

Occupational Health Hazards in Agriculture and Evaluation of Functional Clothing for Agricultural Farm Women in North Eastern Transitional Zone Of Karnataka

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ABSTRACT

Occupational health and safety are the integral components of the general concepts of health, which is a part of socio-economic development. The work environment may influence the person's health either positively/negatively and productivity is in turn influenced by the worker's state of physical and mental well being. While performing agricultural activities on and off the field, farmers face many health hazards. When work is associated with health hazards, it may cause occupational diseases. Developed functional clothing was given for wear trails to black gram and red gram field farm workers. Information was elicited on suitability, comfort ability, functionality and acceptability of designed functional clothing among the farm workers using self structured questionnaire with five point rating scale. The results revealed that the above functional clothing were extremely suitable for weeding, harvesting, threshing and winnowing activities in black gram and red gram crops. The comfort ability of all the garments over the existing clothing practices was found to be statistically significant. There was 18.75 % increase in work efficiency in harvesting operations and similarly the work efficiency of farm workers significantly increased in all agricultural operations

Key Words : Occupational health, Health hazards, Functional clothing, Comfort ability, Farm activities

INTRODUCTION

Health has been defined and widely accepted as a state of complete physical, mental and social well being. Health care is the right of every individual and has been recognized in many countries. Occupational health is concerned with the health safety issues at work. The hazardous exposure in setting can adversely affect the human health. In fact occupational health and safety are the integral components of the general concepts of health, which is a part of social economic development. Occupational health is every body's business; everyone is affected by it directly or indirectly and also has a specific role and responsibility to play with regard to occupational health.

The work environment may influence the person's health either positively/negatively and productivity is in turn influenced by the worker's state of physical and mental well being (Agnihotram, 2005). Work, when it is well adjusted and productive can be an important factor in health promotion. However, the fact that work can have a positive influence on health has not yet been fully exploited; knowledge of work physiology and ergonomics needs to be further developed and applied to benefit worker's health (Sudha *et al.*, 2014).

When work is associated with health hazards, it may cause occupational disease; it is one of the multiple causes of other diseases or may aggravate existing ill health of non-occupational origin. In developing countries, where work is becoming increasingly mechanized, a number of

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work processes have been developed that treat workers as tools in production, putting their health and lives at risk (Tripathy, 2014).

Occupational health hazards in agriculture:

Agriculture is the backbone of Indian economy where more than half of the total work force is employed in agricultural sector. The agricultural activities carried out by farmers are land preparation, seed treatment, sowing, fertilizer application, weeding, pesticide application, harvesting, threshing, winnowing and storage of crops. While performing these activities the farmers face many health hazards.

Occupational exposures to pesticides occur during the production, transportation, preparation and application of pesticides in the workplace. It is also quite common for agricultural workers to experience pesticide exposures even when performing tasks not specifically related to pesticide use. The toxic properties of pesticides pose a potential hazard to human health. It has been estimated that the incidence rate of pesticide related illness in the workplace was approximately 1.17 per 1, 00,000 full time equivalent workers (FTEs). Epidemiological studies have attempted to investigate the association between occupational pesticide exposures and chronic respiratory diseases, such as asthma, chronic obstructive pulmonary disease (COPD) and lung cancer (Ming *et al.*, 2013).

Among all the major health problems faced by the farmers during fertilizer and pesticide application, where they are exposed to chemicals and disinfectants and at same time encounter various health problems *viz.*, skin irritation/itching, skin allergy/ailment, roughness of skin, sneezing and sweating. Health hazards encountered by farmers *viz.*, skin irritation/itching and allergies, cuts, wounds, injuries in hands, breathing problems, swollen and sore hands and feet, eye irritation/itching during harvesting, threshing and sneezing and bronchitis during wheat winnowing (Vastrad *et al.*, 2014).

Functional clothing: is a generic term that includes all such types of clothing/ assemblies that are specifically engineered to deliver a pre defined

performance or functionality to the user over and above its normal functions. Such clothing would normally be made from a mix of innovative materials and functionality in this case would imply the added value or function that a garment is expected to perform (Babel *et al.*, 2014). Such assemblies are ergonomically designed so as to have a minimum inhibit effect on movement and provide maximum comfort and performance to the user.

The critical design requirement here is to protect the body from exposure to extreme elements at the same time facilitating the transport of metabolic heat and moisture from the body (Kumuda, 2012). The functionality of clothing is to allow people to work in and around hostile environments, improve the quality of life and prevent or reduce injuries. In environmental hazard functional clothing is desired against extreme heat/cold, fire, rain, snow, dust, and wind and UV protection.

METHODOLOGY

User friendly functional clothing were designed and developed at AICRP (CT) centre, Dharwad for various agricultural activities that included harvesting, threshing and winnowing activities. The functional clothing kit included apron, hand gloves, mask and headgear. The apron was specially designed with closed neckline, full sleeves and elastic at wrist, hand gloves with stretchable jeans, multilayered mask and headgear was constructed with elastic at forehead and nape of the neck.

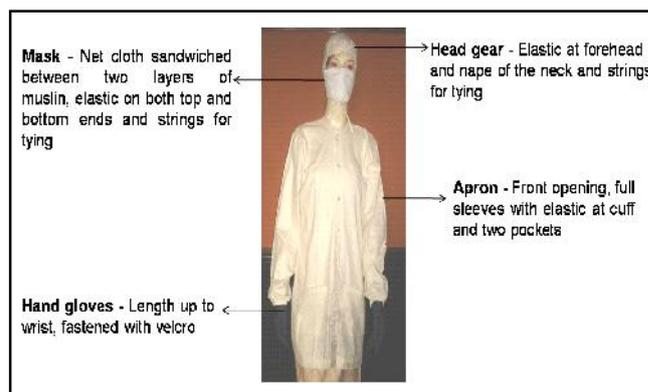


Table: 1 Physical properties of the selected fabrics used for functional clothing (Weeding, harvesting, threshing and winnowing)

Sr. No.	Type of fabric	Yarn count(s)		Cloth count (threads/inch)		Cloth thickness(mm)
		Warp	Weft	warp	Weft	
1.	Unbleached	16	10	59	42	0.33
2.	Muslin	32	30	74	71	0.17
3.	Denim	08	14	71	44	0.69

Table 2: Physical properties of the selected fabrics used for functional clothing (Pesticide application)

Sr. No.	Parameters	Cotton/polyester blend		Poplin fabric		Denim		Muslin	
		Warp	Weft	Warp	Weft	Warp	Weft	Warp	Weft
1.	Yarn count	16	16	15	15	8	14	32	30
2.	Cloth count	60	50	79	53	71	44	74	71
3.	Cloth thickness (mm)	0.36		0.29		0.69		0.17	
4.	Cloth bending length (cms)	1.66	1.55	1.52	1.20	-	-	-	-
5.	Cloth crease recovery (degrees)	120.40	120	78.20	78.60	-	-	-	-
6.	Cloth air permeability (cm ³ /cm ² / sec)	17.32		18.89		-	-	-	-
7.	Water vapour permeability (g/m ² / day)	1945.24		2143.65		-	-	-	-

Functional clothing developed at Dharwad AICRP (CT) by considering suitable physical properties of the fabric for functional clothing was given for wear trails to black gram and red gram field farm workers as a field wear trial at Bidar which is a major pulse growing area in Karnataka. Information was elicited on suitability, comfort ability, functionality and acceptability of designed

functional clothing among the farm workers using self structured questionnaire with five point rating scale.

RESULTS AND DISCUSSION

There is a practice of wearing men’s old shirts by women laborers for various agricultural operations (Fig. 1). When the wear trials were conducted, the results



Existing practice of wearing Old shirts



Demonstration of wearing functional clothes during agricultural operations



Farm women wearing functional clothing during weeding operations in blackgram field



Farm women wearing functional clothing during harvesting operations

Fig. 1 : Women laborers for various agricultural operations

Table 3 : Farm trial of Functional clothing among farm women of Bidar district

Sr. No.	Crop	Name of the trial and treatments	Name and address of the farmers	No. of locations	Comfortability and Suitability		% increase or decrease in work efficiency
					T ₁ : Traditional Practice	T ₂ : Functional clothing kit	
1.	Blackgram	Popularize functional clothing among farm women	Anjanabai Dukre	5	1	4.9	18.75 % increase in work efficiency in harvesting operations
			Laxmi Pandre		1	4.0	
			Mudrikabai Malewale		1	4.9	
			Asha Malewale		1	5.0	
			Ratnabai Rajput		1	4.5	
			Mean		1	4.66	

Table 4 : Assessment of hand gloves as functional clothing for comfort ability in manual harvesting of different crops

Opinions	Always	Sometimes	Never
No burning sensation	30 (100.00)	-	-
No rashes on hands	30 (100.00)	-	-
Comfortable to carryout household chores	24 (80.00)	5 (16.66)	-
Reduced contact with malleic acid facilitates consumption of food	24 (80.00)	5 (16.66)	-
Comfortable for harvesting papaya at un ripe stage	12 (40.00)	18 (60.00)	-
Comfortable for hand weeding	12 (40.00)	18 (60.00)	-
Comfortable for harvesting sunflower and safflower	30 (100.00)	-	-

(Table 3) revealed that the above functional clothing was found to be extremely suitable for harvesting, threshing and winnowing activities in black gram and red gram crops. The comfort ability of all the garments over the existing clothing practices was found to be statistically significant.

The functional clothing kit was highly accepted by the farm women. During the farm trial it was noticed that, there was 18.75 % increase in work efficiency in harvesting operations and similarly the work efficiency of farm workers significantly increased in all agricultural operations like weeding, threshing and winnowing operations. No cuts and damages were observed on hands of farm women as they used hand gloves. But, the size of the garment needs some modification as suggested by the farm women.

The results from the Table 4 revealed that, cent percent of the respondents reported no burning sensation and no rashes on the hands when they wore hand gloves. The hand gloves were also very much comfortable for harvesting papaya, sunflower and safflower crops as cent percent opined. At least 80 % of the respondents were able to carry out household chores by wearing gloves. Forty per cent of the respondents opined that the hand gloves were always suitable for hand weeding and papaya harvesting.

In Bengal gram and safflower it is very difficult to

work without hand gloves and apron as the maleic acid in Bengal gram and the thorns present in safflower severely affects and damages the hands. Hence, majority *i.e.*, 80s% of the respondents expressed that these functional clothes were more comfortable and more suitable for all agricultural operations.

Conclusion:

Functional clothing is normally made from a mixture of innovative materials and functionality that a garment is expected to perform. The functional clothing kit was highly accepted by the farm women. Majority *i.e.*, 80s% of the respondents expressed that these functional clothes were more comfortable and more suitable for all agricultural operations. There was 18.75 % increase in work efficiency in harvesting operations and similarly the work efficiency of farm workers significantly increased in all agricultural operations like weeding, threshing and winnowing operations. Very fewer damages were seen on hands. The knowledge and usage of these clothing is very much essential for a healthy living. Further there is a need to create greater awareness among the workers for usage, about the benefits of functional clothing and popularization of these clothing in agricultural and allied activities is the necessary to avoid the occupational health hazards to certain extent.



Awareness creation to farmers on wearing functional clothing during various agricultural operations by ICAR-KVK Bidar

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