Drudgery Reduction of Farm Women with Cotton Picking Bags

Sunita Chauhan¹, A. R. Raju², G. Majumdar³ and M. K. Meshram⁴

¹. SMS (Home Science), 2. Sr. Scientist(Agronomy), 3. Sr. Scientist(FPM.), 4. Principal Scientist (Plant Pathology) and I/C KVK, Krishi Vigyan Kendra, Central Institute for Cotton Research, Nagpur

Corresponding author e-mail: soyentp@rediffmail.com

ABSTRACT

Ergonomically designed cotton picking bags (Marathwada Agriculture University, Parbhani and CCS, Haryana Agriculture University) were evaluated in participatory mode with Bt hybrid cotton under rainfed condition during 2008-11 in Nagpur District for its suitability in drudgery reduction along with local method. Picking efficiency, energy expenditure, carrying capacity, ease, comfort, safety, loading and unloading etc. were documented for comparison. Family resource and management division, CCS, HAU, Hissar ergonomically designed cotton picking bag was having 50% higher carrying capacity and ease in tying proved significantly superior over Home Science department, MAU, Parbhani designed picking bags as it facilitated longer picking time with less interruptions. HAU bag exerted 37% less load on heart beats, 18% lower energy expenditure KJ kg cotton with a break even of 17 days, India is adopting good agricultural practices (GAPs), where cotton picking bags can be locally stitched, if used 45-60 times in a season with proper hygiene offers body protection, lower trash content and improved picking efficiency. HAU bag requires 25% and 15% extra cloth and costs over MAU bag although, without any protection of hands. HAU cotton picking bag is meeting the objective of ergonomic requirement. Neither bags nor age groups did not differ significantly in output due to light to moderate nature of work load.

Keywords: Drudgery reduction; Ergonomic designs; Onfarm evaluation; Women centered technology;

G. barbadense, G. hirsutum and G. herbaceum cotton varieties can hold cotton in locules for a longer period of time unlike or G. arboreum cotton (except Garo). Delayed picking, unseasonal hail storms can spoil the cotton. Weather effects on the fiber could be minimized in the field by hand picking, at 5-6 intervals. Bt hybrids are expected to retain 25% more bolls because of better insect control on lower branches of sympodia with an early maturity at least by 20 days (Hebbar et al. 2007). Introduction and popularization of Bt hybrid cotton during 2004-2008 brought changes in hand picking front also. As the entire cotton crop in India is hand-picked by women (Anon 2011) labour shortages have been experienced in intensively cultivated Andhra Pradesh and Tamil Nadu states. Hand picking operation requires 450-500 women-h/ha which costs $113 tonn-1 and $ 79-248 ha-1 (Chaudhary, 2011). Cotton picking manually involves a lot of drudgery due to posture, load of picked cotton and abrasion of fingers due to sharp points of dried bracts. An aid to reduce drudgery, efficient collection and field transportation in manual picking cotton would require less labour to pick cotton per unit area thus reducing the cost of cultivation. Cotton picking bags were designed, tested and popularized to improve cotton picking efficiency and reduce trash content (AICRPH, 2004, DDK, Delhi 2007). The present Onfarm adoptive research was concentrated on evaluation of ergonomically designed picking bags in participatory mode by cotton farm women for reducing the drudgery and adoptability.

METHODOLOGY

A Onfarm research project was conducted during 2008-11 for evaluation of cotton picking bags designed and tested by Marathwada Agriculture University, (MAU), Parbhani, Chaudhary Charan Singh Haryana Agriculture University (CCS, HAU), Hissar suitable to different age groups as main and sub plots in split plot design with 9 replications.

Selection and training of subjects: Eighty one farm women in the age range of 18 to 52 years with normal
health/ blood pressure and body temperature were selected from Hingna, Kalmeshwar and Nagpur tahasils of Nagpur district, Maharashtra state. Care was taken to avoid any subjects with any major illness or cardiovascular problems. Knowledge, skills for using these picking bags were imparted and allowed them to use for dummy picking.

Classification of subjects: Height and body weight of cotton picking women were measured for calculating body mass index (BMI), scores were interpreted as per Garrow (1987). Heart beats/ min were measured before and after cotton picking operation in cotton fields, energy expenditure (kJ/min) per kg cotton was calculated from this during Bt hybrid cotton picking.

Stitching of bags: Cotton bags along with technical literature were procured from original source (MAU, Parbhani, CCS, HAU, Hissar) and stitched to assess their suitability for cotton picking women folk of Nagpur district.

Testing cotton picking bags: Output of Bt hybrid cotton picked was measured per unit area and time using all two picking bags and local picking aid called Fadka or a piece of old cotton / synthetic cloth usually tied around the waist of farm women to temporarily store and transport cotton picked in field.

Masculo skeletal problems: Incidences of musculo-skeletal problems during the activity were identified with the help of body map (Corlett and Bishop, 1976), which indicates different body parts viz; upper body parts (eye, neck, shoulder joint, upper arm, elbows, wrist/ hands) and lower body parts (lower arm, low back, upper leg/ thigh, knees, calf muscles, ankles, feet). The perceived discomfort i.e. rating of perceived exertion (RPE) was recorded in terms of pain felt on a 5 point scale developed by Varghese et al. (1994) to record the intensity of the pain in the various parts of the body viz., 5, 4, 3, 2, 1 for the Intensity of the pain as very severe, severe, moderate, mild and very mild respectively.

RESULTS AND DISCUSSION

Ergonomic evaluation of cotton picking bags: Family resource and management division, CCS, HAU, Hissar ergonomically designed back loaded cotton picking bag was having 50% higher carrying capacity and ease in tying (Table 2) proved significantly superior over Home Science department, MAU, Parbhani designed front loaded pouch type of cotton picking bags as it facilitated longer picking time with less interruptions. HAU bag exerted 37% less load on heart beats, 18% lower energy expenditure KJ kg cotton (Table 1) with a break even of 17 days (Table 3) due to ease in field movement compared to MAU bag which created hindrance. These results were in agreement with those observed the suitability of cotton picking bags under Haryana conditions (Gandhi, et al., 2008). HAU, designed cotton bag requires 25% and 15% extra cloth and costs over MAU bag although, without any protection of hands (Table 3). MAU, designed cotton picking bag only offers protection for arms and legs from sun and physical abrasion of cotton bracts and special extra linen is needed in rest. The conventional cloth system exerted more load on left knee due to forward motion with front load of cotton. However, the cotton cloth selection made in the improved picking bags also created less suffocation compared to synthetic cloth used in the local method needs attention of researchers for further comfort.

Onfarm evaluation of cotton picking bags: Average heart rate at rest beats min-1 and after work was non significantly influenced by both picking bags and age groups due to lighter nature of Physiological work load both in improved picking bags and younger and middle age group (18-35 year) of farm women compared to traditional picking tool Fadka in higher age group (36-52 years) as moderate nature of work as described by Garrow (1987). These observations were confirmed from energy expenditure k J /hr/ kg picked cotton. However, the delta average working heart rate b/min during picking was significantly lower in relatively younger age group of 18-25 years compared to their senior counter parts 26-35 and 36-52 years due to their anxiety or reserved energy which can be spent at ease. Bt hybrid cotton picked area, delta heart beats /m2 and quantity /hour were non significantly influenced by both picking bags and age groups due to the nature of work load as discussed earlier.

Looking in to synchronous nature of Bt hybrid cotton and timely picking of cotton against abnormal weather seems to use picking bags/ young and middle age grope as criteria both are going to give a physiological efficiency as advantage in a poor nutrition and energy status of farm women. The earning /day also not significantly influenced by picking bags or age groups may be due to short term job they did for one hour and a break to empty the bag due to lighter nature
of work load in a cohesive team manner despite they were on competitive contract by payment basis on quantity of seed cotton picked. The breakeven economics for cotton picking bag was 17 days only compared to picking period of 60 days in every season. It is more vice to make cotton picking bags as apron for farm women themselves which protects and saves energy from the improved efficiency the cost can be realized. HAU cotton picking bag is meeting the objective of ergonomic requirement.

CONCLUSION

Cotton picking bags could reduce drudgery of cotton farm women if adopted, the bag cost can be realized in single season besides improving personal safety and picking efficiency.

REFERENCES