



User Friendly Pick Bag for Pearl Millet Ear Head Collection

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ABSTRACT

Various agricultural processes like pre-sowing, weeding, picking and post-picking require extensive farm work. For farm workers engaged, these tasks are not only time consuming but also drudgery inducing over years. This directs for interventions in terms of improved technologies to relieve women from high energy demands, time spent and associated drudgery. An access to affordable technology reduces drudgery, saves time and increases work efficiency of farm workers. Adoption of such technologies radically changes their lives. Therefore, study was conducted to develop user friendly pick bag for Pearl Millet Ear Head Collection which would reduce the drudgery and increase farmers' efficiency. The study was carried out in the fields at CCSHAU farm, *Arya Nagar* and *Bherian* village of Haryana state with the objective to assess suitability for pearl millet ear head collection during pearl millet harvesting season on various parameters. Developed pick bag for Pearl millet ear head collection was found suitable. It was assessed as a good initiative towards reduction of drudgery and increasing work efficiency of the worker, hence recommended over the existing practice (conventional bag) of Pearl Millet Ear Head Collection.

Key Words: Drudgery, farm workers, Pearl millet ear head collection, suitability.

INTRODUCTION

Agriculture is one of the most labour intensive occupations of unorganized sector. Many farming and allied activities performed by the farm workers involve a lot of physical strain which adversely affects their work efficiency and leads to several types of occupational health hazards like mechanical hazards, chemical hazards, musculoskeletal disorders, environmental hazards, physical hazards, biological hazards *etc.* These health hazards can create serious health problems for the workers in the long run. Incidences of chronic skeletal muscular and postural health problem such as strain/sprain, neck pain, joint pain, back pain, hand and leg pain, shoulder pain, chest pain, accidents like cut/wounds, scratches, injury and respiratory diseases such as asthma are indicative of work related health disorders (Chaoudhari *et al*, 2009).

Ergonomics is the scientific study of the relationship between man and his working

environment that includes ambient conditions, tools and materials, methods of work and organization of the work. The health of farm workers is of utmost importance, adding to the overall development of agriculture. Therefore, drudgery reduction measures need to be initiated to avoid occurrence of health hazards among farm workers. In view of this, it was felt that there was an urgent need to make them aware about latest drudgery reducing technologies and to motivate them to adopt the same. If relevant technologies are made available to the farm workers, it would definitely contribute in reducing their drudgery, increasing their working capability, increasing farm production, resulting in improved quality of life (Sundhesha, 2018).

The major pearl millet growing states are Rajasthan, Maharashtra, Gujarat, Uttar Pradesh and Haryana which account for more than 90% of pearl millet acreage in the country and commonly grown in *kharif* season. Harvesting of pearl millet

Table 1. Opinion regarding designing features of Pick Bags for Pearl Millet Ear head collection. n=50

Design	Designing Features	WMS
Design # 1	Full body backing with stiff material	1.6
	Back length increased by 3 inches	1.2
Design # 2	Addition of 4 inch wide strip backed with stiff material (tetron) at the bottom and sides	3.0
	Pocket length reduced to 6 inches	2.7
	Straight shape was given at the sides instead of curved	2.7
	Back length increased by 3 inches	1.2
	Provision to insert required material to give raised effect at the main body to provide fullness	3.0
Design # 3	Addition of 4 inch wide strip backed with stiff material (Foam) at the bottom and sides	3.0
	Pocket length reduced to 6 inches	2.7
	Straight shape was given at the sides instead of curved	2.7
	Back length increased by 3 inches	1.2
	Provision to insert stiff material to give raised effect at the main body to provide fullness	3.0
Design # 4	Addition of 4 inch wide strip backed with stiff material (tetron) at the bottom and sides	3.0
	Pocket length reduced to 6 inches	2.7
	Straight shape was given at the sides instead of curved	2.7
	Back length increased by 3 inches	1.2
	Half body was backed with stiff material (tetron) to give stiffness to the main body of the pick bag	2.0
	Provision to insert required material to give raised effect at the main body to provide fullness	1.0
Design # 5	Four inch wide strip added at the bottom and sides with provision for inserting desired stiff material to provide fullness to the pick bag	1.2
	Pocket length reduced to 6 inches	
	Straight shape was given at the sides instead of curved	2.7
	Back length increased by 3 inches	2.7
	Provision to insert required material to give raised effect at the main body to provide fullness	1.2
		1.0

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crop in Haryana is done in two ways as i) in rain fed areas women cut the *bajra* cobs with sickle from top using rest of the crop as green fodder for animals, ii) on the contrary, in irrigated areas the crop is harvested from the bottom and *bajra* cobs are cut after that. This generally requires bending, stooping and adopting unnatural body postures to collect straws & tie the bundles. For doing this task, they have to stretch their hands fully to reach the *bajra* cobs & adopt arduous posture causing undue stress on women. This activity of *bajra* cobs cutting is primarily performed by farm women. This is a tedious activity as reported by farm women. On an average, a woman spends approximately six hr daily in collecting 20-24 Kg of particular crop using '*jholi*' which is a traditional way of making 'conventional bag' out of their own garments and clothing (including *Chunni*, *Lugdi* and *Chadder*) which is tied in the form of a bag on their shoulders and back (Gandhi *et al*, 2012). It was reported that width of the conventional bag made by them using *Chunni* etc. decreases towards upper side and it becomes difficult to collect pearl millet ear heads after half-length of the conventional bag as the heads start falling on the ground. Also, the length of pearl millet ear heads also act as hindering factors. To overcome these problems faced by the farm workers in the fields, pick bag for Pearl millet ear head collection was designed and developed for farm workers. Pick bag for Pearl millet ear head collection was then tested in the fields and was found better than existing method of collection. It was also found highly acceptable technology for being user friendly. In this direction, the suitability of developed user friendly Pick bag for Pearl millet ear head collection, field testing of bag was assessed on various parameters.

MATERIALS AND METHODS

Designing of Pick bag for Pearl millet ear head collection

Six samples of pick bag for Pearl Millet head collection were designed incorporating additional constructional designing features. Out of these, one

design was not found convenient and practically feasible hence was rejected in the first phase of testing itself by the researchers. Five designed and developed pick bags were tested for pearl millet head collection at Chaudhary Charan Singh Haryana Agricultural University farm during the Pearl millet harvesting season along with ergonomics testing team of Family Resource department. All the designing features of pick bag were assessed, so that the most accepted designing features could be combined to finalize a pick bag for Pearl millet head collection on three point scale i.e. highly suitable, suitable and somewhat suitable.

Each design was also tested on various suitability parameters (comfort, shape, appeal, convenient to put on, convenient for loading-unloading, functional (fulfill the purpose) and suitability of fabric) on three point scale i.e. highly agree, agree and somewhat agree scoring 3, 2 and 1 using modified schedule developed in the department.

Development of Pick bag for Pearl millet ear head collection

After final selection of the design on the basis of constructional features, the selected Pick bag for Pearl millet ear head collection was finally developed as per the ergonomic assessment. Some of the features of developed pick bag are half body backing with stiff material to give stiffness to the main body of the pick bag, strip backed with stiff material (tetron) at the bottom and sides, pocket length of 8 inches and straight shape at the sides instead of curved.

Suitability assessment of developed Pick bag

Pick bags was tested on various suitability parameters. The measurement of fabric used for developing pick bag was 40x60 inch. On an average, a farm woman collects 8-10 kg pearl millet ear heads in one lot. Suitability was assessed with reference to comfort, appeal, convenient to put on, convenient for loading-unloading, functional (fulfill the purpose), appropriate size and shape, increase efficiency and good replacement over existing

Table 2. Testing of pick bag for Pearl Millet head collection on various suitability parameters.

Sr. no	Suitability parameter	Design 1 WMS	Design 2 WMS	Design 3 WMS	Design 4 WMS	Design 6 WMS
1	Comfortable	2.0	2.0	2.0	2.0	1.4
2	Appealing	2.0	2.0	2.0	2.0	1.2
3	Convenient to put on	1.7	2.6	2.8	2.8	1.3
4	Convenient for loading-unloading	1.3	1.4	2.0	2.4	2.0
5	Functional	1.4	1.6	2.5	2.8	1.0
6	Shape appropriate	1.4	2.2	2.4	2.8	1.1
7	Suitable fabric	2.0	2.0	2.0	2.0	2.0

methods on five point scale i.e. highly suitable, suitable and somewhat suitable, least suitable, unsuitable scoring 5, 4, 3, 2 and 1, respectively.

RESULTS AND DISCUSSION

Testing of designed pick bags for pearl millet ear head collection (Table 1)

In the case of Design # 1, the designing feature full body backing with stiff material was found suitable with WMS 1.6 while back length increased by 3 inches was the least suitable feature with WMS 1.2. whereas, in design # 2 addition of 4 inch wide strip backed with stiff material (tetron) at the bottom & sides was found 'most suitable' (3.0) by the respondents followed by pocket length reduced to 6 inches and straight shape given at the sides instead of curved with WMS 2.7 .

In design # 3, adding 4 inch wide strip backed with stiff material (foam) at the bottom and sides was most suitable feature (3.0) followed by pocket length reduced to 6 inches and straight shape given at the sides instead of curved with WMS 2.7.

In design # 4, adding 4 inch wide strip backed with stiff material (tetron) at the bottom and sides was found most suitable feature (3.0) followed by straight shape given at the sides and pocket length reduced by 6 inch' with WMS 2.7. Half body backed with stiff material (tetron) to give stiffness to the main body of the pick bag was also reported as suitable feature (2.0).

In Design # 5, pocket length reduced by 6 inches and straight shape given at the sides instead of curved was recorded as suitable feature with WMS 2.7 while the main feature i.e. four inch wide strip added at the bottom and sides with provision for inserting desired stiff material to provide fullness to the pick bag was opined as least suitable (1.2) by majority of the respondents because inserting stiff material was found in-convenient in use. Back length increased by 3 inches and provision to insert required material to give raised effect at the main body to provide fullness were found 'least suitable features in all the designs.

It was concluded that the most acceptable constructional designing features were half body backing with stiff material (tetron) to give stiffness to the main body of the pick bag, addition of 4 inch wide strip backed with stiff material (tetron) and foam at the bottom and sides, pocket length reduced to 6 inches and straight shape given at the sides instead of curved.

Testing of designed and developed pick bags on various suitability parameters (Table 2)

Five designed and developed pick bags were tested on various parameters to assess the suitability. For design no. 1, most of the respondents agreed on suitability parameters i.e. comfort, appeal and suitable fabric with WMS 2.0 followed by convenient to put on' with WMS 1.7, functional',

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appropriate shape (WMS 1.4 each) and convenient for loading and unloading (WMS 1.3).

In design no. 2, respondents were highly agreed for the parameters 'convenient to put on' with WMS 2.6. Most of the respondents were 'agreed' on parameters of 'appropriate shape' (WMS 2.2), 'comfort', 'appeal' and 'suitability of the fabric' with WMS 2.0 followed by 'convenient for loading and unloading' (WMS 1.4) and 'functional' (WMS 1.6).

In design no. 3, respondents were highly agreed for the parameters 'convenient to put on' (WMS 2.8), 'functional' (WMS 2.5) and 'appropriate shape' (WMS 2.4). Most of the respondents were agreed on parameters of 'comfort', 'appeal', 'suitability of the fabric' and 'convenient for loading and unloading' with (WMS 2.0).

In design no. 4, respondents were 'highly agreed' for the parameters 'Convenient to put on', 'appropriate shape' and 'functional' (WMS 2.8). Most of the respondents were agreed on parameters of 'convenient for loading and unloading' followed by 'comfort', 'appeal', 'suitability of the fabric' with WMS 2.0.

In design no. 6, respondents were agreed on 'convenient for loading and unloading' (WMS 2.0) and 'suitability of the fabric' followed by 'comfort' (WMS 1.4), 'convenient to put on' and 'appeal' (WMS 1.2). They were least agreed on 'functional' (WMS 1.0) and 'appropriate shape' (WMS 1.1).

Out of these, five designed and developed pick bags tested for pearl millet head collection, two designs *i.e.*, Design no # 3 & 4 were found comparatively more suitable on different parameters and designing features. Finally, one design *i.e.*, Design no. 4 was finalized after comparative analysis and discussion with ergonomic testing team (Department of FRM) removing the least suitable designing features *i.e.* 'back length' and 'provision for inserting desired stiff material to provide fullness to the pick bag'.

Suitability assessment of pick bag for pearl millet ear head collection in the fields

Pick bag was designed and developed for farm workers as per their requirements. Field testing of the developed pick bag was done to assess its suitability for pearl millet head collection on farm workers during harvesting season and presented in Figure 1.

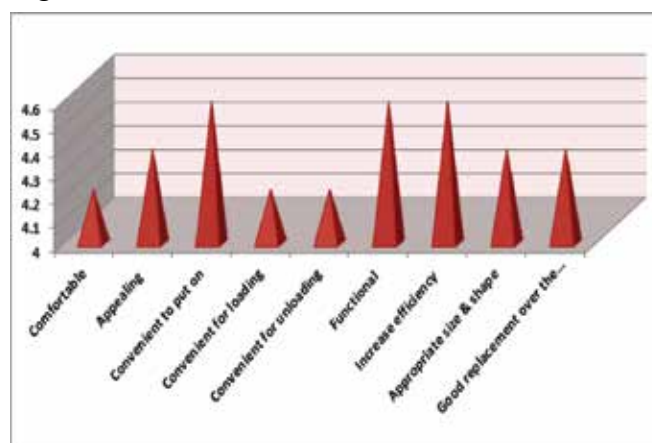


Fig. 1. Suitability Assessment of Pick Bag for Pearl Millet Ear Head Collection.

Pick bag developed for pearl millet head collection was assessed to be highly suitable being functional, convenient to put on and increase efficiency (4.6); good replacement over the existing method (4.4); comfortable and convenient for loading & unloading (4.23). Pick bag was also found to be highly appealing and had appropriate size and shape with WMS 4.4 each.



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CONCLUSION

Developed Pick bag for Pearl millet ear head collection was found suitable. It seems to be a good initiative towards reduction of drudgery and increasing work efficiency of the worker. Hence, with tireless efforts, it can go a long way in improving quality of life of rural people in general and farm workers in particular.

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