International Journal of Humanities
and Social Sciences (IJHSS)
ISSN (P): 2319-393X; ISSN (E): 2319-3948
Vol. 5, Issue 6, Oct – Nov 2016; 1-8

International Academy of Science,
Engineering and Technology
Connecting Researchers; Nurturing Innovations

DESIGNING & CONSTRUCTION OF PROTECTIVE CLOTHING FOR TEA GARDEN WORKER OF ASSAM

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ABSTRACT

The study on protective clothing practice of tea garden worker engaged on pesticide application was carried out in five different tea garden of Jorhat district of Assam. Protective clothing is an important line of defense for workers in hazardous occupations. Even though workers generally recognize the need for protective clothing they often experience problems with the size, design, and function of the clothing as well as experiencing discomfort. Wearing protective clothing and equipment when handling or applying pesticides can reduce the risk of exposure of harmful aspects of pesticide application.

KEYWORDS: Protective Clothing, Pesticide, Gloves, Canvas, Cap, Hat, Mask, Face Cover, Goggles, Shoes

INTRODUCTION

In north east India, Assam is famous for tea cultivation. There are more than 850 tea estates and more than 2500 tea gardens that cover thousands of acres of land and they produced more than half of the tea grown in India. For their scenic beauty, calm and peaceful environment, tea gardens have become a great tourist attraction in Assam. It is fact that most of the tea gardens of Assam are situated in Jorhat which is called the '**Tea Capital of the World**'. Today the tea garden workers of Assam composed of the large part of total population of the state and are engaged in applying pesticides & manures. Lot of pesticides are being used in all the tea garden which really affect the health of the applicators and as the cloth worn by pesticide applicator are being expose to various pesticides, the proper knowledge on the use of protective clothing is very important for the applicators. Hence there is a need to reduce the risk of pesticide poisoning among agricultural worker and pesticide applicators. Pesticides can enter the human body in three ways: through the mouth (orally), by breathing into the lungs (inhalation) and, most commonly, by absorption through the skin or eyes.

As labour force is the integral part of tea production, the owner of the tea garden can't over look the genuine safety and health of workers. There is a need to improve the working conditions and ensure proper health for developing better work performance. Anita Desai (2007) conducted a study on "Safety and Protective Clothing" and reported that, it was important to improve work station and health protection of people engaged in various industrial sectors. Keeping the importance of protective clothing, a study was designed with the following objectives.

- Study the excising dress pattern while spraying pesticides in the tea gardens.
- Designing and construction of protective clothing for pesticide applicators
- Assessment of the suitability of the contracted garments.

MATERIALS & METHODS

Selection of Samples

The present study was conducted in five different tea gardens and 30 samples were purposively selected including both men and women engaged in tea cultivation. The study was under taken in two phases-

- Interview cum questioners method for data collection regarding protective clothing.
- Designing, construction and efficiency testing of constructed protective clothing..

RESULTS AND DISCUSSIONS

Protective Measures followed During Various Activities

As regards the protective measures followed by the respondents during various farm activities very few respondents cover their face during preparation of formulation and pesticide application. None of the respondents were found to cover their neck and feet during farm activities. Very few respondents have knowledge regarding protective measures during farm activities.

Table 1: Distribution of Respondents According to the Storage, Application and Spraying Techniques

S. No.	Storage, Application and Spraying Techniques	Number	Percentage
Storage of Pesticides			
1.	Buy when required	10	33
2.	Store the stock required for the entire crop		
3.	Store the half used	4	13
Method of Application of the Pesticide			
1.	Dipping	3	10
2.	Spraying	27	90
Type of Spraying			
1.	Manual spraying	28	93
2.	Power Sprayers	2	7
3.	Tractor spraying		

From the Table 1 it was observed that regarding storage of pesticides 33% of the respondents buy the pesticides when required. 90% of the respondents use spraying method manually (high volume). As concerned as the time of spraying, 57% of the respondents prefer morning hour whereas 43% involved in whole day.

It was also interesting to note that 90% of the respondents used to spray the pesticides towards the wind while 10% of the respondents were found to spray against the wind. None of the respondents were aware about this kind of application, their advantage and disadvantage.

Table 2: Distribution of Respondents According to Common Problems Faced While Spraying and After Spraying

S. No.	Common Problems	After Spraying			
		Respondents Facing Problems		Respondents Facing Problems	
		Number	(%)	Number	(%)
1.	Headache	16	53	19	63
2.	Dizziness	6	20		
3.	Nausea	11	37	14	47
4.	Vomiting			5	17
5.	Diarrhea	3	10	10	33
6.	Loss of appetite	3	10	20	

Table 2: Contd.,					
7.	Eye irritation			23	77
8.	Gradual loss of vision				
9.	Skin allergies	6	20	9	30
10.	Scorching	9	30		
11.	Heat fatigue			3	10
12.	Excessive sweating				
13.	Rise in BP				
14.	Harsh breath sounds	6	20	10	33
15.	Chest discomfort	3	10	6	20

From the data delivered in Table 2, it was observed that 53% of the respondents suffer from headache during spraying time whereas 63% were found to face the same problem after spraying. 77% of the respondents had loss their appetite after spraying pesticides as mentioned by them. From the data delivered in the table it was also observed that most of the respondents around 10-30% suffer dizziness vomiting, eye irritation, skin allergies etc. during or after spraying.

Table 3: Distribution of Respondents According to Existence of Health Problems and Duration of the Problem

S. No.	Problem	Time Since when the Problem Started and Percentage of Respondents Enduring									
		Less than 1year		1-2 years		2-5 years		5-10 years		Above 10 years	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
1.	Gastro intestinal problems	4	13	3	10						
2.	Kidney problems										
3.	Deformed finger tips	2	7	3	10	2	7				
4.	Deformed nails					2	7	6	20		
5.	Deformed hands										
6.	Gradual loss of vision	1	3					3	10	2	7
7.	Any other										

As mentioned by the respondents (5-10%) in the Table 3, that the most common health problem were gastro-intestinal, deformed finger tips, deformed nails, and loss of vision etc. since from one year to continuing several years.

Existing Dress Patterns

From the study it has been observed that the male respondents generally use half sleeve shirts and sometimes full sleeve shirt is used during farm activities. None of the respondents used were found to wear kurta and coat during farm activities. As regard the lower garment, they prefer to wear shorts/ half pant. None of the respondents wear pyjama and dhoti/lungi during farm activities. Female workers generally wear traditional mekhala chadder or salwar kamez. Also observed from the study that the majority of the respondents (both male & female) never wear hand gloves, canvas, cap, hat, mask, face cover, goggles, chapel, shoes etc. during their farm activities

Use of Protective Clothing While Using Pesticide

Majority of the respondents never wear hand gloves, canvas, cap, hat, mask, face cover, goggles, chapel, shoes etc.

Figure 1: Existing Dress Patterns of Pesticide Applicators

Figure 2: Protective Clothing Designed for Pesticide Applicators of Tea Garden Workers of ASSAM

Protective Clothing's Designed for Pesticide Applicators

For Males: Head Coverings

Cap with Mask **Hood Mask**

Figure 3

Upper Garments

Kurta with Chinese Collar **Jacket and Pyjama (Water Proof)**

Figure 4

For Females

Beak Mask **Scarf with Mask** **Hood Mask**

Figure 5

Acceptability Assessment of the Developed Protective Clothing

Acceptability assessment of the developed protective clothing was conducted with a questionnaire & the results are given in Table 8

Table 4: Acceptability Assessment of Protective Clothing/Accessories

Sr. No.	Statements	WMS
1.	Protective clothes and accessories are easy to wear and remove	2.83
2.	Protective clothing look attractive	2.77
3.	Functional features/fasteners used in garments do not cause pinching	2.87
4.	Protective clothing do not have adverse effect on the work efficiency	2.9
5.	Protective clothing can be washed & maintained easily	1.1
6.	Designs of garment are so simple that person good at stitching can follow the designs	2.83
7.	It is worth spending extra money on protective clothing even if they are not provided by the industry	3
8.	One must wear protective clothing /accessories to protect against health problems	3
9.	The protective garments have no risk of getting entangled in machines	1.17
10.	I will suggest other fellows to adopt protective clothing	2.17
11.	It takes more time while wearing and removing protective clothes	1.1
12.	Protective clothing / accessories seams unattractive	1.17
13.	The garments are not comfortable due to functional features	1.17
14.	The functional features in protective clothes cause hindrance at work place	2.67
15.	The washing and maintenance of protective clothing is difficult	2.83
16.	It will be difficult to get these stitched due to their complicated designs	1.83
17.	Why to spend money as it is the responsibility of the industry to supply it	3
18.	The modified garments are protective but no need to adopt these if one is managing with the existing dress	2.33
19.	Protective clothing should not be worn as these might entangled while working	2.83
20.	These garment should not be recommended because they are not useful	1.17

The weighted mean score ranges between 2-3(out of 3) which shows that developed protective clothing were found to be suitable for applicators.

Distribution of Respondents According to Method of Washing

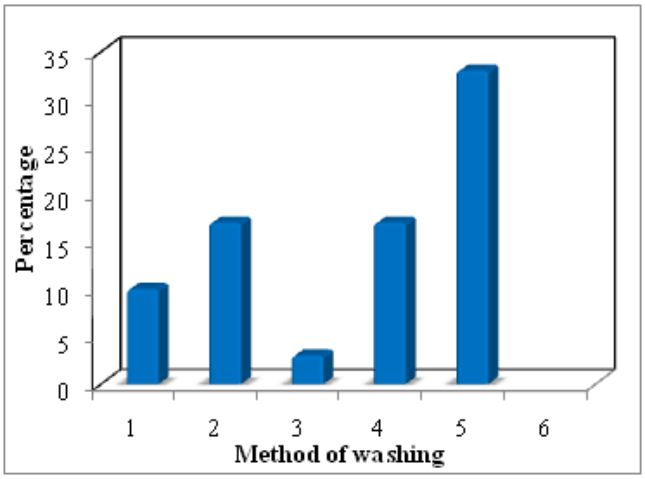

Figure 6: Distribution of Respondents According to Method of Washing

- just rinse & dry
- Presoak or rinse before washing with detergent
- 3.Kneading, squeezing & drying
- Beating, rinsing &drying
- washing with soap & water
- Wash in hot or warm water

From the figure 2 it has been observed that majority of the respondents wash their clothes with soap & water followed by Kneading & squeezing, Beating & rinsing and just rinse & dry. None of the respondents wash their clothes in hot or warm water.

Distribution of Respondents According to their Access to the Information on Protective Clothing

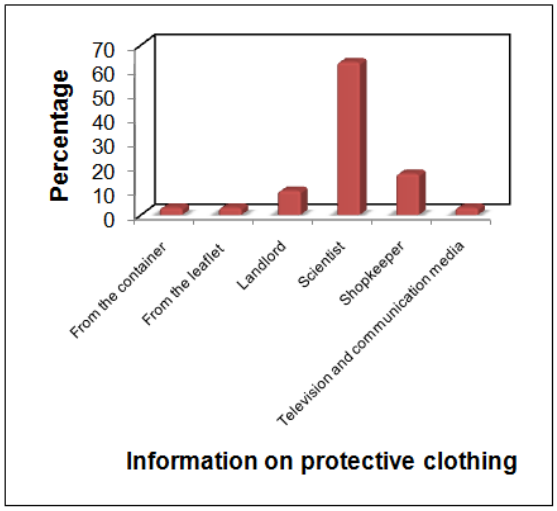

Figure 7: Distribution of Respondents According to their Access to the Information on Protective Clothing

Figure 7 reveals that majority of the respondents(63%) access to the information on protective clothing from scientist followed by shop keeper (17%).

CONCLUSIONS

The purpose of protective clothing is to isolate parts of the body from direct contact with hazardous chemicals used today. With new technologies adopted on economic grounds, the farmers are adopting the use of pesticides to a greater extent. The use of pesticides has brought substantial advantages to them and the population at large. However, the Agricultural workers are commonly exposed to toxic pesticides that cause serious health problems, due to lack of suitable protective clothing.

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