



A SOLUTION TO TRADITIONAL WEEDING ACTIVITY WITH IMPROVED KUTLA - AN ERGONOMIC APPRAISAL

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Abstract

Farmwomen practice agriculture in tune with nature and nurture the crops, animals and other allied enterprises along with upbringing of children in a responsible manner. However, their roles and importance are not explicitly pronounced in technology development, dissemination, extension and policy formulation in many countries. In this context, women are critical to the well-being of farm households. Besides raising children and maintaining general health of their families, women are expected to prepare all meals, maintain the homestead, and assist in crop and animal production, tending to the. Perhaps, ironically, it is because they have so many responsibilities that they have been overlooked by agriculturalists and policy makers. To study the ergonomic appraisal of different types of kutlas used in weeding activity, to find out the acceptability of various kutlas by the respondents

Key words: farm women, kutla, ergonomic, acceptability

Introduction

The mountain regions in general have a unique arrangement of gender roles, with men often migratory in pursuance of economic compulsions, while women is the pivot of family for livelihood security through multiple roles as farmer, child bearer and family maintainer. They are employed mostly in drudgery prone activities that include transplanting, weeding, harvesting, grain cleaning, storage etc (AICRP, 2009). Suma Hasalkar (2004) says that though the weeding activity is light, women feel it as a maximum drudgery prone activity because of its monotony in performance, continuous squatting posture and performing it for a longer period of time. Weeding is performed for a maximum number of 70-90 days/yr and is identified as a maximum

drudgery involved farm activity in the nine states of India. Weeding is performed in both bending and squatting postures continuously for the whole day (Anonymous, 2001). Weeding is one activity carried out by women in squatting position for prolonged hours by using the traditional tool called a kutla. Kutlas were most important tool used by women as multipurpose tool for soil preparation, weeding, uprooting etc. These agricultural operations are energy consuming and that the women can be relieved of this by use of improved technologies. There are number of improved tools and technologies that have been developed by the endless efforts of Home Scientists under AICRP. These technologies have not reached the ultimate users. The users are not aware of these technologies and are still contended with the age old working habits which have led to various musculo skeletal problems and body disorders. It is important to make the women users aware of these technologies by imparting trainings. Hence, it is important to study the ergonomic appraisal of weeders in the form of kutlas specifically for hill farm women of Utrakhand state.

Objectives:-

- To study the ergonomic appraisal of different types of kutlas used in weeding activity
- To find out the acceptability of various kutlas by the respondents

Materials and Methods:-

The study was carried in two blocks of Dehradun district of Utrakhand state viz. Chamba (Dadur, Jaspur, Nand, Jugad and srikot) and Lamgrah (Dhelli, toil, Balia, Annuli and Kharsora).

Tool Used: Interview schedule cum observation sheet was used for recording the data. Additional lectures, demonstrations, awareness campaign, group discussions and trainings were organized to fulfill the set target. Three main categories of kutlas were tested. First category of kutla comprised of similar kutlas as traditionally used by the respondents. Second category kutla consists of dual purpose kutlas with metal pipe fixed handle length and the third category consists of the dual purpose kutlas with long wooden handle lengths.

Sample size: 120 farm women (12 farm women from each village, thus making a sample of 60 from one block, with a similar pattern followed in the other block too) actively involved in weeding activity were selected as sample.

Lecture cum demonstrations on work simplification and use of improved kutlas – In participatory mode, lecture cum demonstration on work simplification by use of appropriate tools, techniques, postures etc. were imparted and feedback was sought from the respondents regarding queries if any about all aspects of improved technology, its cost, availability, usage, technical inputs etc. Aruna Rana et.al (2019) says that farm women are still

not much aware about the various new/ improved drudgery reducing technologies. Thus, training and demonstrations need to be imparted time and again to motivate and make them aware of their use and features.

Field demonstrations on the improved technologies. The women farmers (respondents) were given the new kutlas and were trained how to use the same with appropriate posture, weeding techniques etc. on their field situation by rotation method for two months to get the actual feedback on performance of the tools and their experiences both qualitatively and quantitatively. The data were gathered both on psychological perceptions by using new tools vs. old ones as well as quantified output in terms of production/unit and tool factors such as *easy grip, comfortable in using, less pain in muscle, decrease in angle of bend, less fatigue, new tool better than old* and interest of respondents in purchasing new tools.

Result and Conclusions: -

It was observed during the field trials that similar to sickle, kutla was another very important functional tool used invariably in almost all-important agricultural operation by farm women in both the blocks under study. Different types of 'Kutla's were given in the field. As many as *8 kutlas have been tested* including the traditional kutla used by the sample under study. They were broadly categorized into three different types i.e. Saria kutla's, Dual-purpose kutla with metal handle, Dual-purpose kutla's with wooden handle. The new 'Kutla's' shaped as traditional Kutla were modified improvements. Three Kutla's were tried in the field besides existing one for ergonomic appraisal as well as acceptability trials.

Table 1: Ergonomic Appraisal of Saria Kutla : (N-60)

| Ergonomic Features | Types of Saria Kutlas | | | | | | | | | | | | | | | |
|------------------------|----------------------------------|-------|-------------------------------|-------|----------------------------------|-------|---------------------|-------|----------------------------------|-------|-------------------------------|-------|----------------------------------|-------|---------------------|-------|
| | Chamba | | | | | | | | Lamgrah | | | | | | | |
| | Saria Kutla 1 (SK ₁) | | 6 Notch Hand Rake Kutla (HRK) | | Saria Kutla 2 (SK ₂) | | Existing Kutla (EK) | | Saria Kutla 1 (SK ₁) | | 6 Notch Hand Rake Kutla (HRK) | | Saria Kutla 2 (SK ₂) | | Existing Kutla (EK) | |
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Easy Grip | 60 | 100 | 60 | 100 | 54 | 90.00 | 54 | 90 | 58 | 96.66 | 60 | 100 | 55 | 91.66 | 45 | 75.00 |
| Comfortable | 50 | 93.33 | 60 | 100 | 56 | 93.33 | 47 | 78.33 | 60 | 100 | 51 | 85.00 | 57 | 95.00 | 50 | 83.33 |
| Decrease in angle bend | 57 | 95.00 | 60 | 100 | 49 | 81.66 | 54 | 90 | 53 | 88.33 | 55 | 91.66 | 54 | 90.00 | 42 | 70.00 |
| Less pain in muscle | 38 | 63.33 | 58 | 96.66 | 53 | 88.33 | 23 | 38.33 | 47 | 78.33 | 51 | 85.00 | 51 | 85.00 | 45 | 75.00 |
| Less fatigue | 38 | 63.33 | 59 | 98.33 | 45 | 75.00 | 25 | 41.66 | 55 | 91.66 | 51 | 85.00 | 47 | 78.33 | 45 | 75.00 |
| Appropriate to height | 55 | 91.66 | 57 | 95.00 | 54 | 90.00 | 51 | 85.00 | 53 | 88.33 | 56 | 93.33 | 50 | 83.33 | 49 | 81.66 |
| Area Covered (sq. mt.) | 12.20 | | 14.44 | | 12.95 | | 12.52 | | 11.75 | | 15.40 | | 14.36 | | 14.50 | |

Out of these tools small hand rake has been included along with 'Kutla's'. Table 1 shows the comparative appraisal of ergonomic features of various Kutla's tested in both the blocks viz 'Chamba' and Lamgrah. The findings in 'Chamba' block showed that out of four Kutla's '6 notch hand rake' was liked best by respondents followed by saria Kutla 2. The important features most liked by respondents were easy grip (HRK-100%; SK₁- 100 %), comfortable to work with (HRK - 100%; SK₂ and SK₁ - 93.33% each) decrease in angle bend-(HRK - 100% ; SK₁ - 95%), less pain in muscle (HRK - 96.66%; SK₂ - 88.33%), appropriate to height (HRK 95%; SK₁ - 91.66%) area covered under operation (HRK - 14.44 sq.mt.; SK₂ - 12.95 sq.mt). Similar trend was observed for Lamgrah block (Table 1). Similar trend was observed in Lamgrah block too. Hence, it can be concluded that Hand rake type Kutla was liked the most followed by Saria Kutla 2 as compared to their existing Kutla.

Table 2: Ergonomic Appraisal of Dual-purpose kutla with metal handle (N-60)

| Ergonomic Features | Dual-purpose kutla with metal pipe fixed handle | | | | | | | | | | | |
|------------------------|-------------------------------------------------|-------|----------------------------------|-------|--------------------------------------------|-------|-----------------------|-------|------------------------------|-------|--------------------------------------------|-------|
| | Chamba | | | | | | Lamgrah | | | | | |
| | Flat and Pointed (FP) | | Flat Pointed Double prong (FPDP) | | Pointed Flat and broad Single Prong (FPSP) | | Flat and Pointed (FP) | | Flat and Double Prong (FPDP) | | Pointed Flat and broad single prong (FPSP) | |
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Easy Grip | 60 | 100 | 57 | 95.00 | 60 | 100 | 53 | 88.33 | 55 | 91.66 | 60 | 100 |
| Comfortable | 59 | 98.33 | 51 | 85.55 | 56 | 93.83 | 50 | 83.33 | 60 | 100 | 56 | 93.33 |
| Decrease in angle bend | 57 | 95 | 55 | 91.66 | 58 | 96.66 | 45 | 75.00 | 52 | 86.66 | 51 | 85.00 |
| Less pain in muscle | 60 | 100 | 56 | 93.33 | 59 | 98.33 | 45 | 75.00 | 55 | 91.66 | 57 | 95.00 |
| Less fatigue | 60 | 100 | 55 | 91.66 | 58 | 96.66 | 49 | 81.66 | 51 | 85.00 | 58 | 96.66 |
| Appropriate to height | 57 | 95.00 | 54 | 90.00 | 55 | 91.66 | 50 | 83.33 | 55 | 91.66 | 56 | 93.33 |
| Area Covered (sq. mt.) | 18.58 | | 14.50 | | 20.88 | | 14.90 | | 17.52 | | 18.90 | |

The important features of these kutlas emerged as easy grip (FPSP and FP – 100 % each in Chamba; FPSP – 100 % in Lamgrah block). Flat and Pointed kutla was found to be more comfortable (98.33 %) to work with by the respondents from Chamba Block and cent percent respondents found FPDP more comfortable to work with. The use of FPSP reduced the angle bend (Chamba – 96.66%; Lamgrah- 85%) and also the muscle pain of women of both blocks (Chamba – 98.33 % ; Lamgrah – 95%) thereby improving their postural comfort. The respondents from both the blocks (96.66%) felt less fatigue by using the FPSP as compared to FP and FPDP. Respondents from Lamgrah block (93.33 %) felt that the handle handle of kutla was of appropriate height where

as Chamba block respondents felt the same with the FP kutla. More area was covered with the use of FPSP kutla by women from both the blocks. Hence, it was observed that FPSP kutla was considered best by women of both the blocks with almost a similar liking for FPDP and FP kutlas (Table 2)

Table 3: Ergonomic Appraisal of Dual-purpose kutla's with wooden handle (N-120)

| Ergonomic Features | Dual-purpose kutla's with wooden handle | | | | | | | | | | | |
|------------------------|-----------------------------------------|-------|-------------------|-------|--------------------------------------------|-------|---------------------------------------|-------|-------------------|-------|--------------------------------------------|-------|
| | Chamba | | | | | | Lamgrah | | | | | |
| | Flat, Pointed and Double Prong (FPDP) | | Flat Pointed (FP) | | Pointed Flat and Broad Single Prong (FPSP) | | Flat, Pointed and Double Prong (FPDP) | | Flat Pointed (FP) | | Pointed Flat and Broad Single Prong (FPSP) | |
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Easy Grip | 60 | 100 | 55 | 91.66 | 60 | 100 | 45 | 75.00 | 60 | 100 | 60 | 100 |
| Comfortable | 60 | 100 | 60 | 100 | 54 | 90.00 | 45 | 75.00 | 60 | 100 | 57 | 95.00 |
| Decrease in angle bend | 55 | 91.66 | 53 | 88.33 | 51 | 85.00 | 45 | 75.00 | 55 | 91.66 | 57 | 95.00 |
| Less pain in muscle | 59 | 98.33 | 53 | 88.33 | 50 | 83.33 | 57 | 95.00 | 56 | 93.33 | 58 | 96.66 |
| Less fatigue | 58 | 96.66 | 43 | 88.33 | 51 | 85.00 | 53 | 88.33 | 53 | 88.33 | 53 | 88.33 |
| Appropriate to height | 60 | 100 | 59 | 98.33 | 59 | 98.33 | 53 | 88.33 | 57 | 95.00 | 54 | 90.00 |
| Area Covered (sq. mt.) | 18.57 | | 18.44 | | 18.38 | | 18.08 | | 18.30 | | 18.36 | |

Table 3 shows that as the respondents appreciated the dual working Kutla's, they were further modified as per the feedback and suggestions of respondents. The metal handles were replaced with wooden handles and the length of handles was increased as per the requirements of women workers. The findings of data in Table 3 shows that in Chamba block Flat and double prong and Flat pointed were equally liked. The findings of Lamgrah block showed that two Kutlas viz Flat Pointed (FP) and Flat Pointed Single Broad Prong FPSP were liked almost equally followed by flat and double prong Kutla. The findings of Lamgrah block showed that Kutlas had easy grip (FP and FPSP 100% each); comfortable to use (FP - 100% ; FPSP -95%); decrease in angle bend (FPSP - 95% ; FP – 91.66%); less pain in muscle (FPSP - 96.66% ; FP -93.3%) appropriate to height (FP - 95% ; FPSP - 90%) area covered (FPSP - 18.36 sq.mt ; FP - 18.30sq.mt and FPDP - 18.08sq.mt). Hence, two Kutlas viz. FPSP and FP are almost liked equally by respondents of Lamgrh block.

Acceptability Features - The agricultural tools used by hill farm women were studied in detail and new tools were introduced after modifications as per suitability of the users. All the tools were tested along with existing tools. After analyzing the tools on ergonomic features the selected tools were studied for acceptability features in the field situation. The acceptability features included *easy to use, handle, less time used, can be made locally, more efficient, better than old tools, adoption over old tools*. Three main categories were tested. First group comprised of almost similar 'Kutlas' as traditionally used by the respondents. This category included Saria Kutla₁, hand rake type Kutla₁, Saria Kutla₂.

Table 4: Acceptability Features of kutlas (N-120)

| Acceptability Features | Types of Saria Kutla's | | | | | | | | | | | |
|-------------------------|------------------------|-------|---------------------------|-------|---------------|-------|---------------|-------|---------------------------|-------|---------------|-------|
| | Chamba | | | | | | Lamgrah | | | | | |
| | Saria Kutla 1 | | 6 Notch Kutla – hand rake | | Saria Kutla 2 | | Saria Kutla 1 | | 6 Notch Kutla – hand rake | | Saria Kutla 2 | |
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Easy to use | 56 | 93.33 | 60 | 100 | 48 | 80.00 | 55 | 91.66 | 60 | 100 | 49 | 81.33 |
| Easy to handle | 55 | 91.66 | 60 | 100 | 50 | 83.33 | 51 | 85.00 | 60 | 100 | 47 | 78.66 |
| Less time | 51 | 85.00 | 57 | 95.00 | 49 | 81.66 | 50 | 83.33 | 58 | 96.66 | 48 | 80.00 |
| Made locally | 48 | 80.00 | 56 | 93.33 | 48 | 80.00 | 52 | 86.66 | 57 | 95.00 | 49 | 81.66 |
| More efficient | 47 | 78.33 | 58 | 96.66 | 41 | 68.33 | 43 | 71.66 | 56 | 93.33 | 40 | 66.66 |
| Better than old | 40 | 66.66 | 59 | 98.33 | 39 | 65.00 | 39 | 65.00 | 59 | 98.33 | 37 | 61.66 |
| Adoption over old tools | 41 | 68.33 | 57 | 95.00 | 38 | 63.33 | 42 | 70.00 | 58 | 96.66 | 36 | 60.00 |

The findings in table 4 showed that in both the blocks 6 notch hand rake type Kutla was rated best followed by Saria Kutla₁ and lastly Saria Kutla₂. The most liked features of 6 notch hand rake Kutla in both the blocks are easy to use and easy to handle (100% each). It was more efficient to work with (C - 96.66%, L - 93.33%), better than old (98.33% each). Adoption level of new tool over old tool was also high (C - 95%, L - 96.66%). Hence, this 6 notch hand rake type Kutla was judged best and liked the most by the respondents.

Table 5: Acceptability Features of tools/implements (N-120)

| Acceptability Features | Dual-purpose kutla with metal pipe fixed handle | | | | | | | | | | | |
|-------------------------|-------------------------------------------------|-------|--------------------------------------------|-------|----------------------------------|-------|-----------------------|-------|--------------------------------------------|-------|------------------------------|-------|
| | Chamba | | | | | | Lamgrah | | | | | |
| | Flat and Pointed (FP) | | Pointed Flat and broad Single Prong (FPSP) | | Flat Pointed Double prong (FPDP) | | Flat and Pointed (FP) | | Pointed Flat and broad single prong (FPSP) | | Flat and Double Prong (FPDP) | |
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Easy to use | 58 | 96.66 | 59 | 98.33 | 60 | 100 | 56 | 93.33 | 51 | 85.00 | 60 | 100 |
| Easy to handle | 57 | 95.00 | 55 | 91.66 | 60 | 100 | 57 | 95.00 | 53 | 88.33 | 60 | 100 |
| Less time | 54 | 90.00 | 51 | 85.00 | 57 | 95.00 | 58 | 97.66 | 53 | 88.33 | 58 | 96.66 |
| Made locally | 51 | 85.00 | 45 | 75.00 | 53 | 88.33 | 48 | 80.00 | 46 | 76.66 | 52 | 86.66 |
| More efficient | 48 | 80.00 | 47 | 78.33 | 59 | 98.66 | 49 | 81.66 | 48 | 80.00 | 57 | 95.00 |
| Better than old | 52 | 86.66 | 46 | 76.66 | 60 | 100 | 48 | 80.00 | 45 | 75.00 | 56 | 93.33 |
| Adoption over old tools | 50 | 83.33 | 47 | 78.33 | 60 | 100 | 49 | 81.66 | 45 | 75.00 | 55 | 91.66 |

Another category of commercial Kutlas was given for trial to the respondents from both the blocks. These were made of iron with handle of a metal pipe fixed with rubber grips. In this category three 'Kutlas' were tested viz. Flat and Pointed (FP); Pointed Flat and broad Single Prong (FPSP); and Flat Pointed Double prong (FPDP). According to the results shown in table 5, Flat Pointed Double Prong Kutla was liked most followed by Flat and Pointed and lastly Pointed Flat and broad Single Prong in both the blocks. The most acceptable feature of FPDP Kutlas were easy to use and easy to handle by respondents from Chamba and Lamgrah blocks (100% each), less

time taken in carrying out the task (C – 95%, L – 96.66%), more efficient to work with (C - 98.66%, L – 95%), better than old (C – 100%, L – 93.33%), adoption over old tools (C – 100%, L – 91.66%).

Table 6: Acceptability Features of tools/implements (N-120)

| Acceptability Features | Dual-purpose kutla's with wooden handle | | | | | | | | | | | |
|-------------------------|-----------------------------------------|-------|-------------------|-------|--------------------------------------------|-------|---------------------------------------|-------|-------------------|-------|--------------------------------------------|-------|
| | Chamba | | | | | | Lamgrah | | | | | |
| | Flat, Pointed and Double Prong (FPDP) | | Flat Pointed (FP) | | Pointed Flat and Broad Single Prong (FPSP) | | Flat, Pointed and Double Prong (FPDP) | | Flat Pointed (FP) | | Pointed Flat and Broad Single Prong (FPSP) | |
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Easy to use | 60 | 100 | 56 | 96.66 | 57 | 95.00 | 60 | 100 | 59 | 98.33 | 58 | 96.66 |
| Easy to handle | 60 | 100 | 53 | 88.33 | 54 | 90.00 | 60 | 100 | 49 | 81.66 | 57 | 95.00 |
| Less time | 59 | 98.33 | 51 | 85.00 | 55 | 91.66 | 58 | 96.66 | 47 | 78.33 | 56 | 93.33 |
| Made locally | 54 | 90.00 | 52 | 86.66 | 53 | 88.33 | 55 | 91.66 | 48 | 80.00 | 53 | 88.33 |
| More efficient | 60 | 100 | 54 | 90.00 | 54 | 90.00 | 59 | 98.66 | 46 | 76.66 | 55 | 91.66 |
| Better than old | 57 | 95.00 | 56 | 93.33 | 57 | 95.00 | 58 | 96.66 | 49 | 81.33 | 58 | 96.00 |
| Adoption over old tools | 57 | 95.00 | 57 | 95.00 | 57 | 95.00 | 58 | 96.66 | 48 | 80.00 | 58 | 96.00 |

The results of table 6 shows that readymade metal pipe 'Kutlas' were having small handles of almost similar lengths with different bases. It was important to improve upon handle lengths to fulfill varying function by use of these Kutlas. Therefore, three more 'Kutlas' were tried in the field by providing different lengths of handles in wood for easy working and improving posture of the worker. However, the base of Kutlas was almost similar as that of metal Kutlas. The findings showed that in both the blocks most acceptable features of Kutlas were of flat pointed double prong Kutla followed by flat pointed and lastly flat pointed single prong Kutla. The most liked features of FPDP Kutla were easy to use and easy to handle (100% each in both the blocks), less time taken to perform the task (C – 98.33%, L – 96.66%), more efficient to work with (C – 100%, L – 98.66%), better than old (C – 95%, L – 96.66%) and adoption needed (C – 95%, L – 96.66%) over the old tool

Conclusions

- Lectures cum demonstrations on use of improved kutlas were imparted in both the blocks
- A total of three main categories of kutlas were given for testing
- Amongst the saria kutla, 6 Notch hand rake kutla was liked the best by the respondents of the two blocks.
- Flat Pointed Double Prong kutla was liked the most in the dual purpose kutla with metal pipe handle as well as wooden handle.

Recommendation

- Training programmes for different groups of women beneficiaries for their empowerment needs to be organized with the objectives of imparting knowledge and skill of improved farm tools, along with gaining confidence of farm women towards their participation in sustainable development of other aspects.

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