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ERGONOMIC ASSESSMENT OF EAR CUTTER FOR JOWAR HARVESTING

J. P. ZEND, S. H. UMRIKAR, S. N. YEOLE AND K. J. KAMBLE

ABSTRACT

An ear cutter designed and developed by AICRP-FRM center with the help of College of Engineering, MAU, Parbhani was assessed ergonomically for Jowar harvesting. Ear cutter was again assessed ergonomically after its modifications. The data was compared with traditional method of Jowar harvesting i.e. use of sickle. The subjects of the study were farm women in the age group of 20-45 years who were normal, non pregnant, non lactating and without any major illness and handicaps. Circulatory stresses and physiological cost for ear cutting were measured by sub dividing the activity –pedaling and cutting. Physical fitness was determined by subjecting farm women to step stool test. With the help of Heart Rate monitor (Polar sport tester TM), resting, working and recovery heart rate were recorded till complete recovery during sub stage of the activity. Results indicated that there was increase in Heart rate by 3-4 beats per minute while using ear cutter than the traditional method of Jowar harvesting, but the total cardiac cost of work and physiological cost of work was not increased significantly. Output of operation was significantly increased by 17.34 kg per labourer per 30 minutes than the traditional method. Field trials revealed that use of ear cutter helped in reducing the frequency of postural changes as no postural change was needed while pedaling and cutting. It can be concluded that Ear cutter developed is women friendly and is recommended for performing the Jowar harvesting to increase the output four times more than the traditional method.

See end of the article for authors' affiliations

Correspondence to :
J. P. ZEND
Department of Home Management, College of Home Science, Marathwada Agricultural University, PARBHANI (M.S.) INDIA

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The contribution of farm women in Indian agriculture is estimated to be 50-60per cent (Anon1981). Though Women's contribution in agriculture production is significant, the introduction of machinery for women dominated operation is very low. It is necessary to design and introduce suitable and simple farm tools for farm operations which are women friendly (Kumar and Parvathi, 2001). In India, the farming practices are too haphazard and nonscientific and hence need some forethought to implement a new technology (Karthikeyan and Thomas, 2004).

Jowar and Bajara have considerable area under crop and are important cereal crops of Maharashtra. These crops are harvested manually with the help of sickle and allowed to dry for one or two days in the farm in the form of bundles. Before threshing, these ear are cut by farm women with the help of sickle. The work is being performed in traditional way in open extreme environmental condition. This ear cutting is solely performed by farm women. Thus, keeping in view the most neglected and essentially required aspect of women drudgery due to Jowar ear cutting activity in bending position, the study was conducted with the following objectives

- Design and develop new drudgery reducing technology for Jowar harvesting
- To measure the ergonomic cost of activity Jowar harvesting using traditional method and by using an ear cutter.

METHODOLOGY

A total sample of 30 farm women from the age group of 20-45 years who were normal, non pregnant, non lactating and without any major illness and handicaps, engaged in jowar harvesting activity was selected in order to achieve the objective of present investigation. Before starting the trials, all of them were well acquainted with newly developed ear cutter for Jowar harvesting. Cutting of ear manually with the help of sickle was traditional method and ear cutter used for jowar harvesting /cutting was considered as an improved method. Cutting of ear with the help of ear cutter require two labourers. So the activity was divided in to two stages i.e. pedaling and cutting. Specifications of the ear cutter are given in Table1. Its operation and construction is shown in Fig. 1 and 2.

Equipment :

- Step test stool for physical fitness.
- Polar heart rate monitor for continuous heart rate record.
- Goniometer for postural analysis.