Assessment of occupational health hazards faced by farm workers in green gram cultivation

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Abstract
Green gram is the third main pulse crop of India grown in nearly 8 per cent of the total pulse cultivated area of the country. It’s a seed contains 24.7%, protein due to its supply of cheaper protein source; it is designated as “poor man’s meat”. The present study was conducted in Muzzafarpur district of Bihar (India) to assess the occupational health hazards around 70 farm workers engaged in different activities of green gram cultivation. The study concluded that (100%) of male workers engaged in land preparation and storage activities and female workers (100%) participated in harvesting, winnowing and cleaning activities. The men perform operations like storage (100%), Sowing (82.8%), and harvesting (77%) were performed manually. Besides threshing (65%) using wooden rods, winnowing (37%) is performed using woven bamboo frames. Only land preparation (68%) was performed by using agricultural equipments like tractor. While women shows (100%) involvement in harvesting, threshing and cleaning activities manually. Most of the general problems (95%) in soiling of hair, face, and feet come from land preparation, harvesting, threshing and winnowing activities and most of the workers (95%) were faced a specific problems of shoulders ache and (100%) of workers facing a stress from poor working environment. Hence, there is need to further studies could be conducted on development of improved tool and technologies for mitigating occupational health hazards in green gram cultivation.

Keywords: Occupational, Sustainable, Musculoskeletal, Mitigating

Introduction
The agriculture and allied area continues to be fundamental to the sustainable growth and development of the Indian economy. Not only it meets the food and nutritional necessities of 1.3 billion Indians, but also contributes considerably to production, employment and demand generation through different backward and forward linkages. In addition, the role of the agricultural area in alleviating poverty and in ensuring the sustainable development of the economy is well recognized. In agriculture sector India is the chief producer as well as consumer of pulses in the world. It plays a very important role in Indian Agriculture. In India, total production of pulses is 23.95 million tons (Anonymous, 2017-18) [1]. This is a main source of dietary proteins in the vegetarian diet of our nation. In addition being the source of proteins, they keep soil fertility also from beginning to end through biological nitrogen fixation and thus play a very important role in sustainable agriculture (Kannaiyan, 1999) [2]. Green gram is the third important pulse crop of India grown in nearly 8 per cent of the total cultivated pulse area of the country. Its seed contains 24.7% protein. Being cheaper source protein, it is designated as “poor man’s meat” (Potter and Hotchkiss, 1997) [3]. It is a short duration crop grown mostly as a fallow crop rotation with rice. Most of the operations involved in cultivation of green gram performed manually by farm workers are very tedious, monotonous and time consuming. The workers who participated in green gram cultivation subjected to so many ergonomic problems like different types of musculoskeletal problems, drudgery and various types of occupational health hazards. Farm workers perform strenuous tasks and are exposed to a wide range of occupational risks and hazards. Low socioeconomic status and poor access to health care also contribute to existing health problems in these farm workers (Mobot et al. 1992) [4]. The present study was carried out to study the occupational health hazards among the farm workers in various activities of green gram cultivation.

Methodology
Locale and sample selection
The present study was conducted on Mural block, Muzaffarpur district of Bihar. 35 male and 35 female workers were selected through snowball sampling. The workers were interviewed to elicit the information on occupational health hazards in different activities of green gram cultivation.

Tools used
Self structured questionnaire was used for eliciting information regarding demographics of respondents, type of activity performed, and occupational health problems encountered during work. Information was collected by personal interview and observation method.

Results and discussion
The results of the present study as well as relevant discussions have been presented below:

Background profile of the workers who participated in green gram cultivation activities
The background profile of the respondents is presented in Table 1. Both male (50%) and female (50%) were taken for the study among them the majority (44%) workers belong to the age group 25-35 years and majority (70%) of the respondents were married, (61%) were belong to the joint family system and the majority of the workers (64%) were illiterates.

Table 1: Distribution of male and female respondents according to their background profile

| Variables      | Frequency | (%) |
|---------------|-----------|-----|
| Gender        |           |     |
| Male          | 35        | (50)|
| Female        | 35        | (50)|
| Age           |           |     |
| 15-25 years   | 24        | (34.2)|
| 25-35 years   | 31        | (44.2)|
| 35-45 years   | 12        | (17.1)|
| 45-55 years   | 3         | (4.2)|
| Marital status|           |     |
| Married       | 49        | (70.0)|
| Single        | 21        | (30.0)|
| Family types  |           |     |
| Nuclear       | 17        | (24.2)|
| Joint         | 43        | (61.4)|
| Extended      | 12        | (17.1)|
| Education     |           |     |
| Illiterate    | 48        | (64.2)|
| Elementary school | 14  | (20.0)|
| High school   | 6         | (8.5)|
| Intermediate  | 2         | (2.8)|

Further, it is observed from the table that maximum percent (44%) of respondents had their monthly income of Rs 5,000.00 to Rs 10,000.00, and major occupations of the workers (75%) were agriculture labour.

Activities performed by male and female workers in green gram cultivation
Green gram cultivation done by various activities like a seed selection, land preparation, sowing, harvesting, threshing, winnowing, cleaning and storage. The male and female participated almost all the activities.

Table 2: Types of activities performed by male and female workers in green gram cultivation

| Sl. no. | Activities performed | Male n=35 Frequency (%) | Female n=35 Frequency (%) |
|---------|----------------------|-------------------------|---------------------------|
| 1.      | Selection of seeds   | 7 (20.0)                | 32 (91.4)                 |
| 2.      | Land preparation     | 35 (100)                | 9 (25.7)                  |
| 3.      | Sowing               | 29 (82.8)               | 6 (17.1)                  |
| 4.      | Harvesting           | 27 (77.1)               | 35 (100)                  |
| 5.      | Pod drying           | 16 (45.7)               | 31 (88.5)                 |
| 6.      | Threshing            | 23 (65.7)               | 34 (97.1)                 |
| 7.      | Winnowing            | 13 (37.1)               | 35 (100)                  |
| 8.      | Cleaning             | -                       | 35 (100)                  |
| 9.      | Storage              | 35 (100)                | 12 (34.2)                 |

It was observed from the table-2 that greater percent of male workers engaged in green gram cultivation performed farm activities like land preparation, storage (100% each), sowing (85%), and harvesting (77%) as shown in fig. 1. Whereas the activities performed by female workers are harvesting, winnowing, cleaning (100% each), threshing (97%) and (91%) seed selection as shown in fig. 2.
Manual and mechanical techniques used for green gram cultivation
Green gram cultivation activities are mostly done manually, such as seed selection, sowing, harvesting, threshing, winnowing and cleaning and only one activity land preparation is done either by mechanical tractor or with kudaal, khurpi and bullock.

Table 3: Techniques used by male and female workers for performing in green gram cultivation activities

| Sl. no. | Activities performed | Male n=35 | Female n=35 |
|---------|----------------------|-----------|-------------|
|         | Manual               | Machine   | Manual      | Machine   |
|         | f %                  | f %       | f %         | f %       |
| 1.      | Selection of seeds   | 7 20.0    | -           | 32 91.4   | -           |
| 2.      | Land preparation     | 11 31.4   | 24 68.5     | 9 25.7    | -           |
| 3.      | Sowing               | 29 82.8   | -           | 6 17.1    | -           |
| 4.      | Harvesting           | 27 77.1   | -           | 35 100.0  | -           |
| 5.      | Pod drying           | 16 45.7   | -           | 31 88.5   | -           |
| 6.      | Threshing            | 23 65.7   | -           | 34 97.1   | -           |
| 7.      | Winnowing            | 13 37.1   | -           | 35 100    | -           |
| 8.      | Cleaning             | - -       | -           | 35 100    | -           |
| 9.      | Storage              | 35 100.0  | -           | 12 34.2   | -           |

The techniques used for performing green gram cultivation activities are represented in table 3. The farm activities like storage (100%), Sowing (82.8%) and harvesting (77%) were performed manually. Besides threshing (65%) using wooden rods, winnowing (37%) is performed using woven bamboo frames. Only land preparation (68%) was performed by using agricultural equipments like tractor and machine in green gram field. Women shows (100%) involvement in harvesting, threshing and cleaning manually. None of the activities performed using advanced agricultural equipments and appliances. The lack of mechanization and over drudgery in green gram cultivation lead to many health problems.

General problems faced by farm workers while performing the activities in green gram cultivation
During green gram cultivation farmers faces so many general health problems like skin allergy, headache, hearing problems, rashes insect biting and excessive sweating because they working continuously in contact with sunrays, noisy work environment and long duration of work.

Table 4: General problems encountered while performing the activities in green gram cultivation

| SNo | Problems encountered | Selection of seeds | Land preparation | Sowing | Harvesting | Pod drying | Threshing | Winnowing | Cleaning | Storage |
|-----|----------------------|--------------------|------------------|--------|------------|------------|-----------|-----------|----------|---------|
|     |                      | F (%)              | F (%)            | F (%)  | F (%)      | F (%)      | F (%)     | F (%)     | F (%)    | F (%)   |
| 1.  | Soiling (hair, face & feet) | 62(88.5) | 63(90.0)  | 70(100) | 67(95.7)  | 70(100)  | 70(100)  | 61(87.1) | 25(37.7) |
| 2.  | Skin Allergy (face, hand & feet) | 23(32.8) | 56(80.0)  | 63(90.0) | 55(78.5)  | 66(94.2) | 61(87.1) | 45(64.2) |          |
| 3.  | Headache             | 8(11.4)           | 31(44.2)        | 67(95.7) | 45(64.2)  | 41(58.7) | 22(31.4) | 10(14.2) |          |
| 4.  | Heat (faint, rashes, sweating) | 46(65.7) | 68(97.1)  | 18(25.7) | 70(100)  | 61(87.1) | 70(100)  | 61(87.1) | 55(78.5) | 23(32.8) |
| 5.  | Insects biting       | -                 | 27(38.7)        | 32(45.7) | 5(7.1)    | -         | -        | -         | -        | -       |
| 6.  | Excessive sound during work | 5(7.1)  | 50(71.4)  | -       | -         | -         | 65(92.0) | 12(17.1) | 48(68.5) | -       |
The general problems encountered while performing the activities in green gram cultivation are depicted in Table 4. Soiling of face, feet and hair were the problems faced by green gram workers above (95%) during each activity sowing, thresholding, winnowing and harvesting respectively. Field operation like harvesting, thresholding and land preparation above (95%) causing fainting. Rashes, sweating due to heat from sun during long hours of outdoor activity. While performing farm activity like harvesting, thresholding and winnowing above (85%) causing skin allergies on hands, face and feet due to fine organic dust in the surrounding while performing these activities. Similar results were found in Sudha et al. (2014) [6] found that skin allergy was the major problem faced by the dal mill workers during dehusking, cleaning, sieving, drying, packaging, loading and unloading. Burning sensation of skin, eye irritation and itching were also faced by the dal mill workers attributed to strong sunlight and heat produced by machines.

Specific problems faced by farm workers while performing the activities in green gram cultivation

Farm workers while performing in green gram cultivation faced so many musculoskeletal and other occupational health hazards (Cuts, breathing problems and running nose, etc.). Because they working with poor postures like a forward bending in harvesting activities, seed selection, thresholding, and cleaning activities done with stooping postures and winnowing done with continuously standing postures.

Table 5: Specific problems encountered while performing the activities in green gram cultivation

| Sl.no. | Problems encountered (Specific activity) | Frequency | % |
|-------|------------------------------------------|-----------|---|
| 1.    | Backache due to bending                   | 55        | 78.5 |
| 1.    | Shoulder ache due to holding              | 54        | 77.1 |
| 2.    | Backache due to bending                   | 23        | 32.8 |
| 2.    | Shoulder ache due to holding              | 24        | 34.2 |
| 3.    | Backache due to bending                   | 62        | 88.7 |
| 3.    | Shoulder ache due to holding              | 66        | 94.2 |
| 3.    | Neck pain                                 | 56        | 80.0 |
| 3.    | Itching in hands feet                     | 67        | 95.7 |
| 4.    | Cuts in hand and feet                     | 35        | 50.0 |
| 4.    | Itching /Irritation in hands and other body parts | 64 | 91.4 |
| 5.    | Breathing problems due to dust            | 21        | 30.0 |
| 5.    | Watering in nose                          | 67        | 95.7 |

The specific problems encountered in activities of green gram cultivation are depicted in table 5. The workers faced specific problem during harvesting were itching in hands and feet (95%), shoulder ache due to holding basket while picking green gram (94%), Backache due to prolonged bending (88%) and neck pain (80%). The problems may be due to faulty posture. During threshing activity (91%) respondents faced the problem of irritation in hands and other body parts due to the process of cleaning, dehusking and sieving produces fine organic dust in the environment, which may be the reasons for itching /Irritation. During cleaning, dehusking and sieving activities coughing, sneezing and watering nose are common problems during winnowing activity.

Occupational stress in green gram cultivation activities

Occupational stress is the negative effect on the individual from the sum of the different factors in a workplace, which may act as stress. It has been further defined as perceived imbalance between occupational demands and the individual’s ability to perform when the consequences of failure are tough to be important. During green cultivation, workers face so many work related stress like stress from financial worries, health anxieties, poor working environment, wages discrimination and incorrect postures.

Table 6: Occupational stress faced by workers in green gram cultivation

| Sl.no. | Stress triggers | n=70 | % |
|-------|----------------|------|---|
| 1.    | Incorrect postures | 32   | 91.4 |
| 2.    | Monotonous & repetitive task | 33   | 94.2 |
| 3.    | Poor working environment | 35   | 100 |
| 4.    | Wages discrimination | 34   | 100 |
| 5.    | Financial worries | 32   | 91.4 |
| 6.    | Family problems | 25   | 71.4 |
| 7.    | Multiple roles | 31   | 88.5 |
| 8.    | Health anxieties | 21   | 60.0 |
| 9.    | Lack of equipments (tools & equipment and protective clothing) | 33   | 94.2 |
| 10.   | Time boundation | 3   | 85.7 |

It is noticed from Table 6 that farm worker of green gram cultivation show the various reasons behind disliking the job. Major reasons as stated by workers were poor working environment (100%), wages discrimination in women (97%), monotonous and repetitive work (94%), adopting incorrect postures, lack of equipments (91%) and multiple roles (88%). The above findings get decisive support from the study done by Roscow and Wilson (2005) [15] who reported that the high risk factors for workplace stress were over workload, poor relations with supervisors, a low level of participation in decision and insufficient communication of information etc as shown in fig. 3.
Conclusion
The study concluded that most of the farmers were age group of 25-35 years, 70% were married, 61% belong to joint family, 64% workers were illiterate and 44% of the respondents have 5000-10,000 rupees monthly income and 75% of the workers belongs to agriculture labour category. During green gram cultivation (100%) of male workers engaged in land preparation and storage activities and female workers (100%) participated in harvesting, winnowing and cleaning activities. In farm activities, male perform operations like storage (100%), Sowing (82.8%) and harvesting (77%) manually. Besides threshing (65%) using wooden rods, winnowing (37%) is performed using woven bamboo frames. Only land preparation (68%) was performed by using agricultural equipments like tractor and machine respectively. While women shows (100%) involvement in harvesting, threshing, winnowing and cleaning activities manually. Most of the general problems (95%) like soiling of hair, face, and feet come from land preparation, harvesting, threshing and winnowing activities and most of the workers (95%) were faced a specific problems shoulders ache and 100% of workers facing a stress from poor working environment.

Recommendations
In green gram cultivation occupational health hazards necessarily impose long term effects on health that could be curbed up to some extent through the use of personal protective equipment. And further studies can be conducted on development of improved tool and technologies for mitigating occupational health hazards in green gram cultivation.

References
1. Anonymous second estimate of main agricultural production. Economic Survey, Government of India, Ministry of Finance and Affairs, economic division, New Delhi, 2017-18.
2. Kannaiyan S. Bioresource technology for sustainable agriculture. Associated publishing house, New Delhi, 1999, 422.
3. Mobed K, Gold EB, Schenker MB. Occupational health problems between migrants and seasonal agricultural workers, Western Jr. of Medicine. 1992; 157(3):367-373.
4. Potter NN, Hotchkiss JS. Food science. CBS publishers, New Delhi, India, 1997, 403.
5. Roscow D, Wilson E. Work-related stress emerges as a serious health hazard at work worldwide, 2005. http://www.tricomassociates.com
6. Sudha B, Sangeeta S, Rupali R. Occupational health risks faced by the mill workers, Asian Journal of home science. 2014; 9(1):143-145.