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## Drudgery and occupational health hazards among tribal women involved in paddy cultivation

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### Abstract

Farm mechanization has become utterly essential for timely operation of agricultural activities leading to increase in production and productivity besides reducing drudgery of labour associated with farm activities. It also enables efficient utilization of agricultural inputs and reduces the cost of production. This could be suitably addressed through introduction of women friendly ergonomically designed farm tools and equipment through well designed and targeted interventions. An attempt has been made to reduce the women's drudgery issues in paddy farming, increase their work efficiency and income in two tribal districts (Koraput and Mayurbhanj) of Odisha. A total of 360 tribal women (180 respondents from Lamtaput block of Koraput and 180 respondents from Jashipur block of Mayurbhanj) were selected for identification of drudgery and occupational health hazards. It was found that the tribal women followed traditional practices for cultivation of paddy and vegetables. Most of them did not possess improved tools and implements. The collected data revealed that the activities performed by them were drudgery prone and there were evidences of occupational health hazards. Hence, there was need for intervention of women friendly improved tools and implements to reduce drudgery and occupational health hazards among the tribal women.

**Keywords:** Drudgery, occupational health hazards, women friendly technologies, mechanization, paddy production, tribal women

### Introduction

Women play a pivotal role in agriculture as agricultural labour, farmers, co-farmers, family labour and as managers of farms and agri-entrepreneurs. Their involvement in different operations of major crops- land preparation, seed selection and seedling production, sowing, applying manure, fertilizer and pesticide, weeding, transplanting, threshing, winnowing and harvesting; in livestock production, fish processing, collection of non-timber forest produce (NTFP) has been widely recognized. Despite being the backbone of agricultural economy in developing regions, they remain relatively an unattended group. Less access to education and technology, a host of other socio-economic factors have had an adverse impact on the lives of women farmers and they have often not been able to take advantage of opportunities from new technologies, markets, or contract farming. Rural-urban migration, growing pressure on land, water, agro-biodiversity and firewood and natural disasters associated with climate change have also affected them.

Agriculture in Odisha is the mainstay of majority of the population and thus, holds the key to socioeconomic development of the State. It suffers from frequent natural calamities like cyclones, drought and flash floods. This farming sector still provides employment to more than 60 percent of the population directly or indirectly, making it the largest employment sector of the State. Hence, development in agriculture sector is vital to set the pace of development in the State. Out of the total population, the total female workers were 15,84,529 and the per cent of female workers in agriculture was 60.47 per cent (Census, 2011). They are performing back breaking tasks in traditional method which leads to drudgery and create occupational health hazards among the farmwomen. Due to lack of awareness and knowledge, they lack information about women friendly farm tools and equipment. Farm mechanization has become utterly

essential for timely operation of agricultural activities leading to increase in production and productivity besides reducing drudgery of labour associated with farm activities. It also enables efficient utilization of agricultural inputs and reduces the cost of production. This could be suitably addressed through introduction of women friendly ergonomically designed farm tools and equipment through well designed and targeted interventions. It is evident that wrong choice of technology and equipment has resulted in increasing the drudgery of women farmers in agriculture activities. Drudgery in farming operations is an important gender issue and efforts are under way to develop and popularize such tools and equipment among women farming community.

Farm women performing back breaking tasks in traditional method leads to drudgery and creates occupational health hazards. Due to lack of awareness and knowledge, farmwomen lack information about women friendly farm tools and equipment. Farm mechanization has become essential for timely operation of agricultural activities leading to increase production and productivity besides reducing drudgery. It also enables efficient utilization of agricultural inputs and reduces the cost of production. This could be suitably addressed through introduction of women friendly ergonomically designed farm tools and equipment through well designed and targeted interventions. Keeping these in view, a project has been conceived in a collaborative mode funded by Mahindra & Mahindra, with the partnership of ICAR-CIWA-PRADAN to reduce the women's drudgery issues in paddy, ragi (millet) and vegetable based farm operations, increase their work efficiency and income.

### Objectives

- To study the extent of participation of tribal women and use of existing tools and equipment in paddy and vegetable cropping system.
- To assess drudgery and occupational health hazards among tribal women.

### Methodology

Descriptive designs were chosen to find out the demographic profile of the rural women for both baseline and end-line data collection with the help of structured interview schedule. The base line data collected in two parts which included village level information- part I (information about village, possessions of farm tools and equipment, tractor/animal operated machines, hand operated tools and implements etc.) and information of farm women- part II (general information, information on paddy cultivation, women involved in paddy cultivation, tools and equipment used in paddy cultivation, information about improved farm tools and equipment, prevalence of occupational health hazards during farming activities).

This study was implemented in two districts (Koraput and Mayurbhanj) located at northern and southern part of Odisha. One block from each district such as Jashipur block of Mayurbhanj and Lamtaput block of Koraput district were selected where paddy and vegetables are the major crops cultivated by the tribal families. A total of 180 respondents from 10 villages of Lamtaput block of Koraput and 180 respondents from 10 villages Jashipur block of Mayurbhanj were selected randomly. For collection of Baseline data survey format was prepared with the support of consultation of partners. Training-cum- orientation of master trainer on baseline survey, methodology to carry out the survey conducted. The major activities performed by women were identified through

participatory observation and structured interview schedule.

## Results and Discussion

### Participation of tribal women in paddy and vegetable cropping system in Koraput district

#### General Information about Koraput district

Agriculture is the primary occupation of the major households of Koraput selected for study. They mostly cultivate paddy during kharif season. The land under cultivation is mostly rain fed areas whereas a very few areas has been covered under irrigation for paddy cultivation. The major crops grown by the farm families/tribal families are paddy, ragi and vegetables. The major horticultural crops such as mango, jackfruit, lemon, tamarind, banana, cashew nut including spices are grown in the orchards. It is also observed that the barrel lands were converted to cultivable lands through intervention of agro-forestry such as eucalyptus, acacia etc. which give a huge remuneration through its products and by products. It was found that the majority of the population depend upon agriculture in the selected village. They adopt traditional practices at field level. Both the farmers and farm women use traditional tools and equipment used for cultivation, harvesting and post-harvest activities. Due to the uneven surface of land and undulating plateau, they depend the tools and equipment which are operated by animals and human as source of power. Apart from these some of the farm families possessed tractor or power operated farm tools and equipment.

### Participation of tribal women in paddy and vegetable cropping system in Mayurbhanj district

Mayurbhanj district economy mainly depends on agriculture and which mainly depends on rainfall. The rainfall depends on South-West monsoon. Generally crops grown during *Kharif* and *Rabi* season are Paddy, Ragi, Green gram, Black gram, Groundnut, Mustard, Chickpea, Sunflower and different kinds of vegetables. Agriculture is the primary occupation of the major households selected for study. They mostly cultivate paddy during Kharif season. The land under cultivation are mostly rain fed areas whereas a very few area has been covered under irrigation for paddy cultivation. The major crops grown by the farm families/tribal families are paddy, minor cereals, oilseed, tubers and vegetables. The major horticultural crops such as mango, jackfruit, litchi, tamarind etc. It is also observed that the barrel lands were converted to cultivable lands through intervention of agro-forestry such as *Sal*, *Mahua*, *cashew nut* etc. which give a huge remuneration through its products and by products. It was found that the majority of the population depend upon agriculture in the selected village. They adopt traditional practices at field level. Both the farmers and farm women use traditional tools and equipment used for cultivation, harvesting and post harvest activities. The farmers depend upon the tools and equipment which are operated by animals as source of power. Apart from these some of the farm families possessed tractor or power operated farm tools and equipment.

### General Information on women Involved in paddy cultivation in Koraput and Mayurbhanj district

Most of the respondents belong to tribal community and depend upon the agriculture as their primary occupation in both the district. The age of the selected respondents vary from 21 to 52 years. Majority of them functionally literate whereas less than 10 percent completed their high school education. The average size of land holding is 2-3 acres. The lands are owned by the head of the family or in the name of their male counterpart or husband. The farm families depend upon the monsoon and they

cultivate paddy in *Kharif* season. In some of the areas they opted for due to facility of irrigation. During *Rabi* season they grow millet and vegetables including tubers and green leafy vegetables.

The data related the participation of women in different production activities in paddy cultivation and the existing tools and equipment by them from both the districts were collected from the respondents. The data revealed that more than 85 percent women actively participated in Land preparation, FYM application, interculture activities such as uprooting, transplanting, weeding and harvesting in production process. Of the total 70.8 per cent women involved in seed treatment and 73.6 per cent in nursery raising activities. Farm women's participation in application of fertilizer, sowing and irrigation is very less as compared to other activities. It has been observed that the women farmers from both district used traditional farm tools and equipment for cultivation of paddy. Land preparation is a major activity done by men with the help of women. In this case majority of them used wooden plough which is being used by them since their generation to generation. The tractor used for land preparation activities is about 2 per cent only. The activities such as seed treatment, FYM application, weeding, uprooting etc. were done by bare hands which is most drudgery prone and created injuries in palm and nails. For post harvesting activities most of them followed their traditional practices for threshing, winnowing, cleaning grains and parboiling etc. Nag *et al*<sup>14</sup> (2004) supported from their study that in agriculture, the post harvest operations, by their very nature, include crop gathering and removal, which require the use of manual and mechanical winnowing, raking, shelling, decortications, hulling, peeling,

cutting, slicing, fiber extraction, etc.). Many of the post harvest operations have traditionally been performed on the farm itself, by labour intensive methods, and with a very low output

### Time spent by tribal women involved in paddy cultivation in Koraput and Mayurbhanj district

The information pertaining to the activities carried out in paddy cultivation were gathered in terms of time spent (hours) per day and time spent during the kharif and rabi season. The data collected from Koraput district revealed that majority time of the women farmers spent in the weeding operation (50.5%) followed by land preparation (11.6%), harvesting (10.6%) transplanting (8.6%). Rest of the operations take up approximately 18.7 per cent of their time. On an average 738.84 hours of work is put in by the women in kharif season for paddy cultivation. Whereas in Mayurbhanj, most of the time of the women farmers spent in the harvesting operation (20.1%) followed by (17.8%) and weeding (16.1%). Rest of the operations take up approximately 45.8 percent of their time. On an average 811.5 hours of work is put in by the women in kharif season for paddy cultivation. The following table 1 and fig. 1&2 given below depicting the activities and time spent by women for cultivation of paddy during Kharif season in Koraput and Mayurbhanj district. It has been observed that women spent maximum time during June for field preparation, and sowing related activities followed by August for interculture activities. During September they gave more time for harvesting and post-harvest activities whereas in October they spent less time other post harvest such as storage activities.

**Table 1:** Time spent by tribal women involved in paddy cultivation in Koraput and Mayurbhanj district

| Activities                         | Time spent by tribal women in Koraput (n=180) |            | Time spent by tribal women in Mayurbhanj (n=180) |            |
|------------------------------------|-----------------------------------------------|------------|--------------------------------------------------|------------|
|                                    | Average hours /day                            | Percentage | Average hours /day                               | Percentage |
| Weeding                            | 373.3                                         | 50.5       | 130.7                                            | 16.1       |
| Land preparation                   | 85.4                                          | 11.6       | 144.4                                            | 17.8       |
| Harvesting                         | 78.6                                          | 10.6       | 163.5                                            | 20.1       |
| Transplanting                      | 63.4                                          | 8.6        | 59.6                                             | 7.3        |
| Carrying seedling                  | 32.2                                          | 4.4        | 12.3                                             | 1.5        |
| Uprooting                          | 30.6                                          | 4.1        | 34.3                                             | 4.2        |
| Threshing                          | 23.4                                          | 3.2        | 100.1                                            | 12.3       |
| Winnowing                          | 12.7                                          | 1.7        | 51.4                                             | 6.3        |
| Spraying chemicals                 | 8.6                                           | 1.2        | 11.6                                             | 1.4        |
| Seed treatment                     | 8.0                                           | 1.1        | 5.8                                              | 0.7        |
| Nursery raising                    | 6.6                                           | 0.9        | 10.5                                             | 1.3        |
| Preparation. of chemical solutions | 5.3                                           | 0.7        | 4.8                                              | 0.6        |
| Drying                             | 4.7                                           | 0.6        | 4.1                                              | 0.5        |
| Fertilizer broadcasting            | 3.3                                           | 0.4        | 18.6                                             | 2.3        |
| Sowing                             | 2.8                                           | 0.4        | 32.3                                             | 4.0        |

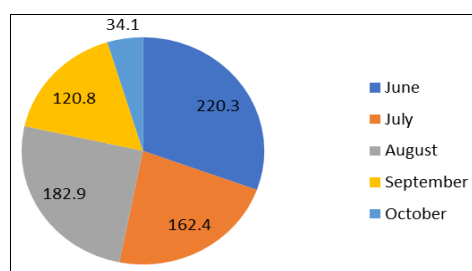


**Fig 1:** Time spent by women in different month during Kharif in Koraput

It has been observed that women spent 88.3 hours /day during June for field preparation and sowing related activities. They spent maximum time during July for sowing and transplanting

related activities followed by August for interculture activities. During September they gave less time for interculture activities whereas in October they spent more time in harvesting and post harvest activities.

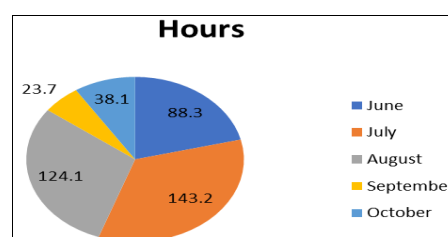


**Fig 2:** Time spent by women in different month during Kharif in Mayurbhanj

### Posture adopted by the selected tribal women involved in paddy cultivation

The postures adopted during different activities in paddy cultivation were recorded through participatory observation and documented using photographs and videos. In the Koraput and Mayurbhanj districts of Odisha, information revealed that tribal women frequently worked in static and repetitive awkward postures such as sitting, squatting, bending, and stooping while performing tasks like land preparation, sowing, weeding, manual irrigation, plant protection, harvesting, and post-harvest operations. Prolonged maintenance of these static postures such as standing, sitting, squatting, or bending were found to be harmful, causing discomfort and pain in various parts of the body. These awkward positions, along with repetitive movements during paddy and vegetable cultivation, contribute significantly to the development of musculoskeletal disorders over time. This issue requires immediate attention to reduce health risks associated with such postural strain. The findings are similar with the study conducted by Singh and Vinay<sup>19</sup> (2013), which reported that women engaged in agriculture and allied activities commonly adopt traditional postures such as sitting, squatting, stooping, sitting with bending, standing with bending, and erect standing. These postures are associated with several adverse health effects, particularly musculoskeletal problems, highlighting the need for interventions to minimize postural discomfort and occupational hazards.

### Occupational hazards of identified among selected tribal women involved in paddy cultivation

The data pertaining to the incidences of occupational health hazards collected through structured interview schedule. Data revealed that in Koraput district the majority of the respondents (67.88%) having light pain in body parts such as pain in neck, back, hand and shoulder (table2). Only (6%) having pain repeatedly in these body parts. Crushing of fingers, cut in lower body parts, bruises in palms, injuries due to weeding, injuries while bundling crops, blisters were very common and it happened sometimes (52.44%) due to monotonous work with repetitive moments of hands, palm etc. Burning in skin, eyes, nose and face sometimes (46.8%) and repeatedly (5.85%). Snake bite, scorpion bite, insect bites also happened sometimes (45%) and repeatedly (15.27%) while working in the field. Women farmers face problem in the field due to environment such as tears from eyes due to severe cold, senseless, blood from nose, affected by hot wave, water from nose, burning in eyes, difficulties in breathing, choked nose etc. while working in the

field sometimes (52.15%) and repeatedly (6.14%).

The data related to occupational health hazards also collected from Mayurbhanj district revealed that (35.56%) respondents had light pain in body parts such as pain in neck, back, hand and shoulder sometimes (27.34%) having pain repeatedly in these body parts. Among them most of them have severe pain lower back and shoulder. Crushing of fingers, cut in lower body parts, bruises in palms, injuries due to weeding, injuries while bundling crops, blisters were very common and it happened sometimes (38.98%) and repeatedly (25.2%) due to monotonous work with repetitive moments of hands, palm etc. Burning in skin, eyes, nose and face sometimes (39.3%) and repeatedly (24.97%). Similarly, Budihal<sup>7</sup> (2007) reported that 68.8 per cent of the women workers suffered from hypertension followed by other problems such as headache (62.50%), eye problems (53.10%), skin irritability (52.50%), asthma (47.50%), and weakness (41.30%), skin diseases (38.8%) heart problems (29.4%) and diabetes (27.5%) in her study Snake bite, scorpion bite insect bites (38.13%) also happened sometimes and repeatedly (25.56%) while working in the field. Sometimes (36.95%) and repeatedly (27.28%) they face problems due to environment while working in the field such as tears from eyes due to severe cold, senseless, blood from nose, affected by loo, water from nose, burning in eyes, difficulties in breathing, choked nose etc. Badodiya et al. (2013) [5] reported that most of the tribal farm women workers (44.17%) were frequently facing health hazards in operation of agricultural activities whereas 34.17 per cent were facing sometimes and 21.66 per cent were facing rarely. Similar study was conducted by Revanwar *et al* (2015) [17] revealed that drudgery of women labourers in cotton cultivation is characterized by physiological, physical and repetitive strain load experienced due to lack of protective aids and appropriate technologies and suggested for improving work life of women workers in agriculture by designing cost-effective tools/ implements, techniques based on ergonomic consideration to avoid physical load carrying, repetitive strain, long hours of work and health hazards. The results are also in line with Bajpai *et al*<sup>6</sup> (2020) that in brinjal harvesting, the occurrence of hand pain (80%), shoulder pain (20.00%), backache pain (53.33%), wrist pain (86.67), finger injury (93.33%) in traditional method whereas using a ring cutter decrease the occurrence of pain in hand (13.33%), shoulder (6.67%), backache (13.33%), wrist pain (66.67%) respectively. Similarly Murthy (2013) [13] found that there were discomforts of different body parts of the farm women working in the agriculture field and dairy farm.

**Table 2:** Occupational hazards during farm activities in Koraput and Mayurbhanj

| S. No | Health Problems               | Koraput (n=180) |               |                | Mayurbhanj (n=180) |               |                |
|-------|-------------------------------|-----------------|---------------|----------------|--------------------|---------------|----------------|
|       |                               | Never (%)       | Sometimes (%) | Repeatedly (%) | Never (%)          | Sometimes (%) | Repeatedly (%) |
| 1.    | <b>Pain</b>                   |                 |               |                |                    |               |                |
|       | Light pain in body part       | 0.00            | 81.1          | 7.2            | 5.6                | 32.2          | 30.6           |
|       | Pain in neck                  | 0.00            | 62.8          | 5.6            | 3.9                | 35.0          | 29.4           |
|       | Pain in hand                  | 0.00            | 73.9          | 4.4            | 8.3                | 33.3          | 26.7           |
|       | Pain in back                  | 0.00            | 62.2          | 5.6            | 4.4                | 40.6          | 23.3           |
|       | Pain in shoulder              | 0.00            | 59.4          | 6.7            | 5                  | 36.7          | 26.7           |
| 2.    | <b>Injuries/cuts etc.</b>     |                 |               |                |                    |               |                |
|       | Crushing of fingers           | 0.00            | 75.6          | 7.2            | 3.9                | 40.6          | 23.9           |
|       | Cut in lower body parts       | 0.00            | 51.7          | 5.0            | 4.4                | 40.6          | 23.3           |
|       | Bruises in palms              | 0.00            | 53.9          | 5.6            | 5                  | 36.7          | 26.7           |
|       | Injuries due to weeding       | 0.00            | 45.6          | 6.7            | 4.4                | 38.3          | 25.6           |
|       | Injuries while bundling crops | 0.00            | 43.9          | 7.8            | 3.3                | 38.3          | 26.7           |
|       | Blisters                      | 0.00            | 43.9          | 6.7            | 3.9                | 39.4          | 25.0           |

|    |                                         |      |      |     |     |      |      |
|----|-----------------------------------------|------|------|-----|-----|------|------|
| 3. | <b>Burning</b>                          |      |      |     |     |      |      |
|    | Skin                                    | 0.00 | 46.1 | 5.6 | 4.4 | 44.4 | 19.4 |
|    | Eyes                                    | 0.00 | 50.6 | 6.1 | 3.9 | 38.3 | 26.1 |
|    | Nose                                    | 0.00 | 46.1 | 5.6 | 4.4 | 35.6 | 28.3 |
|    | Face                                    | 0.00 | 44.4 | 6.1 | 3.3 | 38.9 | 26.1 |
| 4. | <b>Bites</b>                            |      |      |     |     |      |      |
|    | Snake bite                              | 0.00 | 43.9 | 6.7 | 4.4 | 35.0 | 28.9 |
|    | Scorpion bite                           | 0.00 | 47.2 | 6.7 | 3.9 | 42.2 | 22.2 |
|    | Insects bite                            | 0.00 | 43.9 | 5.6 | 5.6 | 37.2 | 25.6 |
| 5. | <b>Due to environment</b>               |      |      |     |     |      |      |
| a  | <b>Effect due to very cold</b>          |      |      |     |     |      |      |
|    | Tears from eyes due to severe cold      | 0.00 | 45.0 | 6.7 | 5   | 36.7 | 26.7 |
|    | Senseless                               | 0.00 | 43.9 | 5   | 4.4 | 33.3 | 30.6 |
|    | Bleeding from nose                      | 0.00 | 45.0 | 5.6 | 2.8 | 37.8 | 27.8 |
| b  | <b>Effect Due to very hot climate</b>   |      |      |     |     |      |      |
|    | Affected by hot wave                    | 0.00 | 48.9 | 6.1 | 4.4 | 39.4 | 24.4 |
| c. | <b>Polluted environment due to dust</b> |      |      |     |     |      |      |
|    | Water from nose                         | 0.00 | 78.3 | 7.8 | 3.9 | 30.0 | 34.4 |
|    | Burning in eyes                         | 0.00 | 48.9 | 5.6 | 3.3 | 40.6 | 24.4 |
|    | Difficulties in breathing               | 0.00 | 52.2 | 6.7 | 4.4 | 37.2 | 26.1 |
|    | Choked nose                             | 0.00 | 55.0 | 5.6 | 3.9 | 40.6 | 23.9 |

### Difficulty level of tasks perceived by Tribal women of Koraput and Mayurbhanj in Paddy Cultivation

The difficulty level of tasks perceived by women workers in paddy cultivation were collected through participatory observations, discussions and documentations. It was given scores ranging from 1-5 such as very difficult-5, difficult-4, normal-3, easy-2, very easy-1 and mean scores were calculated. In Koraput, the levels of difficulty in various activities performed by women workers revealed that threshing was perceived most difficult task that involved repetitive movements of upper and lower arms for longer periods with mean score 5.0 followed by harvesting (4.85), transplanting (4.82), winnowing (4.11) carrying seedlings (3.99), weeding (3.70), uprooting and nursery raising (3.52), seed treatment (3.37), storage (3.35) and drying (3.33). Most of these tasks were done with bending from lower back and repetitive movements of upper and lower limbs. The lowest mean score was observed for sowing paddy (2.62). The score for parboiling of rice was below score 1 indicated that most of the tribal families of Koraput did not consume parboiled rice. In Mayurbhanj, levels of difficulty in various activities

performed by women workers revealed that threshing was perceived most difficult task with mean score 5.0 followed by harvesting (4.91), transplanting (4.54), parboiling (4.34), winnowing (4.20), weeding (4.04), carrying seedlings (3.87), uprooting (3.67), drying (3.33), seed treatment (3.24), nursery raising (3.22) and storage. The lowest mean score was observed for sowing paddy (2.93). The results indicated that for some of the activities such as threshing, harvesting, transplanting, winnowing the level of difficulties were similar for both the districts which reflected the prevalence of drudgery among the tribal women paddy cultivation. These Intervention of women friendly ergonomically designed technologies can help in reducing the difficulties of women workers involved in turmeric cultivation in Punjab and Odisha. Ojha *et al* (2017) <sup>[15]</sup> also confirmed that in sugarcane harvesting activity, 21 per cent agriculture workers perceived the task to be very difficult whereas 12 per cent agriculture workers were found the task was difficult and 22.2 per cent of agriculture workers found very difficulties during cleaning of fields.

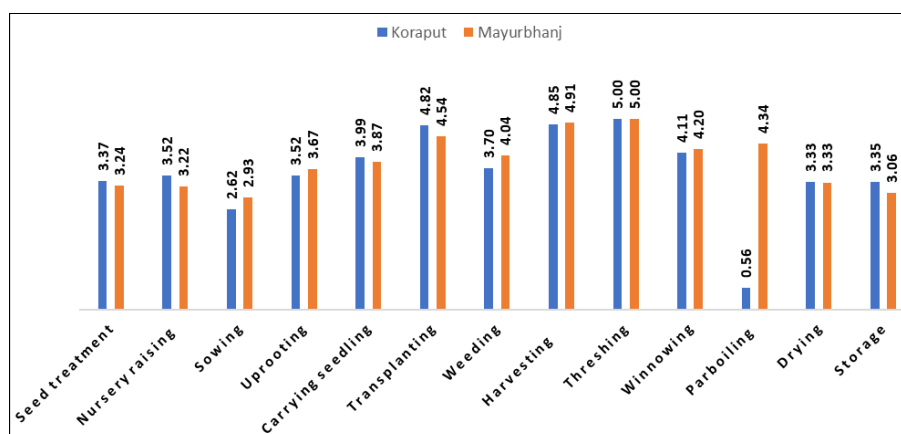


Fig 3: Difficulty level of tasks perceived by Tribal women of Koraput and Mayurbhanj in Paddy Cultivation

### Tools and implement possessed and used by the selected women farmers involved in paddy cultivation activities

The data collected from Koraput district revealed that about 69.7 per cent possessed spade, 76 per cent had khurpi and 94.4 per cent had traditional sickle for various agricultural operation. For preparation of land 27 per cent had traditional plough operated

animals as well as human being in some parts of the district. Less than 10 per cent had tractor, diesel engine, motor pump, power tiller, sprayer etc. Similarly, in case of Mayurbhanj depicted that about 98 per cent possessed spade, 26 per cent had khurpi and all of the respondents had traditional sickle for various agricultural operation. For preparation of land 78 per

cent had traditional plough operated animals Less than 10 per cent had tractor, diesel engine, pump set, power tiller, sprayer etc. The results are in line with Eka *et al* (2019)<sup>[9]</sup> also classified the tools used by farmers as traditional, by utilizing their old equipment and reported that the use of traditional tools accompanied by natural posture, can cause minor injuries to severe injuries.

#### **Awareness about improved farm tools/implements operated by the tribal women in Koraput and Mayurbhanj district**

In Koraput, it has been observed that about 64.4% had Hand winnower followed by Mandwa weeder (49.4%), Two/four row paddy transplanter (8.9%), Finger weeder (8.3%), Paddy drum seeder (8.3%) and seed treatment drum (5.6%). They also have awareness about these tools and they operated various activities with these tools. Rest of the respondent did not have information about these improved tools for drudgery reduction of farm women where as in Mayurbhanj 43.9% have seed treatment drum followed by Mandwa weeder (28.3%), Hand winnower (17.8%), Two/four row paddy transplanter (5.6%), Paddy drum seeder (3.3%) and Fertilizer broadcaster (2.8%). They also have awareness about these tools and they operated various activities with these tools. Rest of the respondent did not have awareness about these improved tools for drudgery reduction of farm women. From the above data it can be concluded that the tribal women farmers/ farmers were not aware about improved tools and implements used in agriculture.

#### **Conclusion**

It can be concluded that the women from both the tribal districts of Odisha were doing tedious work in different troublesome terrain and climate. They adopted awkward postures with repetitive movements of body parts with leads drudgery as well as musculoskeletal problems. These were also responsible for the occurrence of occupational health hazards among tribal women performing activities in paddy cultivation with unsuitable tools and implement. There was lack of awareness and exposure observed for the improved tools and implement. Hence, farm mechanization is essential for timely operation of agricultural activities leading to increase in production and productivity besides reducing drudgery of labour associated with farm activities. It also enables efficient utilization of agricultural inputs and reduces the cost of production. This problem could be suitably addressed through intervention of women friendly ergonomically designed farm tools and equipment to reduce the drudgery of women involved in paddy cultivation in Koraput and Mayurbhanj district of Odisha.

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