

Role of Women in Agricultural Mechanization

C. R. Mehta and K N Agrawal

Director; Project Coordinator, AICRP on FIM
ICAR - Central Institute of Agricultural Engineering
Bhopal - 462038, India E-mail: cr.mehta@icar.gov.in; director.ciae@icar.gov.in

INTRODUCTION

The women work force in agriculture and allied sectors is estimated to be around 110 million which amounts to about 40% of the total rural workers in the country. Traditionally women workers participated in field operations like sowing behind the plough, transplanting, weeding, interculture, harvesting and threshing and primary processing of agro-produce. As per FAO estimates, women produce 60-70% food in most of the developing nations. They are basically major fraction of agricultural workforce. Studies have shown that the Indian women carry out the most arduous activities on farm apart from household activities. Besides household management, most of the work related to management of cattle/other farm animals is done by women. At present, most of the women carry the role of workers only. Despite Woman's major role in agriculture, gender disparities such as lower access to resources, share in decision making, socio-economical vulnerability is being faced. International studies suggest that women can boost agricultural output by 20-30% if they have access to same agricultural resources as men. The mechanization can prove to be a critical tool for closing the gender productivity gap in agriculture while improving women's empowerment.

There are many case studies carried out in the country regarding women's
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contribution in agriculture and allied activities. It has been reported that the rate of participation of female labour in farming activities varies accordingly to the socio-economic status, agricultural seasons, crops grown, type of operations needed, cropping pattern and type of technology used. Women provided a very significant part of the total labour used on all size group of farms (33%, 31% and 26% respectively in small, medium and large farms). Out of the total labour used in crop production, female labour constituted 57.2% (43.0% family labour + 14.2% hired labour) while men labour constituted 42.8% (34.0% family labour + 8.8% hired labour). Out of the total labour use in tending cattle, share of women and men was 79.4 and 20.6%, respectively. Singh (2024) indicated that for rice cultivation, women participation



was crucial in various operations such as sowing/transplanting (86%), weeding (84%), storage of grains (78%), land preparation (72%) and cleaning seed for sowing (70%).

WOMEN EMPOWERMENT THROUGH MECHANIZATION

Mechanization of Indian agriculture stands for modernization of agricultural practices with optimum utilization of inputs. Engineering inputs to on-farm and off-farm practices, agro-processing (Secondary Agriculture) and rural life are very important and vital to prosperity with dignity without undue drudgery. Appropriate mechanization is also needed in natural resource conservation and management. With rapid change in technological advancement, appropriate mechanization of field operations like

seedbed preparation, sowing and planting, nursery raising and transplanting, interculture and earthing up, irrigation, harvesting, threshing, cleaning and grading, packaging and transport is the need of the hour. Mechanization through use of modern power sources and matching implements brings in added operational capacity, reduces dependence on labour, helps in timeliness in field operations for optimal productivity, precision in metering and placement of inputs like seed, fertilizer, irrigation water, pesticides etc. The mechanization level at present is about 47%, which needs to be increased to 60% by 2030 and to 75% by 2047. There is ample evidence on the positive impact of mechanization on agricultural productivity and growth.

The role of women also needs to change with improving mechanization from a source of power to the role as an operator, manager and decision marker. The cultural divide of gender discrimination needs to change, through improving their capability for other roles. It is necessary to design machines suitable to them and upgrade their skill for operating those machinery. Also, for the role of Manager and Entrepreneur, their knowledge base will have to be suitably updated. Though, considerable work has been done to develop agriculture with major emphasis on technical and economic achievement, very little attention has been given to gender issues. The technology development and transfer programmes are generally carried out on the assumption that the technologies are either gender-neutral or that the men are the main users and decision makers. This is often incorrect because women have quite different technological needs than men due to their different ergonomical characteristics, level of education, experiences, skills, etc. Therefore, many of these programmes prove to be ineffective as the technologies developed



are not relevant to the needs of women users, and the transfer programmes do not reach to them. The mechanization at rural level is experiencing a paradigm shift due to movement of male workers to urban areas in search of job in industrial and service sectors. This phenomenon is likely to continue with development of urban infrastructure and industrialization leading to better employment opportunity. Women in rural India has assumed a major role in agricultural economy of our country.

Mechanization produces various positive effects. It minimizes hard labour, reduces drudgery and improve timeliness of operations and reduces overall cost of operation. The mechanization also leads to higher output of woman workers with expanding assets. Increasing pace of mechanization has led to changing role of workers from source of power to operator. Introduction of tractor, power tiller and engine operated equipment requires skill to control, adjust and operate. Initially the same has been taken as male domain. Women in agriculture often forced to operate the tools and equipment being developed considering the requirement of their male counterpart. It has been well

established fact that female has different ergonomical characteristics than male workers. Similarly, the strength capabilities of the female are also lower than male workers. To improve the work efficiency of the women workers, there is a need to modify the design of the tools and equipment considering ergonomical requirement of women workers. Operating the tractors and self-propelled equipment has been a male dominant occupation, however with changing rural socio-economic condition, there is a need to make these power sources gender neutral. The workplace layout of tractors suitable for women workers has been developed at Central Institute of Agricultural Engineering, Bhopal. The non-governmental organizations can play a very effective role in transfer of technology as they have many grass root level women workers. The rural women are more comfortable with women trainers and are able to express their views better to them. All the departments which are involved in transfer of technology to rural women should have enough number of women trainers to make technology transfer more successful.

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Engineering, Bhopal, ICAR-Central Institute of Women in Agriculture, Bhubaneswar, centres of AICRP on Ergonomics and Safety in Agriculture located in different SAUs has developed more than 30 tools/equipment suitable for women workers. Efforts are being made to manufacture and make these tools available to farm women for reducing drudgery and enhanced output. The brief details of some of the ergonomically improved tools are given in Table 1.

STRATEGY FOR GREATER ROLE OF WOMEN WORKERS IN MECHANIZATION

In the changing scenario, the participation of women workforce in agriculture is going to increase to 50% by 2030 i.e. out of the total estimated agricultural workforce of 240 million, about 120 million will be women workers. This is expected to happen mainly because male workers will either get involved in other non-farm activities or migrate to towns and cities for other jobs. To meet this situation, it is necessary to take the following steps.

- Design the tools/equipment keeping in view the anthropometric data of women workers
- Make these tools and equipment available in rural areas for purchase by users or create farm machinery bank
- Remove social taboos which makes women not to operate farm machines
- Organize demonstrations and trainings to rural women on various modern tools/equipment in proper and safe operation.
- Encourage manufacturers/entrepreneurs to fabricate improved tools and equipment – policy intervention
- Test the equipment with women workers
- Assist farm women, after being duly trained to get loans from banks/other organizations to procure various tools/equipment.

**TABLE 1 IMPROVED TOOLS/EQUIPMENT/ENERGY GADGETS FOR
REDUCING DRUDGERY OF WOMEN IN AGRICULTURE**

S. No.	Operation	Traditional practice and details	Improved tools/ equipment and details	Photograph
1	Seed treatment drum	Done with bare hands. Non-uniform application, possible seed damage, health hazards- chemicals in direct contact with hands.	Cost-Rs. 2000/- Capacity-200 kg/h, contact with chemical avoided, uniform application, no seed damage.	
2	Two row rice transplanter	By hand in bending posture, output-34 m ² /h	Cost-Rs. 6500/- Capacity-250 m ² /h, bending avoided, about 13% saving of cardiac cost of worker per unit area.	
3	Four row paddy drum seeder	Broadcasting by hand, non-uniform sowing, difficulty in weeding	Cost-Rs. 6000/- Capacity-920 m ² /h, uniform seeding in rows.	
4	Cono weeder	By hand in bending posture, capacity-30 m ² /h	Cost-Rs. 1900/- Capacity-120 m ² /h, bending is avoided.	
5	Pedal operated paddy thresher	By hand beating in bending posture	Cost-Rs. 6500/-, Capacity-35 kg/h, discomfort is reduced as work is done in standing posture.	
6	Coco-nut Tree Climber	By climbing on tree	Cost :3,500/- Capacity: 56 coconuts/h Eliminates the high work stress, severe neck and back pain	
7	Pedal operated arecanut sheller	Manual arecanut shelling	Cost:Rs. 25000/- Capacity: 15 kg/h Increased work output. Saving in the cost of dehusking operation. Reduces drudgery	
8	Fish dressing Platform	Traditional method of working on plastic crates, occupational health issue of low temperature handling	Height of platform: 630-700 mm Material: Stainless steel Cost: Rs. 14500/- Improves the working posture and work efficiency. To avoid low temperature and slippage, double layer of cotton gloves and surgical gloves have been provided.	
9	Cashewnut desheller	Manual shelling	Cost: Rs. 4000/- Capacity: 5.3 kg/h Drudgery involved in deshelling operation is reduced. Reduce finger injury due to cashewnut shell liquid oil.	
10	Hanging type grain cleaner	Manually using supa	Cost:Rs. 5,700/- Capacity: 225 kg/h Weight: 17 kg About 63% saving in cardiac cost of worker per unit of output. Working heart rate 104beats/min	