



Awareness on Drudgery Reducing Farm Technologies for Gender Equity

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Authors' contributions

This work was carried out in collaboration with the second author. Author VVL designed the study, wrote the protocol, managed the literature searches, wrote the draft and finetuned the manuscript. Author JD collected the data, performed the statistical analysis, prepared the tables and typed the manuscript. Both authors read and approved the final manuscript.

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ABSTRACT

Agriculture in India is moving away from animal driven to machine driven. Apart from tractors and power weeders which are used by farmers, there are farm tools and implements that can be used by farm women to reduce their drudgery with increased productivity. The present study made an attempt in introducing the set of 14 drudgery reducing farm tools and implements i.e. sapling transplanter, sickle/kurpi, long handle weeders, three types of harvest bags, ring cutter, finger guards, milking stand cum stool, head load manager, seed cum fertilizer bag, seed placement tube and fertilizer broad caster. A capacity building training programme was conducted to the farm women for exposure about the improved set of farm tools and implements. The implements were given to village secretary for use of this equipment by a group of 50 farm women and data were collected from them regarding the awareness about the technologies before and after the capacity building training programmes. Adoption levels were assessed after completion of a crop season. It was found that partial awareness was there about the improved equipment before training and cent per cent awareness was in the random selected group after the training programs. About 62 per cent of the sample has moderately adopted the given technologies. The study indicated for educating the farmers about the importance of drudgery reducing technologies, training them in

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using the farm implements and providing them to have an easy accessibility to enhance the adoption level. Custom hiring centres can be the solution to house the improved technologies suitable for farm women so that they can be used on rotation basis.

Keywords: Drudgery reducing farm technologies; farm women; capacity building training programmes; adoption and awareness.

1. INTRODUCTION

Agriculture is the process of producing food, feed, fiber and many other desired products by the cultivation of certain plants. The practice of agriculture is also known as "farming". Agricultural technology refers to technology for the production of machines used on a farm to help with farming. Agricultural machineries have been designed for practically every stage of the agricultural process. They include machines for tilling the soil, planting seeds, irrigating the land, cultivating crops, protecting them from pests and weeds, harvesting, threshing grain, livestock feeding and sorting and packaging the products. Technology has played a big role in developing the agricultural industry. And women play major role in farming activities, who constitute nearly 43% of the world's agricultural labor force, which rises up to 70% in some countries. But they do not have adequate awareness and access to improved technologies to reduce their drudgery and improve productivity, unlike men. Hence the present study has been conducted to make a positive impact by empowering them and bring awareness through capacity building trainings on ergonomically sound, cost effective, easy to use and small drudgery reducing farm tools and equipment to improve the productivity and enhance the occupational comfort and sustenance.

2. REVIEW OF LITERATURE

A study conducted by Anitha et al. [1] revealed that long handle weeders, sapling transplanter, ground nut stripper and seed placement tube have reduced the back pain and improved the work output.

Performance of hanging grain cleaner in wheat cleaning and grading was evaluated by Barkha [2]. It was found that due to the hanging grain cleaner there was less exertion, less discomfort and back pain.

Kumar and Kumari [3] have developed a farm women friendly sickle. Since harvesting was done solely by women, this improved sickle was designed and field tested on 10 farm women. It

was found that sickle was easy to operate, less in cost and reduced the drudgery.

Sumita et al. [4] evaluated the impact of trainings given by 31 KVKs on adoption of 25 drudgery reducing technologies by rural women. The study revealed that due to the use of improved tools, there was a reduction in their drudgery, improvement in the output and comfort. However authors have recommended the need for availability of these technologies at their door step.

Bhushan et al. [5] conducted a study to find out awareness about the drudgery reducing farm technologies by women farm workers in Gujarat. The study had focused only on assessing the awareness of farm workers about 30 technologies. But training to use them was not given. They also recommended that training accessibility needs to be improved to make the workers adopt the technologies.

Tripathi et al. [6] found that by using groundnut decorticator, drudgery was reduced by 84% among farm women and work output was increased.

Sharma et al. [7] revealed that weeding operation tools e.g. hand hoes or khurpi in both squatting and bending position decreases the work efficiency and also observed that the same amount of work could be done in almost half of the time and work efficiency was increased by 86.3 per cent if they use improved weeders.

Manju et al. [8] studied on five technologies i.e., improved sickle, wheel hand hoe, capron, cot bag and protective gloves which revealed that the drudgery was reduced in both men and women. However wheel hand hoe was used successfully by men in comparison to women who preferred to use their conventional technology i.e., improved long-handled hoe. Evaluation of technologies reported that improved sickle was used successfully by both men and women farmers. More than half of the men farmers (53.3%) and only 13.3 per cent women farmers preferred the wheel hand hoe over the traditional one as they found it four

times more efficient in terms of time, energy and money saving. Cot bag was preferred by the entire sample. Capron was preferred by four-fifth of the men farmers (80.0%) whereas women farmers did not prefer it much. Only one third of men (33.3%) and 26.7 per cent of women farmers preferred using gloves while harvesting of guar and picking of cotton. The study implies that women need to be trained in using the improved technologies otherwise they find it difficult to adopt the new tool/implement.

Singh et al. [9] conducted a study on women friendly improved farm tools and implements for reducing drudgery in farm operations. Benchmark study was conducted in Madhya Pradesh regarding involvement of farm women in agriculture and allied activities. Findings of the study revealed that the adoption level of improved farm tools and equipment had increased efficiency and reduced drudgery with 4.78 per cent which was quite low.

Singh et al. [10] developed a women friendly improved sowing Hand ridger for making ridges in field to sow vegetables. The equipment can also be used for making furrows in field for irrigation. The findings of the study revealed that about 67 per cent saving in cardiac cost of worker per unit output was found with the ridger in comparison to the traditional method of making ridges.

From the review of literature, it is evident that improved technologies reduce the drudgery of women, improve the output and comfort. But technologies need to be accessible and training needs to be given to them to use it efficiently.

3. METHODOLOGY

Ex-post facto research design was selected for the study since it is exploratory type and

reduces the artificiality in the research. A total sample of 50 farm women was selected from the village of Ramachandraguda, Maheswaram mandal, Rangareddy district, Telangana. Capacity building training programmes on different types gender friendly drudgery reducing farm technologies i.e. sapling transplanter, sickle/kurpi, long handle weeders, three types of harvest bags, ring cutter, finger guards, milking stand cum stool, head load manager, seed cum fertilizer bag, seed placement tube and fertilizer broad caster was introduced. Complete set of technologies were handed over to village secretary in Gram Panchayat office for its use by selected farm women. Village secretary was made responsible to issue the technologies to the farmers as per their requests. An interview schedule was developed on gender friendly drudgery reducing farm technologies. The developed schedule included both closed and open ended questions to assess the awareness and adoption levels. Data were collected from the selected women farmers as per developed schedule before and after the capacity building training programmes. After one season of crop, data were collected and analyzed to understand the adoption level of given technologies. Descriptive statistics were used for analyzing the data.

4. RESULTS AND DISCUSSION

A total of twenty capacity building training programmes were conducted in the village and nearly 125- number of farm women participated in the program. Initially, survey was conducted to test their knowledge about the use of drudgery reducing technologies. Based on information of their level of understanding, they were explained about the salient features of technologies, cost, benefits and impact. Simultaneously they were given hands on experience in using the technology.



Fig. 1. Capacity building training programme on gender friendly farm technologies

Table 1. Distribution of sample by age (N=50)

Age in years	Frequency	Percentage (%)	Mean \pm S.D
Below 20 years	1	2.0	39.58 \pm 12.2
Between 21-40 years	30	60.0	
Between 41-60 years	17	34.0	
Above 61 years	2	4.0	

Table 1 revealed that sixty per cent of farm women belonged to the age group of 21-40 years whereas only two per cent belonged to the age group of below 20 years. Thirty four per cent of the farm women were in between 41-60 years and four per cent were above 60 years old. The random selection of farm women was based on – partial or complete involvement in agricultural operations and also willingness to participate in the intervention programmes.

It was found from Table 2 that forty per cent of farm women were having below 10 years of work experience followed by 30 per cent were having 11-20 years of work experience, 12 per cent were having 21-30 years of work experience, 10 per cent were having 31-40 years of work experience and 8 per cent were having 41 years of work experience. This implies that all the farm women of the study were involved in farming activities either for full time or part time.

When pre-evaluation about the awareness of different technologies was done, 20 per cent of the farm women knew about water trolley used for carrying water, 8 per cent said ring cutter (8%) being used for bhindi (okra) plucking and flowers; and seed placement tube was known by 4 per cent. After the capacity building programmes, post evaluation was done due to which cent per cent of farm women knew about ring cutter, seed cum fertilizer drill, water trolley and 98 per cent of farm women knew about seed placement tube (Table 3).

When studied about awareness on weeding tools in pre-evaluation, highest percentage (58%) of farm women knew about khurpi. In post evaluation, highest percentage (78%) knew about all weeding tools i.e., sickle, khurpi and long handle weeders. Additionally 50 per cent of the sample had come to know about the weeding tools in post evaluation (Table 4).

Table 2. Distribution of sample by work experience (N=50)

Work experience	Frequency	Percentages (%)	Mean \pm S.D
Below 10 years	20	40.0	19.08 \pm 12.9
Between 11-20 years	15	30.0	
Between 21-30 years	6	12.0	
Between 31-40 years	5	10.0	
Above 41 years	4	8.0	

Table 3. Distribution of technologies = to farm women

	Pre-evaluation		Post-evaluation	
	Yes F (%)	No F (%)	Yes F (%)	No F (%)
Ring cutter	4 (8%)	46 (92%)	50 (100%)	--
Seed placement tube	2 (4%)	48 (96%)	49 (98%)	1 (2%)
Seed cum fertilizer drill	--	50 (100%)	50 (100%)	--
Water Trolley	10 (20%)	40 (80%)	50 (100%)	--

Table 4. Awareness about weeding tools (N=50)

Tools	Crops	Pre-evaluation	Post-evaluation
Sickle	Okra, eggplant, tomato	1 (2%)	10 (20%)
Khurpi	Vegetable and horticulture	29 (58%)	40 (80%)
Long handled weeder	Maize, okra, eggplant, tomato, chillie, grape vine yards	1 (2%)	39 (78%)
All		10 (20%)	39 (78%)



Fig. 2. Ring cutter



Fig. 3. Seed placement tube



Fig. 4. Seed cum fertilizer drill



Fig. 5. Finger guards



Fig. 6. Sickle



Fig. 7. Khurpi



Fig. 8. Long handled weeders

Women stand for long hours in bending or kneeling posture while harvesting any produce. Normally they tie their pallu like a bag in the front side and put the flowers, cotton, vegetables etc. in that. Once it is filled up, they dump into a bigger basket. Thus they suffer from back pain as load is in the front and need to bend forward. Moreover flowers were stuffed and damaged. Whereas harvest bags are designed in such a way that farm women can use both the hands while gathering or plucking th produce and maintain an erect posture.

Regarding, harvest bags, when pre-evaluation was done, one-third of the farm women knew about wing type cotton harvest bag, all the three harvest bags (28%), backload harvest bag (22%) and frontload harvest bag (16%) where in post evaluation, 68 per cent of farm women knew about almost all the three harvest bags followed by front load cotton harvest bag (88%), wing type and backload harvest bag (76% & 68% respectively). Thus nearly 40 per cent more

sample was aware of all types of harvest bags due to capacity building training programmes (Table 5).

In pre-evaluation study, majority (48%) of farm women knew that milking stool was used for standing purpose while doing the task whereas 40 per cent of farm women knew that milking stool was used for sitting purpose. Twelve per cent were aware that milking stand was used for both sitting and standing purposes. Few of the women in the study were involved in milking activity. Normally they use any stool to sit or kneel down while milking and move between the animals with the milk pot in one hand and dragging the stool or carrying the stool with other hand. So it is a laborious process for them to get up and sit down to complete the task. However in the improved method, stool and stand have wheels so that it is easy for them to move and vessel can be fitted in the stand snugly without spilling the contents.

Table 5. Awareness about Harvest bags (N=50)

Types of harvest bags	Pre-evaluation	Post-evaluation
Front load harvest bag	8 (16%)	44 (88%)
Wing type cotton harvest bag	17 (34%)	38 (76%)
Back load harvest bag	11 (22%)	34 (68%)
All	14 (28%)	34 (68%)

Table 6. Awareness about Milking stand with stool (N=50)

	Pre-evaluation	Post-evaluation
Sitting purpose	20 (40%)	50 (100%)
Standing purpose	24 (48%)	-
Both	6 (12%)	-



Fig. 9. Frontload harvest bag



Fig. 10. Wing type harvest bag



Fig. 11. Backload harvest bag



Fig. 12. Milking stand with stool

Table 7. Distribution of sample by responses on Head load manage (N=50)

	Pre-evaluation	Post-evaluation
Light in weight	12 (24%)	-
Made with cane	13 (26%)	-
Easy to handle	19 (38%)	-
Stress of weight to be supported by back muscles and relieves strain on head and shoulder	6 (12%)	-
All	-	50 (100%)

In post-evaluation study, cent per cent of farm women knew that stool was used for sitting purpose for milking from cows and buffaloes (Table 6).

In pre-evaluation study, most of the farm women said that headload manager was easy to handle (38%), made with cane (26%), light in weight (24%) and twelve per cent said that stress of weight to be supported by back muscles and relieves strain on head and shoulder.

In post-evaluation study, cent percent of farm women said that headload manager was light in weight, made with cane, easy to handle and stress of weight to be supported by back muscles and relieves strain on head and shoulder, which implies that capacity building programme created

an impact by increasing their awareness (Table 7).

Before Capacity Building Training programmes (CBTP), 80 per cent of farm women said that they were not aware about technologies used for transplanting seedlings/sapling whereas after conducting CBTP, cent per cent of farm women knew that sapling transplanter was used for transplanting seedlings/saplings (Table 8).

Tables 9 & 10 depict the adoption of drudgery reducing tools kept at resource centre. All the technologies listed in Table 9 were kept in the village to be used by the villagers freely. After conducting CBTPs respondents were asked to use them. After three months, evaluation study was conducted to find out the adoption of these technologies.



Fig. 13. Headload manager



Fig. 14. Sapling transplanter



Fig. 15. Row seeder



Fig. 16. Hand wheel hoe

Table 8. Distribution of sample by awareness on Tools for transplantation (N=50)

	Pre-evaluation	Post-evaluation
Sapling Transplanter	5 (10%)	50 (100%)
Row seeder	4 (8%)	-
Weeder	1 (2%)	-
None of the above	40 (80%)	-

Table 9. Adoption level on gender friendly drudgery reducing tools N=50

Drudgery Reducing Tools	Adoption level			
	Not adopted		Adopted	
	Frequency (N)	Percentages (%)	Frequency (N)	Percentages (%)
Ring cutter	17	34.00	33	66.00
Seed placement tube	5	10.00	45	90.00
Seed cum fertilizer drill	50	100	--	--
Sickle/khurpi	33	66.00	17	34.00
Long handled weeders	13	26.00	37	74.00
Front load harvest bag	46	92.00	4	8.00
Wingtype cotton harvest bag	38	76.00	12	24.00
Backload harvest bag	50	100	--	--
Seed cum fertilizer bag	5	10.00	45	90.00
Milking stand with stool	50	100	--	--
Headload manager	13	26.00	37	74.00
Sapling transplanter	9	18.00	41	82.00
Finger guards	42	84.00	8	16.00
Fertilizer broadcaster /Sprayers	46	92.00	4	8.00

If they have used 2 score was given and 1 score was given if it is not used. Thus the total score ranged between 14 and 28 based on which adoption levels were categorized. The sample of the study has borrowed the tools from the village secretary for using in their fields. It revealed that majority of the respondents had moderately adopted the tools while nearly one-fifth of them had low adoption. Further analysis showed that seed placement tube (90%), sapling transplanter (82%) and long handle weeders (74%) were

adopted by majority of the farm women. Reasons given for less adoption were non availability of tools, social and political issues, tools being used repeatedly by same people etc. Responses of the farm women were taken only after three months of using the technologies which means one cycle of usage. Ring cutter was used in maize and okra fields by the farm women, seed placement tube and seed cum fertilizer drill were used in maize and jowar, sickle was used in vegetable crops, long handle handle weeders



Fig. 17. Seed cum fertilizer Bag



Fig. 18. Fertilizer broadcaster

Table 10. Level of adoption on gender friendly drudgery reducing tools N=50

Level of adoption	Range	Frequency (%)	Mean \pm S.D
Low	Less than 18	11 (22.00%)	19.7 \pm 1.69
Medium	Between 18-21	31 (62.00%)	
High	More than 22	8 (16.00%)	

were used in vegetable and floriculture crops i.e. palak, okra, chillie, tomato, mary gold and chrysanthemum as they are widely grown in this area. Finger guards were used for plucking marigold to protect their fingers from scratches of fine thorns. Sapling transplanter was used in tomato and chilli plantation. Fertilizer broad caster was more suitable for leafy vegetable, okra, tomato, chilli and floricultural crops. On the whole the sample of the present study have used the technologies either in toto or partially in their fields depending on the crops cultivated.

5. CONCLUSION AND RECOMMENDATIONS

From the study, it was evident that women were involved in various agricultural operations which were carried out by traditional methods. However they have heard about few of the improved tools but not used it due to lack of accessibility. Moreover they were not aware of how to use the improved technologies. But due to the capacity building training programmes, their awareness levels were increased and started using them in their fields when they were accessible to them in their village. Thus it can be concluded that awareness among the farmers can be increased by conducting capacity building programmes, where we can introduce/ educate/train in using the technologies. If they are aware and implements are accessible, they were able to adopt the improved tools as per their crop needs

and reduce their drudgery. However there is a need to supply these technologies at their door step to utilize them as every farmer cannot afford to purchase them.

Custom hiring centres can be started at village level by making a person responsible to take care of it. A register can be maintained in which details of borrower of the tools can be entered. If any tool goes out of order, repair work can be taken up by that concerned person. Sometimes due to cumulative effect, wear and tear might happen. In that case all the users can pay some nominal amount as hiring charges per day so that collected amount can be used for repairing purpose.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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