

Gender Perception on the Health and Environmental Hazards of Pesticide Usage among Cocoa Farmers in Ekiti State, Nigeria

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Abstract: The study was conducted in Ekiti State, Nigeria among male and female cocoa farmers, to assess the gender differential in perception of the health and environmental hazards of pesticides usage. Multi stage purposive sampling technique was used to select 120 male cocoa farmers and 120 female cocoa farmers to make a total of 240 respondents for the study. Descriptive and inferential statistics was used to analyse the data. The result showed that male cocoa farmers, likewise female cocoa are vulnerable to health, (tearing and redness of eyes, body pain, headache) hazards, likewise they also indicated their experience of environmental (air pollution, pollute streams) hazards. About 64% Male and 54% female cocoa farmers had a positive perception of the health and environmental hazards of pesticides usage but there was a significant difference between male and female cocoa farmers perception of pesticides hazards. It was concluded that majority male as well as female cocoa farmers in Ekiti State were vulnerable to one pesticide hazards or the other. Adequate and frequent training was recommended for male and female cocoa farmers on pesticides hazards, at the same time less reliance on pesticides usage to reduce vulnerability to the hazards.

Keywords: Pesticides Hazards, Gender Differential, Perception, Pest and Diseases, Cocoa Production

1. Introduction

Cocoa (*Theobroma cacao*) has been a major cash crop in Nigeria; it has contributed immensely to her economy over the years. It has served as a source of employments, both directly and indirectly, as a mean of foreign exchange, as an important source of industrial raw materials, and internal revenue to government of producing state. Nigeria was the second leading producer of cocoa in the 60s and early 70s [1]. Production decline in cocoa started in 1971 with annual yield of 255,000 tonnes, 241,000 tonnes in 1972 and 137,000 tonnes in 1978/79 [2]. This was associated with old ages of tress, disease and pest attack and abandonment of productive holdings as a result of low price incentives [3]. Nigeria is currently the fourth largest producer of cocoa in the world where she produced (250,000 tonnes), Indonesia (490,000 tonnes), Ghana (662,400 tonnes) and Cote d'Ivoire (1,000

223 tonnes) [4]. Though Nigeria's annual cocoa yield has been between 200,000 and 250,000 tonnes in recent years, but rose to 270,000 in 2012/13 [5].

Research [1, 6, 7] revealed that pests and diseases constitute the major problem of cocoa production in Nigeria. Cocoa farmers in Nigeria have glued to the use of pesticides in controlling the incidence of pest and diseases because of its quick and easy to use action, compare to other means like biological and cultural methods [8]. Most cocoa farmers are ignorant of the hazardous effects of pesticides and rarely use protective kits; they seldom follow other precautionary measures of health and environmental hazards and indiscriminately use pesticides, thus making them vulnerable to pesticide hazards. Research [9, 10, 11] reveal that human exposure to pesticides is an important health and social issue as it usually results in serious health problems such as Redness of eyes, Headache, Sneezing, Breathing difficulty,

Body pain, Excessive Sweating, vomiting, difficult breathing, body itching, yellow skin, diarrhoea, fever and mental imbalance for farmers. On the other hand have environmental impact consisting of the effects of pesticides on non-target species. Pesticides usage in Nigeria cocoa production today revolves round the involvement of male and female cocoa farmers and their exposure to various health and environmental hazards, this corroborate [12] assertion that female cocoa farmers plays significant roles in cocoa production. Likewise [13] posited that there has been a continuous increase of female involvement in agriculture and male involvement continued to decline to about 64 per cent from 2006. This has made the involvement of male and female farmers pivotal in agricultural production and germane to be viewed with gender lens.

Gender cut across having a deep knowledge of the culturally ascribed role, responsibility, privilege, opportunities as well as constraints to either of the sexes (male and female). Deji, 2011 [14] posited that gender is defined by the culture of the society hence varies from one society to the other and from time to time. This is buttressed by Bem, 1981 [15] in her 'gender schema theory' which this study stand on, that gender associated information is predominantly transmuted through society by the way of schemata, where there are individual differences in the degree to which people hold the gender schemata. Schemata here mean an organizational or conceptual pattern in the mind of individual that becomes gendered in a society. Martin & Halverson, 1981 [16] posited that whenever an individual internalises information from external world, it will be arranged into different schemata which will eventually help to regulate the individual behaviour, attitude and perception. A schema does this by providing an individual with the basis of hope for the future, developing and implementing plans and setting targets/goals. It thus explains how each sex perceives happenings in the society and how this informs individual behaviour. This study exclusively looked at schema as relates to perception, thus examined how male and female cocoa farmers in Ekiti State perceived the hazardous effects associated with pesticide usage in cocoa production. The hazardous effects of pesticides usage on users' health and environment have been documented in literature, however the gender disaggregated empirical evidence about farmers' perception on effects of pesticide usage on users' health and environment is scanty in literature. Hence, it became imperative to identify and categorize the hazards of pesticides usage among male and female cocoa farmers and assess the gender differential in perception on health and environmental hazards of pesticide usage among cocoa farmers in Ekiti State. Thus in this study we reported the various health and environmental hazards of pesticides usage among male and female cocoa farmers, gender differential in perception on health and environmental hazards and their personal and socio-economic characteristics. In line with above objectives the hypothesis below was tested.

There is no significant difference between male and female cocoa farmer's perception on health and environmental hazards of pesticide usage.

2. Methodology

The study was purposively carried out in Ekiti State in south western Nigeria due to her predominance in cocoa production. Ekiti State fall within Latitude: 7° 43' 01" N Longitude: 5° 20' 02" E. The state lie within the tropics bounded in the North by Kwara State, in the South by Ondo State, in the East by Kogi State and in the West by Osun state. The state comprises sixteen local government areas. The 2006 national population census puts the population of the area to be 2,384,212 people. It has an approximate land area of 10,898.68 square kilometres [17] Ekiti State is purely a homogenous community and has a purely agrarian economy. Ekiti State is known for cocoa production under the old Ondo State and income generated from cocoa production has been used in some developmental projects in the State. Cocoa production in Ekiti State is practiced by male and female farmers. The major language of the inhabitants is Yoruba and the dialect spoken is Ekiti, which has slight variations among the different communities.

A multistage sampling procedure was used to select respondents for the study. At the first stage, five Local Government Areas (LGAs) with high cocoa production were purposively selected for the study. At the second stage three communities with the high cocoa production were purposively selected from each LGAs to make a total of fifteen communities. At the third stage eight male and eight female cocoa farmers were selected from each of the communities through accidental sampling technique to make a total of 240 respondents for the study. Well validated structured interview schedule was used to elicit information (personal and socio-economic characteristics of farmers, experienced hazards and perception of health and environmental hazards) from the respondents. Data collected were analysed using descriptive statistics such as frequency counts, percentages, mean and standard deviation, while ANOVA and correlation analysis were used to make inferential deductions. Focus group discussion was used to collect qualitative data. Six focus group discussion sessions were conducted for the study, three sessions each for male and three sessions each for female cocoa farmers. Each FGD session comprised of 8-10 participants. The FGD was used to unveiled hidden gender issues concerning pesticides hazards and perception on health and environmental hazards of pesticide usage. The information elicited from the discussions was analysed using content analysis method and was used to buttress quantitative findings.

3. Results and Discussion

3.1. Socio Economic and Personal Characteristics

Results in Table 1 shows that majority of male cocoa farmers (MCF) 79.2 per cent and female cocoa farmers (FCF) 90.8 per cent were aged between 30 and 60 years old. The mean age of MCF was 52.5± 9.82 years while the mean age of FCF was 45.2±8.49 years. This implies that majority of cocoa farmers are still in their active ages, this findings agrees with

Famuyiwa *et al.*, 2013 [1] who found that the mean age of Nigeria cocoa farmers was 48.6 years. The findings also reveal that majority of female cocoa farmers (CFs) are in their active ages compare to their male counterpart and this can bring improvement in female CFs involvement in cocoa production. About 34 per cent and 40 per cent of male and female CFs respectively had between 6-12 years of formal education. The average years of formal education had by male and female CFs was 4.82 ± 5.71 and 4.91 ± 4.62 respectively. Majority 52.5 per cent MCF had between 6-10 hectares of cocoa farm size, and majority 80.8 per cent FCF had between 1-5 hectares of cocoa farm size. The mean farm size for male and female CFs were 5.5 ± 2.94 and 4.3 ± 2.51 hectares respectively. This implies that male CFs had higher farm size than their female counterparts and this might determine their production output as well as their level of pesticide usage. More than half 50.8 per cent MCF and 53.3 per cent FCF had cocoa farming experience between 16-30 years. The mean cocoa farming experience in years of male and female CFs were 27.9 ± 9.23 and 22.3 ± 9.68 years respectively. The findings revealed that male had

relatively higher farming experience than their female counterparts, which implies that male CFs will have better knowledge of cocoa production and pesticide usage compare to their female counterpart. The mean annual income of male and female CFs was $341,575 \pm 231,036.48$ and $259,291 \pm 238,139.06$ respectively. The findings revealed that male CFs had higher annual income from sales of cocoa than their female counterparts. This might influence high level of pesticide usage among the male cocoa farmers as compare to their female counterparts since the usage of pesticide might be income determined. About 41 per cent and 23 per cent of male and female CFs had contact with extension agents 11 times and above in the last 12 months respectively as compare to 26 times they are supposed to be visited in a year. The mean number of contacts was 8.36 ± 5.37 and 5.58 ± 5.66 for male and female CFs respectively. The finding reveals that male CFs had more contact than their female counterpart in the study area. This might a significant implication on the knowledge level of male cocoa farmers as compare to their female counterpart.

Table 1. Distribution of respondents on personal and socio economics characteristics.

Variables	Male (n=120)		Female (n=120)		Total (n=240)	
	Freq	%	Freq	%	Freq	%
Age						
≤30	1	0.8	5	4.2	6	2.5
30-60	95	79.2	109	90.8	204	85
>60	24	20	6	5	30	12.5
Mean	52.5		45.2		48.8	
SD	9.82		8.49		9.15	
Years of Formal Education						
Not applicable	64	53.3	38	31.7	102	42.5
<6	2	1.7	30	25.0	32	13.3
6-12	41	34.2	48	40.0	89	37.1
13 and above	13	10.8	4	3.3	17	7.1
Mean	4.82		4.92		4.87	
SD	5.71		4.62		5.18	
Cocoa Farm Size						
≤5	53	44.2	97	80.8	150	62.5
6-10	63	52.5	20	16.7	83	34.5
11 and above	4	3.3	3	2.5	7	3.0
Mean	5.5		4.3		4.9	
SD	2.94		2.51		2.73	
Cocoa Farming Experience						
≤15	16	13.3	38	31.7	54	22.5
16-30	61	50.8	64	53.3	125	52.1
30 and above	43	35.9	18	15.0	61	25.4
Mean	27.9		22.3		25.1	
SD	9.23		9.68		9.45	
Annual Income from Cocoa						
≤150,000	41	34.2	53	44.2	94	39.2
150,001--300,000	31	25.8	38	31.7	69	28.7
300,001--450,000	13	10.8	7	5.8	20	8.3
450,001 and above	35	29.2	22	18.3	57	23.8
Mean	341,575		259,291.6		300,433.3	
SD	238,139.1		231,036.5		469,175.6	
Contact with Ext Agents						
No contact	18	15.0	37	30.8	55	22.9
≤5	22	18.3	33	27.5	55	22.9
6-10	31	25.8	22	18.3	53	22.1
11 and above	49	40.8	28	23.3	77	32.1
Mean	8.4		5.5		6.95	
SD	5.37		5.66		5.52	

Source: Field survey, 2015

3.2. Hazards of Pesticides Usage

The hazards of pesticides usage in cocoa production were categorized based on its effects on users' health and environment. The health hazards were measured based on the symptoms as perceived by male and female cocoa farmers in the study area. No health diagnose was carried out on the farmers, they only indicate the hazards experienced based on their perceived symptoms.

Results in Table 2 reveals the identification of hazards associated with pesticide usage among male and female cocoa farmers in the study area. It shows that majority 86.7 per cent male cocoa farmers (MCF) and 62.5 per cent female cocoa farmers (FCF) have experienced tearing and redness of eyes as a result of pesticides usage, this usually occur as most male and female cocoa farmers seldom wear face guard when spraying the chemicals. The findings corroborate Ogunjimi and Farinde, 2012 [11] who identified tearing and redness of the eyes as health symptoms of pesticide hazards among cocoa farmers. About 40 per cent MCF and 24 per cent FCF have experienced breathing difficulty, while (40.8% MCF and 26.7% FCF) have experienced excessive sweating which might be due to the stress they undergo during the spraying of the pesticides. Also 45.8 per cent MCF and 34.2 per cent FCF indicated that they do have headache after spraying pesticides. These health hazards align with [10] findings that cocoa farmers suffers from headache and breathing difficulty as a result of pesticide use. Majority of cocoa farmer suffer from this health symptoms because they seldom wear protective clothing. Conversely 66.7 per cent MCF and 55 per cent FCF affirmed to have experienced sneezing, while male (70%), female (30%) CFs has experienced body pain as a result of pesticide usage; this may be due to the weight of the sprayer being used for the application. Other health hazards experienced by male and female cocoa farmers are body itching, stomach cramps, skin rash vomiting, this experienced hazards agrees with the findings of [9, 10, 11] of the various health hazards symptoms experienced by cocoa farmers.

On the other hand the table further shows environmental hazards experienced by male and female cocoa farmers. About 61 per cent MCF and 53 per cent FCF indicated that they have experienced reduction in soil quality through the use of pesticide. This agrees with [18] that not using pesticides results in higher soil quality needed. Likewise 83 per cent MCF and 76 per cent FCF have experienced that pesticides usage harms beneficial insects like bees; this goes a long way in reducing pollination of flowers and quick reproduction of flowering plants, among which cocoa is not an exemption. However, 69.2 per cent MCF and 56.7 per cent FCF have experienced decrease in biodiversity in soil, consequently reducing the beneficial insects in the soil

necessary for supplying plant the necessary nutrients needed for instance in case of nitrogen fixing bacteria. Majority 86.7 per cent MCF and 79.2 per cent FCF have experienced pesticides usage contributing to air pollution. The finding agrees with [19] that pesticides usage can contribute to air pollution. Conversely, 78.3 per cent MCF and 66.7 per cent FCF have experienced pesticides polluting stream, rivers and wells, which is in agreement with [20] that indiscriminate use of pesticides were found to pollute every source of water including wells. About 68 per cent MCF, 55 per cent FCF have experienced the harmful effects of pesticides usage on other non-target organisms (Birds), this is in line with [21] that pesticide usage on agricultural fields has reduced the population of many insects eating birds such as partridges, grouse and pheasants due to the loss of their insect food in agricultural fields. Other environmental hazards experienced by cocoa farmers include inhibition of plant growth, contamination of marine ecosystem and negative effects on domestic and wild animal reproduction as they have seen the death of several of some wild and domestic life on sprayed farms. The finding shows that high proportion of male cocoa farmers has experienced various environmental hazards compare to their female counterpart. This might be due to the fact that male farmers may take into cognizance what is happening in their environment into consideration compare to their female counterpart, male cocoa farmers having higher farming experience may also be a determinant. Excerpt from Focus Group Discussion (FGD) reveal that male and female cocoa farmers attest to the fact that have experienced different symptoms of health hazards as well as incidence of environmental hazards as a result of pesticide usage on their farms.

‘Most time when we spray pesticides most of us usually feel that our eyes are red and they itch. At the same time we do sweat a lot because there is no how you will carry the sprayer that you won't sweat, that is why we seldom wear overall whenever we want to spray the chemical. Sneezing is also a common thing whenever pesticides are being sprayed on farms most especially insecticides and fungicides, even if you are not the one spraying it but you are on the farm with them’.

‘Whenever we spray pesticide most especially insecticides and fungicides, we realize it pollutes the air that you can perceive the smell of some fungicides like 2km away from you, and it is usually offensive. On the other hand domestic animals are seldom affected whenever we spray pesticides on our farm because they still move around in the places been sprayed, though we find some of them dead whenever they move around in the place just sprayed’.

Excerpt from FGD

Table 2. Distribution of respondents on experienced health and environmental hazards.

Hazards	Male(n=120)		Female(n=120)		Total (240)	
	Freq	%	Freq	%	Freq	%
Health Hazards						
Tearing and redness of eyes	104	86.7	75	62.5	179	74.5
Breathing difficulty	48	40.0	29	24.2	77	32.0
Excessive sweating	49	40.8	32	26.7	81	33.7
Headache	55	45.8	41	34.2	96	40.0
Sneezing	80	66.7	66	55.0	146	60.8
Body pain	84	70.0	36	30.0	120	50.0
Body itching	75	62.5	38	31.7	113	47.0
Stomach cramp	49	40.8	34	28.3	83	34.5
Skin rash	61	50.8	33	27.5	94	39.2
Cough	33	27.5	17	14.2	50	20.8
Vomiting	---	---	12	10.0	12	5.0
Environmental hazards						
Reduce soil quality	73	60.8	64	53.3	137	57.0
Harming beneficial insects	100	83.3	91	75.8	191	79.5
Decrease soil biodiversity	83	69.2	68	56.6	151	62.9
Contribute to air pollution	104	86.7	95	79.2	199	82.9
Pollute streams and rivers	94	78.3	80	66.7	174	72.5
Harming non target organisms (birds)	82	68.3	66	55.0	148	61.6
Inhibits plant growth	67	55.8	59	49.2	126	53.7
Affects animal reproduction	34	28.3	25	20.8	59	24.5
Contaminate marine ecosystem	65	54.2	32	26.7	97	40.4

Source: Field survey, 2015

3.3. Perception on Health and Environmental Hazards

Result in Table 3 shows that the grand mean score of perception on health and environmental hazards for male cocoa farmers is 3.79 ± 0.33 and 3.45 ± 0.29 for female cocoa farmers. It shows that cocoa farmers had positive perception to statement that has mean score above the grand mean and negative perception for statement that has mean score below the grand mean. The table reveals that male and female cocoa farmers had positive perception with mean 4.12 ± 1.30 and 3.57 ± 1.25 respectively, that death of man can occur as a result of pesticide misuse. Contrarily male CFs 2.90 ± 1.35 and female CFs 2.92 ± 1.27 had a negative perception on pesticide residue in food could result in death of man. About 64 per cent and 57 per cent of the mean score of male and female cocoa farmers' perception statement respectively were equal or greater than the grand mean, while about 36 per cent and 43 per cent of male and female cocoa farmers' perception statement respectively were below the grand mean. This implies that

there is positive perception on health and environmental hazards of pesticide usage among male and female cocoa farmers, though male cocoa farmers had relatively higher positive perception on health and environmental hazards compared to their female counterpart. This positive perception can make them to respond speedily to trainings on how to combat the incidence of pesticides hazards. Perception of male and female cocoa farmers was buttressed by the excerpt from Focus Group Discussion (FGD).

'Despite that pesticide can be dangerous to farmers' health and the environment, we can't do without it because of the diseases of cocoa, we use it on our farms to combat pest and diseases because of its quick action'. We are aware of the hazards associated with pesticide usage, but if we don't use it the diseases will destroy our crop. Everyone is vulnerable to the hazards regardless of your sex whether male or female in as much as you use pesticides on your farm'.

Excerpt from FGD

Table 3. Mean scores of respondents' perception on health and environmental hazards of pesticides usage.

Perception Statement	Male	n=120	Female	n=120
	Mean	SD	Mean	SD
Death of man can occur as a result of pesticides usage	4.12	1.30	3.57	1.25
Pesticides residue in food products could result in death of man	2.90	1.35	2.92	1.27
Working on the farm within 24 hours of spraying can results in health hazards	3.83	1.07	3.94	3.81
Pesticides usage can result in various form of health symptoms for man such as; headache, stomach-ache, redness of eyes, breathing difficulty	4.06	1.17	3.15	1.31
Pesticides will kill other organisms such as bees, birds, earthworms around agricultural fields apart from reaching the target organisms.	3.98	0.84	3.58	1.13
Pesticides usage/misuse can cause loss of biodiversity in soil	3.50	0.91	3.51	1.02
Pesticides usage/misuse can cause the deaths of wild animals	4.00	0.77	3.45	0.99
Pesticide usage/misuse can result in the death of domestic farm animals	4.04	0.71	3.25	1.15
Contamination/pollution of, soil and air can result from usage/misuse of pesticide.	3.79	1.12	3.29	1.26
Natural pest control can be hindered by the unavoidable destruction of beneficial insects through pesticides usage	3.69	0.97	3.94	1.05

Perception Statement	Male	n=120	Female	n=120
Pesticide hazards occur as a result of its unsafe use or misuse	3.65	1.02	3.19	1.13
Pesticides usage can inhibit the growth of plants	3.50	1.05	3.38	0.96
Pesticides usage can result in air pollution and affects arboreal organisms	3.88	0.95	3.57	0.77
Pesticides usage can pollute stream well, and river. Contaminating them and endangering the marine ecosystem	4.19	0.82	3.68	1.06
Grand Mean	3.79		3.45	
Standard Deviation	0.33		0.28	

SD= Standard Deviation. Rating scale: 1= Strongly disagree, 2= Disagree, 3= Undecided, 4 = Agree, 5= Strongly agree.
Source: Field survey, 2015

3.4. Correlation Analyses between Male and Female Cocoa Farmers’ Personal and Socioeconomic Characteristics and Perception on Health and Environmental Hazards

Table 4 showed the correlation coefficient, which established that at $P \leq 0.05$ level of significance cocoa farming experience ($r = 0.221$) show a positive significant relationship with male cocoa farmers perception on health and environmental hazards, while years of formal education ($r = 0.218$) show a positive significant relationship with female cocoa farmers perception on health and environmental hazards. On the other hand at $P \leq 0.01$ level of significance income from cocoa ($r = 0.241$, $r = 0.453$) show a positive significant relationship with male and female cocoa

farmers perception on health and environmental hazards respectively. Female cocoa farmers years of farming experience ($r = 0.292$) also a positive significant relationship with perception on health and environmental hazards. The relationship between male and female cocoa farmers’ years of farming experience and their perception implies that the higher their years of experience the positive their perception, this may be due to the experience farmers have gathered in previous years of health and environmental hazards. While female farmers years of formal education positive relationship implies that female farmers might have access to information on negative effects of pesticides usage through their educational endeavour.

Table 4. Results of correlation analyses of the relationship between personal and socio-economic characteristics of male and female cocoa farmers and their perception on health and environmental hazards of pesticide usage.

Variables	r-value	(MALE) p-value	Decision	r-value	(FEMALE) p-value	Decision
Age	0.084	0.364	NS	0.155	0.090	NS
Years of formal education	0.138	0.132	NS	0.218*	0.017	S
Cocoa farming experience	0.221**	0.015	S	0.292**	0.001	S
Size of cocoa farm	0.097	0.293	NS	0.063	0.496	NS
Income from cocoa	0.241**	0.008	S	0.453**	0.000	S
Contact with extension agents	-0.064	0.487	NS	0.014	0.877	NS

** Significant at $P \leq 0.01$

*Significant at $P \leq 0.05$

Source: Field survey, 2015

3.5. Analysis of Variance of Male and Female Cocoa Farmer Perception on Health and Environmental Hazards

Table 5 show the results of (ANOVA) Analysis of Variance at $P \leq 0.01$ level of significance that there was a significant difference ($F=23.302$) between male and female cocoa farmers

perception on health and environmental hazards of pesticide usage. This implies that male cocoa farmers had higher positive perception on pesticides hazards compare to their female counterpart. As shown by earlier findings this can be influenced differently among male and female cocoa farmers by the years of cocoa farming experience and years of formal education.

Table 5. Summary of analysis of variance (ANOVA) showing the differences between male and female perception on health and environmental hazards of pesticide usage.

		SS	DF	MS	F	Sig
Perception	Between groups	1859.267	1	1859.267	23.302	0.000**
	Within groups	18990.067	238	79.790		
	Total	20849.333	239			

**= significant at 0.01 level of significance

SS= Sum of Squares, DF=Degree of Freedom, MS= Mean Square

Source: Field survey, 2015

4. Conclusions

The findings from the study gave a broad knowledge on

the various health and environmental hazards associated with pesticides usage experienced by male and female cocoa farmers. Male and female cocoa farmers are mostly experienced tearing and redness of eyes and air pollution as

the most common health and environmental hazards respectively. It shows that farmers are exposed to pesticides hazard regardless of sex, and this occurs because majority of cocoa farmers adopts the use of pesticides to combat pest and diseases. Income from cocoa production and cocoa farming experiences influences positively male and female cocoa farmers' perception on pesticide hazards, while years of formal education also positively influences female farmers' perception on pesticide hazards. It was concluded that there was higher positive perception on health and environmental hazards of pesticide usage among male cocoa farmers compared to their female counterpart.

Recommendations

Based on the conclusions of major findings the following recommendations were made to reduce the incidence of health and environmental hazards of pesticides usage in cocoa production.

- Given the various hazards associated with pesticides usage, there is a need for awareness and training on regular basis for male and female cocoa farmers and intending cocoa farmers on pesticides application, hazards associated with pesticides usage and precautionary measures to be taken, by government and non-governmental agencies/organization.
- Ultimately the practice of integrated pest management should be reinforced among male and female cocoa farmers to reduce the incidence of pesticides hazards rather than depending solely on chemicals.

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