

## Ergonomic evaluation of different improved sickles in paddy harvesting

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■ **ABSTRACT** : Naveen, Baibhav and Local sickles were evaluated for harvesting paddy crop with 20 farm women age 30-50 years (Subjects) at surrounding villages of KVK, Chatra, Jharkhand. The data of improved and Local sickles were compared. During the harvesting session, they spend nearly 7-8 hours daily to perform the activity. The Naveen sickle was the heaviest weight 229g followed by Baibhav and deshi was 202 and 178g, respectively. Deshi sickle was the lightest in weight (178g). Blade of both improved sickles were made up of high carbon steel except for deshi sickle that was made up of iron. The output was found maximum for Naveen sickle (74.2kg) this sickle resulted 6.9 per cent more output over the deshi sickle and also increase area covered 4.7 per cent over the deshi sickle. Average working heart rate (104bpm) and corresponding energy expenditure (7.81kg/min) was found minimum for Naveen sickle. Total cardiac cost of work for all sickles ranged from 840 beats to 1010 beats TCCW for Naveen sickle was 19.38 per cent less over deshi sickle. Therefore, Naveen sickle was suitable for crop harvesting under prevailing bio-physical and social economic condition of Chatra district, Jharkhand.

■ **KEY WORDS** : Improved sickles, Women workers, Heart rate, Paddy harvesting

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**R**ice (*Oryza sativa*) is the most important crop of Chatra district in Jharkhand. It occupies about 60 per cent cultivated area of Chatra District. This district land slope is more than 6-7 per cent and also very small, so the combine harvester, power reaper operation is very difficult. Also due to easy availability of human labour, easy available tools, simplicity in design and operation the most of farmers are depended on sickles. The relative performance evaluation of sickles for paddy crop harvesting is being felt important in order to reduce the drudgery of harvesting. Hence, the study was under taken with the objectives to study the physical characteristics of the women involved in paddy harvesting to assess the physical work load of the women using deshi and improved sickles.

### ■ METHODOLOGY

The study was undertaken in four villages viz., Turag, Dhamania, Uтта, Kharik in Chatra block of Chatra District under KVK, Chatra with three treatments in Randomize Block Design with four replications during *Kharif* 2009-2010 and 2010-11, On 20 farm women subject ranging from 30-50 years of age using three different sickles viz., T<sub>1</sub>- Local sickles T<sub>2</sub>- Vaibhav sickle T<sub>3</sub>- Navin sickle for paddy harvesting. To maintain

uniformity in on farm trial data, physically fit women was selected, physical fitness of the women was studied through step-stool ergo meter.

### Health status through step stool test :

Selected farm women was given enough of rest and her resting heart rate was measured with the stethoscope. After the completeness, then after they ready to perform the stepping activity on the step test ergometer for maximum 5 min with uniform stepping rate of 30 steps/min. During the stepping activity the heart rate was recorded every minute. After 5 min of stepping activity, the farm women was asked to stop the activity and sit comfortably on resting chair. Then recovery pulse rate was recorded after every minute for a period of 5 min.

Physical fitness t index (PFI) was calculated by using the formula which interpretation of scores was given by Varghese *et al.* (1994).

$$PFI = \frac{\text{Duration of stepping (sec)} \times 100}{\text{Sum of 1st, 2nd \& 3rd min recovery HR}}$$

Health status through Aerobic capacity (VO<sub>2</sub>max)

VO<sub>2</sub> max was calculated by using the regression formula:

$$VO_2(\text{MI} / \text{Kg} \times \text{min}) = 0.377 \times \text{step stool test (PFI)} - 12.767$$