3 km/h. Women workers could operate this equipment with suitable rest pauses during day long work. As regards the improved sickles, it was found that the mean heart rate in operation of sickle developed by the CIAE, Bhopal, and local sickles for harvesting rice crop was 103.4 beats/min and 105.8 beats/min, respectively. Corresponding values for increase in heart rate over rest was 18.7 beats/min and 20.3 beats/min, respectively.

Using single factor experiment with repeated measures, there was no significant difference in working heart rate and heart rate at rest for CIAE Bhopal sickle and local sickles.

The study on **Popularization of Eco-Friendly Pest Management Technologies for Vegetables among Farm women in Homestead Land** revealed that in brinjal, CV BB 44 was preferred by farm women because of its suitability for transportation, tomato var. Kumari (BT 10) was preferred because of its good keeping quality, while cabbage var. Gold Star (Hybrid) was preferred because of solid heads and non-bursting even after several days of maturity. Maximum benefit : cost ratio was obtained when eco-friendly methods of pest management were adopted as compared to conventional methods. Thirty-nine eco-friendly pest management technologies and ITKs related to vegetables collected from different villages of Orissa as well as from organizations located at Bhubaneswar were documented.

Under the project **Technological Empowerment of Farm Women for Family Sustenance**, the problems of men and women in rainfed areas of Orissa were identified through participatory rapid appraisal (PRA) technique. Trainings and exposure visits were conducted on use of improved agricultural implements and tools, production technique including insect pest management of vegetable nursery and production of vermin-compost. Besides, documentation of these activities was taken up to develop educational materials for gender mainstreaming in extension programmes.

Studies showed that proper child weaning practices were not followed irrespective of different localities. Under the project on **Standardization of Weaning Mix Using Different Proportions of Sweet Potato**, standardization of a low cost weaning mix by utilizing locally available food materials was carried out. Dehydrated materials from sweet potato, green leaves and potato were prepared and kept in air-tight containers and polythene bags for evaluating its shelf-life. The base containing roasted flake powder, roasted wheat powder, pulses (0.50 greengram

SUCCESS STORY

Farm mechanization for tribal region in Southern Rajasthan

The equipments demonstrated in Udaipur, Chittorgarh and Banswara districts were tractor mounted rotavator (42 ha), CIAE multipurpose tool frame (22 ha), power weeder (14 ha), PAU tractor mounted multicrop planter (40 ha), self-propelled vertical conveyor reaper (65 ha), manual garlic planter (5 ha), CIAE power operated groundnut thresher (102 hr), CIAE high capacity thresher (89 hr), multicrop thresher 5 hp Amar make (166 hr).



dal + 0.50 bengal gram *dal*) and sesame seeds powder in the ratio of 2 : 1 : 1 : 0.25 was most preferred as weaning mix. The base and dehydrated sweet potato powder in the proportion of 75 : 25 were ranked first. Weaning mixes, which were rich in protein, energy and beta-carotene required for growth and development of the children were most preferred. The unit cost of such weaning mix was very low (Rs 23.90/kg).

Nutrient composition of standardized weaning mix (per 100 g)

Nutrients	Level
Moisture (%)	5.81
Crude protein (%)	10.86
Crude fat (%)	5.89
Total ash (%)	1.95
Crude fibre (%)	2.78
Energy value (Kcal/100 g)	456.00
Beta carotene	84.54
Dry matter (%)	94.19

A low cost storage structure- **Zero Energy Cool Chamber (ZECC)** was constructed and storage studies of fruits/vegetables like tomato, french bean, carrot, spinach, orange and mango were carried out at ambient temperature, low temperature, and in the ZECC. The shelf-life and quality of the perishables (fruits and vegetables) in ZECC was at par with the quality at low temperature (refrigerator). The ZECC was very useful for small farmers during summer as it maintained a temperature of 25–28°C with a relative humidity of 85–90%. A structure of 170 cm × 115 cm × 70 cm costing approximately Rs 3,500 could store 100 kg of vegetables. Training programmes were organized to empower 120 farm women of different villages for use of ZECC.

As a part of a project on **Family Based Economic Security of Backward Communities through Ornamental and Integrated Fish Farming**, involving 194 families and eight ponds covering 0.22 ha were taken up for seed production. Fish-cum-duck, fish-cum-poultry, fish-cum-horticulture, and fish-cum-mushroom were introduced. Khaki-Campbell and *desi* strains of duck and Grama Priya and Vanaraja breeds of poultry were introduced under fish-cum-duck and fish-cum-poultry system respectively.

Ornamental fish production units were established in 6 villages involving 37 scheduled caste beneficiaries. Continuous production of guppy, molly, sword tail, and rosy barb were successfully achieved. Economic gain per unit was Rs 200–500/month. During the year 2005–06, the income generated by the groups from fish and different integrations was Rs 6.25 lakh. Different aquaculture technologies like nursery rearing, carp poly culture, fish-cum-duck

Economic evaluation of aquaculture integration during 2005–06

Integration	Ponds	Total	Total	Economic
Fish-cum-duck	3	0.20	23,000	115,000
Fish-cum-poultry	7	0.57	42,000	73,685

integration, and fish-cum-poultry integration were disseminated to 240 farm women and a model for production of fingerlings at village level was developed. Some of the significant impacts were that healthy and desired species of fry were available up to 40 km in and around the adopted villages. The average fish yield of the ponds under project had gone up to 2.88 tonnes/ha from an average of 0.125 tonnes/ha. It has also brought in economic security from sale of fry and fishes.

Training Programme

The Krishi Vigyan Kendras (KVKs) organized 3,970 training programmes for in-service extension personnel to upgrade their knowledge and skills in frontier areas of agriculture technology including horticulture, animal husbandry, soil conservation, biotechnology, fishery etc in which 21,339 women in-service extension

Trainings

Short Course on Drainage Technologies

A training programme on drainage technologies for enhancing agricultural productivity in vertisols was organized during 2–11 August 2006 for 27 participants at CIAE Bhopal.

Advanced Instrumentation

A 6 days training programme on Advanced Instrumentation for R&D in Agricultural Engineering was organised at CIAE, Bhopal for faculty members of the SAU's during 21–26 August 2006.

Agro based Products

CIAE organized entrepreneurship development training programme on agro-based products for 29 participants of District Poverty Initiative Programme (DPIP) during 12–17 June 2006 and 10–17 July 2006.

Manufacturing Technology

A 11-day Training programme on Manufacturing Technology for Fabrication of Agricultural Implements for Teachers/Instructors of Farm Machinery Vocational Education was organized in collaboration with PSSCIVE, Bhopal at CIAE, Bhopal during 18–28 September 2006. Eighteen instructors from different vocational training institutes from Punjab, Haryana and Madhya Pradesh participated in the programme.



SUCCESS STORY

Farm Mechanization Research in NEH Region

NEH, Barapani centre of AICRP on FIM evaluated 4-row manual paddy seeder (15 kg weight). It was pulled by single-person which provided field capacity from 0.04 to 0.06 ha/hr. The seed rate used between 60 and 80 kg/hr in seeder (overall dimensions 1,700 × 940 × 600 mm). The net saving with the use of seeder was Rs 2,000/ha. The labour requirement was 30–40 man-h/ha.

NEH, Barapani centre of AICRP on FIM has developed manual seed drill (13.80 kg weight). The overall dimensions of seed drill are 87 cm × 44 cm × 110 cm. The drive ratio from ground wheel (diameter 40 cm) to metering shaft is 1 : 1. The V-shaped furrow openers; seed hopper (capacity 2 kg) and cup feed type seed metering are salient features of machine. The balanced machine operated by two persons proved boom for farmers for sowing maize and pigeonpea.

NEH, Barapani centre of AICRP on FIM adopted light weight power tiller powered by 3.7 kW diesel engine (Amar make). In valley farmers appreciated its use on narrow terraced lands. The shifting of unit from one terrace to other was easy due to small turning radius and light weight. During field test, the field capacity varied from 0.06 to 0.08 ha/hr in tilling. The fuel consumption was from 1 to 1.25 litre/hr.

Self-propelled vertical conveyor reaper has been demonstrated on farmers' fields on large scale for rice crop in valley land of the region. Total 5.0 ha was covered during harvesting season of 2004 and 6.0 ha in 2005. The average field capacity of the machine was observed around 0.05 ha/hr.

A motorized paddy thresher has been developed and

promoted in the region, which helps in completion of operation in time. In this operation, threshing of paddy crop can be done by holding paddy bundles against moving cylinder and blower helps to throw the broken chaff at some distance away from grain. Thus grain obtained have less chaff and broken straw than pedal type thresher. Overall dimensions of thresher are 850 cm × 750 cm × 750 mm (lxbxh) and total weight excluding prime mover is 50 kg. Two persons are employed to perform threshing operation. One person holds paddy bundle against moving cylinder and second person is required for supplying paddy bundles. Threshing cylinder and prime mover can easily be detached (if necessary) from the frame to enable easy transportation of thresher in hilly area.

Grain output capacity was about 4–5 times more in power thresher as compared to pedal type depending upon crop condition and variety. Labour requirement in per quintal of threshed grain was only one man-hr in power thresher and 5 man-hr in pedal thresher. Thus there is about 80% saving in labour requirement and cost of threshing grain can be saved up to 74% by using power thresher as compared to pedal type paddy thresher.

For the purpose of winnowing, the farmers of north east region are mainly dependent on natural wind. The average output of the manual winnower was observed from 2.5 to 3.5 q/hr. Due to timeliness of operation, it is gaining much popularity among the farmers of this region. Equipment has been demonstrated for 200 hr during last two years.

personnel participated. The KVKs also organized training programmes for farm women in various areas like crop production, horticulture, home science, livestock production and management, farm implements and machinery, mushroom production, sericulture, and vermin-composting etc. Through these training

Participatory evaluation workshop with farm women.



programmes 2.87 lakh farm women were trained. In addition 41,984 farm women participated in the training programmes organized by the KVKs on sponsorship by NABARD, DRDA, CAPART, ATMA, DBT, DST, and State Departments of Agriculture, Animal Husbandry, Horticulture Development Board, etc. The NRCW, Bhubaneswar also

Women in Agriculture Day.





GENDER ISSUES FOR TECHNOLOGY EMPOWERMENT OF WOMEN IN AGRICULTURE



Training on increasing income generation of farm women.

organized a trainers' training programme on Entrepreneurship Development among Farm Women. Another training on techniques for improving extension services for farm women was organized in sponsorship by the Directorate of Extension, Government of India.



Demonstration on SRI method of rice cultivation.

The KVKs organized 78,548 farmers' fair, farm day, advisory visits, agri-exhibitions and several other such activities for dissemination of agriculture technology, in which 41.90 lakh farmers and farm women participated.