



# **SUMMARY, CONCLUSION AND RECOMMENDATIONS**

## CHPATER V

### SUMMARY ,CONCLUSION AND RECOMMENDATIONS

The demand of food for growing population is being achieved by the tremendous use of synthetic chemicals, fertilisers and pesticides. No doubt with the use of these synthetic chemicals and pesticides India has increased its food grain production but this has resulted into exploitation of natural resources, emergence of new nutrients disorder, soil and environment degradation etc. The aim of organic farming is to increase productivity with minimum reliance on chemicals. The biggest challenge is how to shift from chemical farming to sustainable farming, the answer lies in organic farming. Organic farming is a system that provides a balanced environment, help in maintenance of soil fertility and the control of pests and diseases. It is a system that eliminates the use of synthetic inputs such as synthetic fertilisers, pesticides, genetically modified seeds and breed, preservatives, additives etc. Most of the women in rural areas are associated directly or indirectly with agricultural production, processing and distribution. They are engaged in collection of cow dung, preparation of organic manure, weeding, harvesting etc. All these activities were considered as critical activities because heart rate in these activities exceeds beyond 110 beats/min. The role of women in agriculture is so significant that without them nothing can be done on the farms. Women perform activities continuously for long hours without any break in between. Therefore most of the women suffer heavy workload. Lifting heavy weights and carrying heavy loads on their heads lead to various gynaecological consequences such as menstrual disorder, uterine prolapsed, miscarriage, backache, lumber pain, forearm pain etc. causing long term repercussions (ILO, 1983)

Long lasting static posture with heavy load without any rest impairs the blood supply and the waste products are accumulated in the muscles. The knowledge of workload in different activities is of great practical value, particularly with

more attention to the economic use of human resources in order to provide comfort and consequently to promote health and well being of the farmers. Presently, the agricultural industry is thought to be a source of environmental pollution if not properly managed. Therefore, organic matter should be used only for the purpose of suitable agriculture. So it is necessary to apply more organic fertilisers to the soil to produce high quality agricultural products and maintain high soil fertility. The findings of the study will have great practical utility for women farmers who spend long hours in fields without any rest. There is a need to measure the workload of women farmers involved in organic farming. With such a background, present investigation was planned.

### **Objectives of the Study**

1. To study the attitude of women farmers regarding organic farming.
2. To identify critical activities performed by women farmers and to study
  - a) Sequence of critical activities
  - b) Time spent and distance travelled in critical activities
  - c) Technologies used in critical activities
3. To identify the body discomfort/health problems experienced by women farmers in various critical activities.
4. To assess the physical fitness of women farmers in terms of
 

a) Standing height	b) Body weight
c) Blood pressure	d) Body temperature
e) Physical fitness index (PFI)	f) Pondural Index (PI)
g) Aerobic capacity ( $\text{Vo}_2 \text{ max}$ )	
5. To measure the workload of women farmers in terms of
 

a) Cardio-vascular stress	b) Energy expenditure
c) Total cardiac cost of work (TCCW)	d) Physiological cost of work (PCW)
d) Muscular stress (grip - strength)	

6. To suggest remedial measures in order to reduce the workload of women farmers (on the basis of workload experienced by them)

### **Hypotheses of the Study**

- H<sub>1</sub>** There is a relationship between attitude of women farmers regarding organic farming and their personal, family and situational variable.
- H<sub>2</sub>** There is a relationship between body discomfort experienced by women farmers and their personal, family and situational variables.
- H<sub>3</sub>** There is a relationship between age, standing height, body weight of women farmers and following selected variables namely,
- a) Physical fitness index                      b) Aerobic capacity
  - c) Pondural index                              d)) Heart-rate (HR)
  - e) Energy expenditure (EE)
- H<sub>4</sub>** There is a relationship between heart rate and energy expenditure of women farmers on various activities.
- H<sub>5</sub>** There is a relationship between total cardiac cost of work (TCCW) and physiological cost of work (PCW) of women farmers while performing various activities.
- H<sub>6</sub>** There is a difference between heart rate and energy expenditure of women farmers before and while performing various critical activities.
- H<sub>7</sub>** There exists a variation in the heart rate, energy expenditure, total cardiac cost of work, physiological cost of work, grip strength and work rest allowance of women farmers while performing various activities.

### **De-limitations of the Study**

1. Study was limited to Nainital district of Uttranchal state.
2. Study was limited to those women farmers who are involved in organic farming
3. Study was limited to 120 women farmers for descriptive data

4. For experimental work six physically fit women farmers were selected.

### **Method of procedure**

A sequential method of research is as follows:

**Research design :** Descriptive cum experimental research design was used.

**Locale of the study :** The present study has been carried out in Nainital district of Uttranchal under two blocks viz. Kotabag block and Haldwani block were selected.

**Sampling design :** The multistage purposive cum convenient sampling design was used.

**Sample size :** For descriptive data 120 women farmers were selected. For experimental data six physically fit women farmers were selected. Reason for selecting only six women farmers was because each women farmer had to perform ten selected critical activities. For each activity three trials were conducted and each trial was of 15 minutes.

### **Development of the instrument and selection of tool**

For descriptive data interview schedule was developed. It consist of three sections:

**Section I** contained questions to elicit information about background characteristics of women farmers.

**Section II** dealt with the detailed information regarding organic farming, type of activities, type of technologies used by the women farmers, time spent and distance travelled in various activities and health hazards experienced by them.

**Section III** contained the subjective questions of attitude of women farmers regarding organic farming. Content validity and reliability of the scale was established. For experimental data physical fitness of women farmers were recorded by using step-stool ergometre, standing height, body weight, blood pressure and body temperature. Then workload in terms of heart-rate, energy expenditure, and muscular stress was recorded.

## Analysis of data

Descriptive and relational statistic was used for the present study.

## Major Findings of The Study

Highlights of the findings of this investigation are reported below

### Demographic Characteristics of Women Farmers

The mean age of the women farmers was  $36.40 \pm 1.10$  years. Nearly one fifth of the women farmers i.e. 19.17 percent were illiterate and very few of them i.e. 6.66 percent were postgraduate. Rest of them varied in their educational level. Majority of women farmers i.e. 88.33 percent were full time farmers and only 11.67 percent of them were part time farmers. More than half i.e. 55.83 percent had nuclear family. The mean family size of the women farmers was  $7.0 \pm 0.31$ . The mean size of land holding of women farmers was  $2.92 \pm 0.27$  acres. Nearly one fifth of women farmers i.e. 19.17 percent had large size of land holding and 14.16 percent of them had marginal size of landholding. The Mean monthly income of family from all sources was Rs.  $3870 \pm 221.47$  More than one fourth of women farmers i.e. 31.67 percent had large income of Rs. 4201- Rs. 8400 and less than half of them i.e. 44.17 had low income of Rs. 1700. A vast majority of women farmers i.e. 95.00 percent had self farming. Mean years of experiences in organic farming was  $11.85 \pm 0.12$  yeas. More than half i.e. 67.80 percent women farmers had less than 16 years of experience in organic farming. On the whole majority of women farmers i.e. 84.17 percent of them producing crops seasonally.

### Agriculture and Livestock Related Data

**Livestock profile of women farmers :** Findings revealed that more than half i.e. 61.67 per cent of women farmers possessed both cow and buffaloes. Average herd size was 3.33 cow per farmer followed by 1.28 buffaloes per farmer. Mean number of livestock was  $5.20 \pm 0.29$ .

**Information on organic manure and its application :** it was found that a little more than half i.e. 80.83 percent of farmers used self made organic manure and

50.84 percent of them applied manure twice per month. A vast majority of women farmers i.e. 84.17 percent stored organic manure in the form of heap.

**Information on bio-pesticides and its application :** All the women farmers belonged to different groups were getting bio-pesticides from authorized / certified agencies. It was observed that little more than half i.e. 51.67 percent women farmers were selecting bio-pesticides on the basis of disease and more than half i.e. 53.33 percent of them used bio-pesticides when the disease attacked. On the whole more than half i.e. 56.67 percent women farmers applied pesticides one time per month and a little more than half i.e. 53.33 per cent women farmers had knowledge about waiting period of bio-pesticides.

**Awareness of women farmers regarding pesticides resistance :** With regards to awareness of women farmers regarding pesticides resistance it was noted that majority of women farmers i.e. 60.00 per cent were not aware about pesticides resistance in pest but 62.50 per cent women farmers were aware about pesticides residue in food and their hazards

**Crop husbandry practices followed by women farmers :** For analyzing the crop husbandry practices followed by women farmer a check list was prepared by the investigator. It was observed that none of the women farmer kept the record of her farm inputs or outputs. But all of them were having cow and buffaloes of *desi* breed. More than half i.e. 59.17 per cent of women farmers used high yielding varieties of crops that were permitted under organic farming standards. Further, more than half i.e. 54.17 per cent of them used seeds of their own farm. Then a majority of women farmers i.e. 65.83 percent were using all methods of pest control i.e. physical, chemical and biological methods. Further a wide majority of women farmers i.e. 85.83 per cent used physical methods of weeds control in their field. Majority of women farmers i.e. 70.83 per cent used both chemical fertilizers and chemical fungicides as a synthetic chemicals in their field. The purpose for using them was just to optimized the crop production and protect crop from diseases.

**Other miscellaneous activities :** Women farmers were also asked about miscellaneous activities. Findings showed that all the farmers used compost, bio-fertilizers on their field, very few of them i.e. 4.17 per cent of large farmers were adopting integrated pest management practices in their field. All of them had taken effective measure to check soil erosion properly, utilizing the water for irrigation of field. Moreover, all of them were following crop rotation and cultivated green manure crops in their field.

### **Attitude of Women Farmers Regarding Organic Farming**

Findings showed that near about half i.e. 80.83 per cent of women farmers possessed favorable attitude towards organic farming and very few of them 1.67 percent had unfavorable attitude towards organic farming. Remaining more than half i.e. 47.50 percent had neutral attitude towards organic farming. Non-significant relationship was found between age, education level and attitude of women farmers regarding organic farming. Negative correlation was observed between size of family and attitude of women farmers regarding organic farming

Positive correlation was found between size of land holding and attitude of women farmers regarding organic farming. A positive correlation was found between number of livestock and attitude of women farmer regarding organic farming.

### **Time Spent, Distance Travelled and Posture Adopted by Women Farmers**

It was found that maximum times spend by women farmers was on harvesting ( 480 minutes ) and minimum on transportation of cow dung to manure shed (15 minutes). It was further analyzed that highest distance travelled by women farmers was 96 meters ( preparation of organic manure ) and lowest distance travelled by them was 2.0 meters during winnowing. Posture mainly adopted by women farmers among various activities was squatting cum bending.



### **Type of Technologies Used by Women Farmers**

For collection of cow dung all of them used hand, broom, tub and bucket, for transportation of cow dung to manure shed more than half i.e. 53.33 percent used tub. For preparation of organic manure all of them were used hand, tub, bucket. For transportation of organic manure to field more than half i.e. 53.33 percent used tub. For digging of land more than half i.e. 51.66 percent used “*kudal*”, for application of manure all the farmers spread it by hand. For sowing majority of them used hand only. For weeding majority of them i.e. 76.57 percent used ‘*Khurpi*’. For harvesting all the women farmers used only sickle. For winnowing majority of them did hand beating with the help of *soupa* and fan.

### **Body Discomfort Experienced by Women Farmers**

On the basis of score range, less than half of the women farmers had severe and moderate body discomfort and only 15.83 percent had no body discomfort. On the basis of percentage of respondents experiencing discomfort in different body parts it was found that lumber pain ( 78.33% ), forearm pain ( 70.83% ), backache (67.50% ), knee pain ( 62.50 % ), limb pain ( 56.66% ) were more common among them while headache ( 18.34% ) , chest pain ( 18.33% ) palm pain (45.00%) were least common among them. Negative correlation was observed between age and body discomfort experienced by women farmers A positive correlation was observed between educational level and body discomfort experienced by women farmer A positive correlation was observed between years of experience in organic farming and body discomfort experienced by women farmers.

### **Physical Characteristics of the Selected Women Farmers**

Mean age of women framers was  $25.66 \pm 2.01$  years, mean body weight and standing height of women farmers were 44.83 kg and 160.23 cm respectively.

### **Physical Fitness Test of Selected Women Farmers**

It was found that mean physical fitness index score of women farmer was  $102.79 \pm 6.90$  which indicate that their physical fitness is of high average category. Mean aerobic capacity score of women farmers was  $32.33 \pm 6.43$  which falls in good category. Mean body type score of women farmers was  $27.96 \pm 0.98$  which showed that they were belonged to endomorphic category. A positive correlation ( $p \leq 0.05$ ) was observed between age and aerobic capacity of women farmers. A Positive correlation was also found between body weight and pondural index of women farmers.

### **Cardio Vascular Stress of Women Farmers Among Different Critical Activities**

Cardio vasaular stress was highest during preparation of organic manure in field ( $121.44 \pm 4.65$ ) It was lowest during application of manure in the field ( $106.16 \pm 0.57$ ) On the basic of cardio vasaular stress all these activities were classified as moderately heavy activities. A positive correlation was observed between age and heart rate of women farmers during transportation of cow dung to manure shed and application of manure in the field. A positive correlation was observed between standing height and heart rate during digging of land. A negative correlation was observed during body weight and heart rate of women farmers.

### **Energy Expenditure of Women Farmers Among Various Critical Activities**

Energy expenditure during preparation of organic manure was highest during preparation of organic manure ( $10.61 \pm 0.73$ ) and percentage increase over rest was  $7.41 \text{ kj / min.}$  while it was lowest during application of manure in the field i.e.  $8.15 \pm 0.93$  and percentage increase over rest was  $7.41$  on the basis of energy expenditure preparation of organic manure was 'extremely heavy' activity while application of manure was very heavy activity. A positive correlation was observed between energy expenditure and heart rate during

transportation of organic manure to the field, transportation of cow dung to manure shed and winnowing. A positive correlation was observed between height and energy expenditure during digging. A negative correlation was observed between body weight and energy expenditure during digging. A positive correlation was observed between pondural index and heart rate of women farmers during collection of cow dung from cattle shed. A negative correlation was observed between pondural index and heart rate of women farmers during sowing. A positive correlation was observed between heart rate and energy expenditure of women farmers during collection of cow dung from cattle shed, transportation of cow dung to manure shed and preparation of organic manure

#### **Total Cardiac Cost of Work (TCCW) of Women Farmers Among Various Critical Activities**

Total cardiac cost of work (TCCW) of women farmers was significantly ( $p \leq 0.01$ ) highest during preparation of organic manure i.e.  $1149.13 \pm 106.57$  beats while it was lowest during collection of cow dung from cattle shed i.e.  $721.07 \pm 22.81$ .

#### **Physiological Cost of Work (PCW) of Women Farmers Among Various Critical Activities**

Physiological cost of work (PCW) of women farmers was significantly ( $p \leq 0.01$ ) highest during preparation of organic manure ( $76.44 \pm 7.00$  beats) while it was lowest during collection of cow dung from cattle shed ( $47.90 \pm 1.57$ ). A positive correlation was found between TCCW and PCW

#### **Calculated Work Rest Allowance (WRA) Among Various Critical Activities**

Calculated Work Rest Allowance (WRA) required by women farmers for preparation of organic manure and transportation of manure to field was highest

i.e. 10.00 minutes  $\pm$  0.57 while it was lowest for collection of cow dung from cattle shed i.e. 2.30  $\pm$  0.80 minutes.

### Conclusion

On the basis of findings of this investigation the following conclusions are drawn.

1. Maximum time spent by women farmers was on harvesting and minimum on transportation of cow dung to manure shed. Maximum distance travelled by women farmers was during preparation of organic manure and minimum during winnowing.
2. All the women farmers used traditional technologies for performing various critical activities. But very few of medium and large farmers used tractor trolley for transportation of manure to field, seed drill for sowing of seeds, small handle and long handle spade for digging of land, small handle and long handle hoe for weeding and winnower for winnowing.
3. Body discomfort experienced by women farmers in descending order was lumber pain, forearm pain, back pain, calf muscles pain, knee pain, foot pain, palm pain, chest pain, and headache. Body discomfort was affected by personal, family and situational variables of women farmers.
4. On the basis of physical fitness tests, it was concluded that mean score of women farmer on physical fitness index was fall under high average category, their aerobic capacity was good and all of them were 'endormophic'.
5. Cardio - vascular stress of women farmers was highest during preparation of organic manure and it was lowest during application of manure in the field.
6. Energy expenditure of women farmers was highest during preparation of organic manure and it was lowest during application of manure in the field.

7. Total cardiac cost of work (TCW) and physiology cost of work(PCW) of women farmers was highest during preparation of organic manure in the field and it was lowest during application of manure in the field.
8. Grip strength of women farmers for right and left hand was maximum decreased during digging of land and it was minimum decreased during transportation of cow dung to manure shed.
9. On overall basis of parameters work loads of women farmers was highest during preparation of organic and it was and lowest during collection of cow dung from cattle shed.
10. Maximum work rest allowance was required during preparation of organic manure and minimum during collection of cow dung from cattle shed.
11. Half of the women farmers had favourable attitude towards organic farming and t heir family and situational variables affected their attitude regarding organic farming .

Thus the theory set for the present study was accepted to a great extent.

### **Implications of the Study**

The findings of the investigation brought out a number of implications for the government, NGO's and educational institutions.

1. From the findings, it was revealed that women farmers used to spend long hours while performing these activities. Distance travelled by them were high, posture adopted, technologies used by them were faulty, they were neither ergonomically designed nor gender based therefore, there is need to conduct workshops, training programmes at village level to demonstrate ergonomically designed, gender based tools and technologies for women farmers. Moreover, government should provide certain credit facility and schemes so that women farmers could easily bear the cost of these tools and technologies. Institutes and ergonomically designed labs which are involved in constructing these

technologies they should use locally available materials for the construction of these tools and technologies so that they could easily available at cheap rate for women farmers.

2. Home management department should develop a well equipped ergonomics lab for research scholars and provide training to them at college level and also at field level so that they could develop interest in conducting such type of research studies in their degree programme.
3. Rural women should be made educated because education of rural women regarding better work methods, ergonomically sound technologies, ergonomically fit posture will automatically results in reducing the workload on them.
4. It was found that although several institutes like CIAE, Bhopal, G.B.Pant University of Agriculture and Technology, Pantnagar had developed several ergonomically sound women oriented technologies but women farmers still couldn't adopt these technologies. Friends and relatives are the main source of information for the rural women. Programmes like '*Kisen mela*' in the village should be encouraged. Also agencies like *Gramin Krishi Vikas Samiti*, *gram savika*, extension workers etc. should perform these work effectively because the women could not feel shy in front of them. They could easily share their experience to them and could learn from them.
5. Popularity of television as an important communication media could be fully exploited by the government for imparting guidance to rural women regarding workload experienced by them and how to alleviate this workload by improved technologies, improved working methods. These programmes should be developed in their local rural language so that they could easily understand them. The time of these programme should be set in such a way so that women farmers could spare their time in watching these programmes because at the peak time of day most of the women are working in their fields.

6. Through All India Co-ordinated Research Projects (AICRP) developed by Indian Council of Agriculture Research (ICAR) New Delhi use of improved technologies, work methods, work rest allowance in between and after performing activities should be introduced which would enhance their efficiency and will improve the work performance. This will help them in reducing workload.
7. Rural women should be encouraged to take up some income generating activities like *badi*, *papad* making, pickle making, packing of spices etc. in their spare time and can improve the economic status of the family. Also government can grant credit to them to start self help groups in their area.
8. On the basis of checklist regarding organic farming standards it is implied that knowledge regarding keeping of farm records with respect to production, purchase of crops, fruits and vegetable or other products was nil among women farmers. Though their recalling ability with respect to inputs used and outputs was quite amazing but they failed to keep written record. Although government of India has already launched a programme called National Programme for Organic Production (NPOP) to promote organic production within the country but still there is need to make farmers aware about standards of organic farming. This could be done through various programmes at village level.
9. On the basis of opinion of farmers it was found that they were ready to grow organic food but there was lack of organic market at their local area. Moreover, they said that they are getting same price for both organically grown food and chemically grown food. Therefore there is an urgent need to develop local market for organic foods so that they could sell their products over there and could get more price.
10. Government should also create strong awareness among the consumers regarding health hazards caused by consumption of chemically grown food and encourage them for consumption of organic food.

11. Organic food fair could be organised by NGO's at village level so that the buyers and sellers of organic food could meet each other and can make market contact with each other.

### **Recommendations of the Study**

1. An in -depth study can be conducted to find out the knowledge and awareness level of women farmers regarding organic farming in different regions.
2. Comparative study on organic farming and conventional farming in different aspects can be done.
3. Comparative study of traditional technologies and ergonomically designed tools and technologies could be conducted to compare the workload of women farmers.
4. Comparative study of work - rest allowance required while using traditional tools and ergonomically designed tools could also be conducted.
5. An in depth study of various postures adopted and postural stress experience by women farmers while performing various organic farming activities could also be studied.