

## Impact of Rising Temperature on the farmers working outdoor

K. Kesarwani<sup>1</sup>, P. Sharma<sup>2</sup> S. Rani<sup>3</sup>& P. Kesarwani<sup>4</sup>

<sup>1</sup>Ph.D. Scholar, G.B. Pant University of Agriculture and Technology, Pantnagar, India.

<sup>2</sup>Professor, G.B. Pant University of Agriculture and Technology, Pantnagar, India.

<sup>3</sup>Assistant Professor, G.B. Pant University of Agriculture and Technology, Pantnagar, India.

<sup>4</sup>Assistant Professor, Allahabad Central University, India

### ABSTRACT

India is primarily an agrarian economy as farming is one of the most important occupations in the country. It is generally perceived as a healthy outdoor occupation. However numbers of studies have classified farming as a risky and hazardous job because of the nature of farm work. Farm workers are particularly at higher risk of developing health problems. The drastic change in the world wide climate has created too much problems among farmers. Most of farm operations are still accomplished manually under direct heat of sun. These factors, makes farm operation quite dangerous. The exposure of farm workers to hot occupational environment remains a persistent impediment to improve productivity and problems affecting the health of the workers. The study was undertaken to find out the health problems experienced by farmers and to design, develop and disseminate PPE to safe guard the farmers from the impact of excessive heat. Heat disorders occur most often when heavy physical work is done in hot, humid environments and when the body consequently loses too much fluid and salt resulting in heat cramp, heat exhaustion, heat syncope etc,. Prevalence of the above factors is more common among the farm workers due to unawareness and lack of knowledge about associated heat exposure risks, resulting in poor adaption of preventive and protective measures. While disseminating the PPE, the acceptability among the farm workers was reported to be very high.

**Keywords:** Heat, climate change, Farmers.

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### INTRODUCTION

India being mainly an agricultural country, economy and further its growth purely depends on farming, making agriculture as most preferred occupation nationwide. The exposure of farm workers to extreme weather condition especially during the summer months (March-June) is just hampering their health. Worsening of health is more prominent among farmers because most of farm activities are carried out manually under direct heat exposure and lack of awareness among the farm workers regarding the health hazards and even the un-availability of the protective methods. The combination of manual farm activities and heat exposure is a health, environmental and occupational issue, which need serious concern [3-5]. Thus, in order to assess the impact of rising temperature on the farm workers effect of different environmental factors effecting were analyzed and then the combined effect of the environment on their productivity and health was assessed.

### MATERIAL AND METHODS

The present study was conducted in six villages of Jasra Block of Allahabad district of Uttar Pradesh which lies in Indo-Gangetic Plain. The geographical diversity of the state causes

varied climatic conditions. The district has a tropical climate and average maximum temperature ranges between 43°C - 45°C which may go as high as 46°C during peak summers. Being an agriculture-oriented district the major workforce depends upon agriculture and agricultural allied activities with the total gross irrigated area of 392.142 hectares of land. A sample of 180 farm workers was selected via simple random sampling technique. The farm workers who were aged above 30 years were only included in the study having minimum five years of farm experience. Further, the sample was segregated into three age groups viz., 31-40 years, 41-50 years and above 50 years with 60 sample in each age category. Out of total 180 farm workers 43.3 per cent of them were male and rest 56.7 per cent of farm workers were females were mass of them were revealed as illiterate. The study was conducted during the month of March to June. Further with the help of Interview Schedule the data was collected. Heat related illness model was adopted from [1]. This model comprises of heat-related illness conditions with associated symptoms. The heat illness conditions are not a physiological continuum such that individuals may not incur all conditions. Symptoms may vary by individual, heat illness condition, and time since onset. Further, in order to safeguard the farm workers PPE was developed to protect them.

## RESULT AND DISCUSSION

### Environmental factors

The external working condition matters a lot for the person working in it, for longer hours. Lam *et al.* [2] reported in their study that participants of both genders working long hours in the hot sun and high temperature are more prone to heat related illness and even more serious for those not taking breaks in the shade can cause heat illness. Further, lack of shade in the crop areas in which they work also promotes heat related health symptoms. The environmental factors include extreme temperature, relative humidity, wind and noise. On the whole, it is evident from the Table 1 that majority reported temperature, relative humidity and wind are majorly responsible for heat stress. While comparing the data among the farm workers of different age groups it can be clearly envisaged that more than 90 per cent in all the age groups reported for the same. In reference to wind, though its occurrence was reducing the temperature but the topographical phenomenon of the locale was converting in to *Loo* (a dry warm wind blowing with great pace) which further restricted them to work safely. As once the farm workers were caught by the *loo* it was making them ill, severely resulting in absence at work [5].

**Table 1: Environmental factors enforcing/influencing severity towards heat stress**

Source of Hazard	Influencing Factors	30-40 Years (n=60)	41-50 Years (n=60)	51 Years and above (n=60)	Total (N=180)
Environmental	Temperature	58 (96.7)	58 (96.7)	60 (100)	176 (97.8)
	Relative Humidity	60 (100)	57 (95)	58 (96.7)	175 (97.2)
	Wind	58 (96.7)	58 (96.7)	59 (98.3)	175 (97.2)
	Rainfall	16 (26.7)	9 (15)	7 (11.7)	32 (17.8)
	Sunshine	60 (100)	60 (100)	57 (95)	177 (98.3)
	Noise	14 (23.3)	22 (36.7)	42 (70)	78 (43.3)

\*Figures in the parentheses indicate the percentage value

### Problems Associated with the heat stress with reference to work

While working on the farm fields, farm workers undergo several problems. Such as reduced work productivity, loss of concentration, occupational accidents and sick leave.

The Table 2 illustrates the various problems faced by the farm workers while working under direct heat with reference to work. It can be clearly envisaged from the Table 2 that on a whole 98.9 per cent of the farm workers faced the problem of reduced productivity whereas only 19.4 per cent of the farm workers were taking leave.

**Table 2: Problems Associated with the heat stress with reference to work**

S.No.	Problems	31-40 Years (n=60)	41-50 Years (n=60)	51 Years and above (n=60)	Total (N=180)
1.	Reduced work productivity	58 (96.7)	60 (100)	60 (100)	178 (98.9)
2.	Loss of concentration while working	33 (55)	42 (70)	37 (61.7)	112 (62.2)
3.	Occupational accidents	6 (10)	12 (20)	17 (28.3)	35 (19.4)
4.	Sick leave	13 (21.7)	18 (30)	16 (26.7)	47 (26.1)

\*Figures in the parentheses indicate the percentage value

These results were found consistent with the study of [2] who summarized in this study that 70 per cent of the agricultural workers reported for reduced productivity while working in hot weather whereas cent per cent for health impacts. Sick leave was prominent only among contractual labourers.

While comparing the data as given in the Table 2 about different age group it was revealed that cent per cent of farm workers in the age group of 41-50 years and above 50 years were complaining about the reduced work productivity. Loss of concentration among the farm workers was prominent among the age group 41-50 years with 70 per cent complaining for the same whereas in the age group (31-40 years) only 55 per cent were losing concentration while working under extreme weather events. The occupational accident was not reported by much of the farm workers as only 19.4 per cent reported for it and 28.3 per cent of the elderly population reported for it. Sick leave among the farm workers aged above 50 years where 26.7 per cent reported for it while in the age group 31-40 years only 21.7 per cent stated for sick leave.

### Health problems

The exposure of workers to hot occupational environment remains a persistent impediment to improve productivity and problems affecting the health of the farm workers. The combination of heat stress, dehydration and physical activity impose challenge for physical adjustment, with potential risk of resulting into heat related injuries and disorders, such as heat rash, heat syncope, heat cramp, heat exhaustion and heat syncope. Thus, in order to elucidate data regarding the associated health problems which were quite noticeable among the farm workers a simplified model of heat related illness was used. The model comprises symptoms of five health problems associated with extreme exposure in heat. The model includes severity in ascending order (heat rash, heat syncope, heat cramp, heat exhaustion and heat stroke) with a condition that heat illness conditions are not a physiological continuum such that individuals may not incur all conditions. Symptoms may vary by individual, heat illness condition, and time since onset.

On analysing the data on whole, it was observed that none of farm workers reported for heat stroke, as heat stroke generally causes sudden death among the individual, and the farm workers were asked to point up their personal health problems which they faced during March -June. But, on the whole heat rash was reported by majority of the farm workers.

On analysing the data, in the age group of 41-50 years cent per cent reported for heat rash, and 90 per cent in the age group (31-40 years). The symptoms of the heat syncope include dizziness and fainting, and more than 80 per cent of the farm workers stated for this problem. Among the farm workers above 50 years 90 per cent reported for dizziness and 96.7 per cent for fainting while working under direct heat. Further 80 per cent of them were suffering from dizziness in the age group (31-40 years) and 78.3 per cent for fainting in the age group 41-50 years.

After few days of continuous working under direct heat, heat cramp also became a common problem among the farm workers who were continuously working without any treatment. The symptoms of heat cramp are profuse sweating, thirst, muscle cramp, low salt level and rapid pulse. The overall data about the heat cramp showed that all of the farm workers were facing the problem of thirst whereas only 48.3 per cent of them reported for rapid pulse rate. On comparing the prevalence of heat cramp among three different age groups, in the age group of 31-40 years cent per cent of them reported for thirst, majority for profuse

sweating and muscle cramp. Rapid pulse rate and low salt level was reported by 53.3 per cent of the farm workers in the same age group. Among the age group of above 50 years it was explored that more than four fifth of the farm workers reported for the symptoms of heat cramp.

Heat Exhaustion is one step before deadly heat stroke. The prominent symptoms are body temperature above 37.7 degree Celsius, intense thirst, dehydration, fatigue, nausea, confusion, irritability, rapid pulse, low blood pressure, and low urine excretion. The overall data regarding the occurrence of symptoms of heat exhaustion showed that majority were facing the problem of fatigue, intense thirst, dehydration and body temperature above or equal to 37.7°C.

While comparing the data among all the three classified age groups, among all the farm workers of the age group 31-40 years, all of them were having feeling for intense thirst, while majority for fatigue/weakness, dehydration and body temperature above or equal to 37.7°C (86.6 per cent, 95 per cent, 81.7 per cent respectively). In the age group of 41-50 years, fatigue/weakness and intense thirst was reported by more than 90 per cent of the farm workers. Confusion was reported by 21.7 per cent of them. While in the age group of above 50 years majority reported for body temperature above 37.7°C, dehydration, fatigue/weakness, confusion and irritability. Rapid pulse rate, low blood pressure, low urine excretion was highest in this age group in comparison to other two age groups.

Overall it can be concluded that symptoms covered in heat related illness model were more prominently reported by the farm workers while working on the farm fields. Out of which heat rash was most common, cent per cent of farm workers reported for the thirst, as dehydration becomes very common when heavy physical activity is accompanied with direct sun heat.

#### **Development of Personal Protective Equipment (PPE)**

A broad beam hat was developed, which was given to the farmers in order to safeguard the farm workers during the summer months. The farmers gave positive response while using it. They found no irritation or pressure points while wearing PPE. Further, it was providing sufficient shade to the farm workers while performing farm operations under heat with comfort.

#### **CONCLUSION**

The pace with which global average temperature is rising, there arises an emerging need to focus on the farm workers regarding health related issues and to promote holistic facilities, policies and programs for dealing with the emerging severity on their health. The health risk among farm workers is an urgent need to overcome the problems faced by the outdoor workers in order to keep themselves protected from heat stress. Creating awareness and developing PPE to safeguard has become one of the most important issue to focus on.

#### **REFERENCES**

1. Jackson, L.L. and Rosenberg, H.R. (2010). Preventing heat-related illness among agricultural workers. *Journal of Agromedicine*. 15:200–215.
2. Lam, M.; Krenz, J.; Palmández, P.; Negrete, M.; Perla, M.; Murphy-Robinson, H. and Spector, J. T. (2013). Identification of barriers to the prevention and treatment of heat-related illness in Latino farmworkers using activity-oriented, participatory rural appraisal focus group methods. *BMC Public Health*, 13(1): 1004. Retrived from <https://doi.org/10.1186/1471-2458-13-1004>.
3. IPCC. (2007). Climate Change 2007: Impacts, adaptation and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press: Cambridge.
4. Hyatt, O.M.; Lemke, B. and Kjellstrom, T. (2010). Regional maps of occupational heat exposure: past, present and potential future. *Global Health Action*. 3.doi: 10.3402/gha.v3i0.5715.
5. Indian Council of Agricultural Research. (2010). District Profile: Uttar Pradesh, 1-368. Retrived from [http://zpd.org.in/sites/default/files/districtprofile\(2-2-10\).pdf](http://zpd.org.in/sites/default/files/districtprofile(2-2-10).pdf).