

GENDER DIFFERENCES IN KNOWLEDGE OF RECOMMENDED PESTICIDES USAGE AMONG VEGETABLE FARMERS IN KWARA STATE, NIGERIA.

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ABSTRACT

This study assessed the gender based knowledge and usage of recommended use of pesticides among vegetable farmers in Kwara state, Nigeria. The study assessed male and female vegetable farmers that had the knowledge of recommended use of pesticide, examined male and female vegetable farmers that used pesticide recommended handling practices, and determine factors hindering recommended use of agrochemicals practices. Selection of respondents was done using a three-stage sampling technique. Interview schedule was used to collect data. Frequency count, percentages, and t-test were used to analysed data collected. Finding revealed that majority of both male and female of the respondents were classified to have high knowledge of the practices. Few percentages of the respondents used the practices. T-test analysis further revealed that age ($t=0.019$, $p=0.019$) and income ($t=-2.600$; 0.010) were the factors tested to have significant relationship among male and female farmers for the use of pesticide in the study area. It was concluded that knowledge of both male and female vegetable farmers in Kwara state on recommended handling and application practices was considered high but the level of use was low. The study recommends that extension organizations should train and improve the practical knowledge of female vegetable farmers on the importance of keeping first aid for safe handling and application practices of pesticide.

Keywords: protective gear, first aid kit, sprayer, instruction manual, vegetable farmers

INTRODUCTION

Pest and disease infestation is a major constraint militating against the production of vegetable on an increased scale as it may cause severe loss if there is no adequate and timely intervention (DFID, 2002; Ugwu, Omoloye, Asogwa and Aduloju, 2015). The leaves and fruits of vegetable crops are highly vulnerable to attack by pest this will depreciate its market value as well as reduce its yield consequently leading to reduction in quality and quantity of the crop. Pests and diseases attack on vegetable may cause severe crop damage resulting in about 20 to 60% pre-harvest losses of vegetable crop (Sithanthamet *al.*, 2003). Consequently, farmers resolve to the use of pesticides in order to curb wastages and loss, thereby leading to increased productivity (Okrikata and Anaso, 2008). According

to Tijani(2006), the use of pesticide in cocoa and rice plantation can prevent loss due to pests and diseases attack by 45 percent which implies better yield.

There are many aspects to consider when focusing on the gender inequality of access to vegetable production knowledge. The warnings about the lack of equal opportunity for women are constantly heard in international settings (Commission for Africa 2005), yet significant progress will only be achieved at a local scale when underlying effects causing an inequality between men and women in access to agricultural knowledge are understood (Olajide 2011; TandiLwoga, Stilwell, and Ngulube 2011; Yaseen et al. 2016).

Women working in agriculture in rural settings tend to have less knowledge to, and make less use of, pesticide, land, quality seed, fertilisers, women working in agriculture in rural settings tend to have less knowledge to, and make less use of, land, quality seed, fertilisers, pesticides, credit, insurance, education and rural advisory services (Ragasa et al. 2013), despite women significant and culturally specialised input in vegetable production activities (FAO 2011) and their potential to improve vegetable production (Doss 2011).

In patriarchal countries like Nigeria, gender inequalities of knowledge in agricultural information access are readily reinforced in their socio-cultural contexts (FAO 2015). Nigerian women farmers have limited knowledge in access to adequate vegetable production resources. Increasing access to information for women in rural settings is very challenging: according to previous research, women farmers face not only a shortage of information sources to consult (Hassan, Ali, and Ahmad 2007), but the sources they do consult are generally perceived as poor in quality (Sadaf, Asif, and Muhammad 2006). Sadaf, Asif, and Muhammad (2006) found the main information source for women farmers to be through face-to-face contact in the community (either with the male head of household, female relatives or female neighbours), suggesting that women primarily have mediated, rather than direct, contact with expert sources.

The Food and Agricultural Organization (FAO, 2004) noted that both men and women in most developing countries do not have access to adequate knowledge of resources for vegetable farming, but women's access is even more constrained as a result of cultural, traditional and sociological factors.

World Bank (2005) report that women hold title to approximately two percent of land globally and are frequently denied the right to inherit property. Owotoki, (2003) also stated that gender differences in resource control, assets ownership and income earning have been identified as important factors in household food security. Ogundele et al. (2002) assert that, female farmers are highly discriminated against in the use of critical input such as land, family labour, pesticide and fertilizer but favoured in the use of agro-chemical and seeds. Apart from inequalities in access to employment, gender bias in access to technology may hamper the ability of women to increase the vegetable production, domestic entrepreneurial activities and thus reduce economic growth. Women are too often marginalized in their families and their communities, suffering from a lack of access to credit, land, education, decision-making power and rights to work (Spleidoch, 2007; Ajani, 2008). Inequities in access to and control of assets have severe consequences for women's ability to provide food, health, and their children, especially their female children. In this view, Apata (2013) has recommended the need to introduce strategies to reduce gender barriers, constraints and inequalities and increase returns to the poorest, especially women by increasing their access and control over productive assets and resources such as pesticide, farm land, improved seedlings, herbicides, human capital, decision making in north-central region of Nigeria. Poor access to credit facilities prevents women from purchasing the needed inputs for agricultural purposes. Thus it has been observed by (Mehra and Rojas, 2008) that women are able to access only one percent of credit in agriculture. In cases where tools which are very suitable for women are available, most them are either unaware of such tools or do not have money to buy them. They therefore continue to use the old manual methods which decrease their speed of work and productivity (World Bank, 2008).

In recent times, there is a growing concern for increase in the quantity of pesticides consumed by male and female farmers for the control of pests and diseases of vegetable crops among farmers in Nigeria. In fact, pesticides use among farmers in the country has proven to be indispensable tool in combating damage from pests. The reason for this has been the improvement in yield which is attributed to the ability of pesticides to eliminate pests of vegetables crops. There are also a knowledge gap on the appropriate recommended safe practices for pesticide handling and application (Ngowiet al. 2007) which could be attributed to lack of adequate, up to date, timely information and training on pesticide safety, low education levels among rural population, the use of poor spraying technology and non-compliance with adequate personal protection during pesticide use between male and female farmers (Hurtiget al. 2003; Atreya, 2008).

Farmers' health status is greatly affected by indiscriminate use of pesticides on their vegetable crops which definitely weakens the health condition of the farmers causing a great reduction in the number of man-hour put as labour. Some farmers reduce their farm sizes because of the incapacitation and some others die from diseases resulting from pesticide usage. Eventually, there is great reduction in farm output and income resulting in poor living condition of the people (Kesavachandran et al. 2009). It is evident that farmers are concerned with obtaining maximum yield with minimum input. This is why over the years; the use of pesticide by vegetable farmers has increased with its attendant adverse effect on human health. In a bid to reduce the undesired effect of pesticides, there is need to identify the pesticide use practices among vegetable farmers in compliance with healthy / safe practices during handling and application of pesticides. It is necessary to identify knowledge gaps and determine capacity building needs of vegetable farmers in order to design intervention programmes for improving pesticide use practices among vegetable farmers.

Findings from this study will be a useful guide for extension workers and other relevant training agencies to facilitate trainings and capacity building of vegetable farmers on Best Management Practices for pesticide use. The study will show relevant organizations the challenges faced by vegetable farmers in following recommended safe practices while handling pesticides. This will help in designing appropriate interventions to meet the farmers' needs. It is against this background that this study through the outcome of this study seek promote recommended equal knowledge of safe practices in handling and application of pesticide among male and female vegetable farmers in order to foster good health condition of farmers so that they can perform their activities to the fullest and achieve better productivity. The general aim of this study is gender assessment of knowledge and usage of recommended use of pesticides among vegetable farmers in Kwara State, Nigeria. The specific objectives are to:

- i. assess male and female vegetable farmers that had the knowledge of recommended use of pesticide,
- ii. examined male and female vegetable farmers that used pesticide recommended handling practices, and
- iii. determine factors hindering recommended use of agrochemicals practices.

METHODOLOGY

The Study Area

The study was carried out in Kwara State, Nigeria. There are sixteen (16) Local Government Areas (LGAs) in the state. Kwara State lies between latitude 8° 5' - 10° 4'N and longitude 4° 55'N and 6° 5'E. Crop farming is one the main occupation of people in the state. The state was grouped into four

zones namely A to D by the Kwara State Agricultural Development Project (KWADP) based on the peculiar ecological characteristics of the various parts of the state. The Zonal headquarter of Zone A is Kaiama, Zone B has its headquarter in Patigi, while Malete and Igbaja are the Zonal headquarter of Zone C and Zone D respectively.

Population, sampling procedure and sample size

The population of the study comprised of 1,059 vegetable farmers all belonging to vegetable farmers' groups that registered with Kwara ADP (KWADP) in zone B, C, and D. Selection of respondents was done using a three-stage sampling technique. The first stage involved purposive selection of eleven vegetable producing LGAs spread across the three ADP zones in Kwara State. In the second stage, a purposive selection of twenty seven (27) major vegetable producing communities from the eleven LGAs was done. The purposive selection of LGAs and communities was determined by the list obtained from Kwara State ADP. The LGAs and communities selected are Edu (Lafiagi and Tsaragi), Patigi (Kpada, Lade and Tsuba), Ilorin-West (Oko-erin, Osere and Oloje), Ilorin-East (Oke-oyi, Oke-Ose, Alalubosa, Isale-koko and Sobi), Asa (Balla, Otte, Owode-oja, Lasoju, Ganmo, Amoyo and Temidire), Moro (Shao, Oloru and Bode-Saadu), Ilorin South (Maraba and Oyun), Ifelodun (Omupo and Oke-ode), Irepodun (Ajase and Omu-aran), Oke-Ero (Odo-owa and Iloff and Erinmope) and Oyun (Erin-ile and Ipee). The third stage involved simple random selection of 50% of the population of vegetable farmers from the 27 communities selected from the 11 LGAs. This gave a total of 532 respondents. A total of 532 questionnaires were administered out of which only 455 satisfactory questionnaires from respondents were retrieved and analysed.

Instrument for data collection

Primary data was collected using structured questionnaire. The period of data collection lapsed between 28th May and 30th June 2016. The questionnaire designed was modified by experts in Agricultural Extension and Agronomy in the University of Ilorin to ensure its validity. Suggestions made by experts were thoroughly used to restructure the instrument before being used for data collection.

RESULTS AND DISCUSSION

The results presented in Table 1 that both male and female respondents had knowledge of recommended use of pesticide such as wear protective gear, read instruction manual before using pesticide, follow calibration recommendations, avoid mixing more than one type of pesticide in same spraying container, observe weather condition prior spraying, Wash equipment after use, Proper training on the use of sprayer, check expiry date, check sprayer for leaks, avoid reuse of pesticide container for domestic purpose, Take bath after pesticide application, properly dispose pesticide containers, observe restricted entry interval, observe pre-harvest interval, keep clean water during application of pesticide in case of accidental spill, trained on sprayer use and knowledge of training received sprayer usage. Only the keeping of first aid kit on farm (38.5%) was not known by majority of female respondents. Summary of the knowledge areas for recommended use of pesticide presented in Table 2 shows that majority of both male (75.4%) and female (69.6%) of the respondents were classified to have high knowledge of the practices.

As regards the use of recommended practices for use of pesticide, Table 3 indicated that only following of calibration recommendation (71.8%), avoid mixing more than one type of pesticide in same spraying container (76.9%), observe weather condition prior spraying (87.7%), wash equipment after use (92.8%), avoid reuse of pesticide container for domestic purpose (91.3%), Take bath after pesticide application (99.0%) and Properly dispose pesticide containers (95.0%) were the commonly used practices among male respondents while Avoid mixing more than one type of pesticide in same spraying container (87.3%), Properly dispose pesticide containers (95.4%) and Keep clean water during application of pesticide in case of accidental spill (82.7%) were the only recommended practices mostly used by female respondents. Table 4 further shows that factors perceived to be hindering recommended use of agrochemicals practices among age ($t=0.019$, $=p0.019$) and income ($t= -2.600$; 0.010) were the factors tested to have significant relationship among male and female farmers for the use of pesticide in the study area.

Table 1: Percentage distribution of respondents that had knowledge of recommended use of pesticide

| Knowledge Areas | Male | | Female | |
|---|-------|------|--------|------|
| | Freq. | % | Freq. | % |
| Wear protective gear | 162 | 83.1 | 212 | 81.5 |
| Read instruction manual before using pesticide | 164 | 84.1 | 197 | 75.8 |
| Follow calibration recommendation | 170 | 87.2 | 201 | 77.3 |
| Avoid mixing more than one type of pesticide in same spraying container | 157 | 80.5 | 234 | 90.0 |
| Observe weather condition prior spraying | 176 | 90.3 | 249 | 95.8 |
| Wash equipment after use | 184 | 94.4 | 253 | 97.3 |
| Proper training on the use of sprayer | 190 | 97.4 | 242 | 93.1 |
| Check expiry date | 171 | 87.7 | 194 | 74.6 |

| | | | | |
|--|-----|-------|-----|------|
| Check sprayer for leaks | 157 | 80.5 | 180 | 69.2 |
| Avoid reuse of pesticide container for domestic purpose | 179 | 91.8 | 230 | 88.5 |
| Take bath after pesticide application | 195 | 100.0 | 257 | 98.8 |
| Properly dispose pesticide containers | 191 | 97.9 | 251 | 96.5 |
| Observe restricted entry interval | 168 | 86.2 | 241 | 92.7 |
| Observe pre-harvest interval | 178 | 91.3 | 245 | 94.2 |
| Keep clean water during application of pesticide in case of accidental spill | 167 | 85.6 | 242 | 93.1 |
| Keep first aid kit on farm | 133 | 68.2 | 100 | 38.5 |
| Trained on sprayer use | 150 | 76.9 | 215 | 82.7 |
| Knowledge of training received sprayer usage | 151 | 77.4 | 215 | 82.7 |

To classify the knowledge level in different categories, the knowledge index of each respondent was computed using this formula:

$$\text{Percentage knowledge index} = \frac{\text{Respondents score obtained}}{\text{Total possible score (18)}} \times 100$$

Based on the knowledge index scores, the farmers were categorized under knowledge level 5 categories namely; very low, low, medium, high and very high.

Criteria for classification: Since the score of respondents was multiplied by 100 to give the knowledge index, 100 was divided by 5 = 20. Hence, 20 index intervals was considered. Level 1: knowledge index from 0 to 20 were considered as very low. Level 2: knowledge index from 21 to 40 were be considered as low. Level 3: knowledge index from 41 to 60 were considered as medium. Level 4: knowledge index from 61 to 80 were considered as high while Level 5: knowledge index from 81 to 100 were considered as very high.

Table 2: Summary of knowledge level of male and female vegetable farmers

| Category | Percentage Index range | Male | | Female | |
|------------------|------------------------|-----------|-------------|-----------|-------------|
| | | Frequency | Percentage | Frequency | Percentage |
| Very low | 20 or less | 0 | 0.0 | 2 | 0.8 |
| Low | 21 - 40 | 12 | 6.2 | 6 | 2.3 |
| Medium | 41 - 60 | 15 | 7.7 | 24 | 9.2 |
| High | 61 - 80 | 147 | 75.4 | 181 | 69.6 |
| Very high | 80 – 100 | 21 | 10.8 | 47 | 18.1 |
| Total | | 195 | | 260 | |

Table 3: Percentage distribution of respondents that used pesticide recommended handling practices

| Practices | Male | | Female | |
|--|------|------|--------|------|
| | n | % | n | % |
| Wear protective gear | 51 | 26.2 | 50 | 19.2 |
| Read instruction manual before using pesticide | 31 | 15.9 | 100 | 38.5 |
| Follow calibration recommendation | 140 | 71.8 | 101 | 38.8 |
| Avoid mixing more than one type of pesticide in same spraying container | 150 | 76.9 | 227 | 87.3 |
| Observe weather condition prior spraying | 171 | 87.7 | 45 | 17.3 |
| Wash equipment after use | 181 | 92.8 | 25 | 9.6 |
| Proper training on the use of sprayer | 162 | 83.1 | 103 | 39.6 |
| Check expiry date | 51 | 26.2 | 107 | 41.2 |
| Check sprayer for leaks | 51 | 26.2 | 103 | 39.6 |
| Avoid reuse of pesticide container for domestic purpose | 178 | 91.3 | 25 | 9.6 |
| Take bath after pesticide application | 193 | 99.0 | 30 | 11.5 |
| Properly dispose pesticide containers | 187 | 95.9 | 248 | 95.4 |
| Observe restricted entry interval | 8 | 4.1 | 85 | 32.7 |
| Observe pre-harvest interval | 37 | 19.0 | 4 | 1.5 |
| Keep clean water during application of pesticide in case of accidental spill | 2 | 1.0 | 215 | 82.7 |
| Keep first aid kit on farm | 31 | 15.9 | 27 | 10.4 |
| Trained on sprayer use | 50 | 25.6 | 49 | 18.8 |
| Knowledge of training received sprayer usage | 116 | 59.5 | 98 | 37.7 |

Table 4: Perceived factors hindering recommended use of agrochemicals practices

| Factors | Male | | Female | | Mean difference | t-value | p-value |
|--------------------------------|------------------------|--------|------------------------|--------|-----------------|---------|----------------|
| | \bar{X} (σ) | Rating | \bar{X} (σ) | Rating | | | |
| Age | 4.16 (0.882) | 1 | 4.03 (0.710) | 1 | 0.13 | 2.357 | 0.019* |
| Sex | 3.82 (0.541) | 2 | 3.84 (0.627) | 2 | -0.02 | -1.096 | 0.274 |
| Education | 3.49(0.735) | 6 | 3.63(0.670) | 4 | -0.14 | -1.718 | 0.087 |
| Income | 3.60(0.621) | 5 | 3.73 (0.604) | 3 | -0.13 | -2.600 | 0.010** |
| Farm Size | 3.69(0.607) | 4 | 3.63(0.703) | 5 | 0.06 | -0.086 | 0.932 |
| Experience in using pesticide | 3.73 (0.636) | 3 | 3.43(0.615) | 6 | 0.30 | 6.171 | 0.001** |
| Types of vegetable grown | 3.14(0.737) | 8 | 2.86(0.789) | 8 | 0.28 | 5.349 | 0.001** |
| Number of vegetable per season | 3.30(0.706) | 7 | 3.33(0.669) | 7 | -0.03 | -1.069 | 0.286 |

\bar{X} = Mean Score, σ = Standard deviation

Scale used: Strongly agree=5, Agree=4, Undecided=3, Disagree=2 and Strongly disagree=1

CONCLUSION

It was concluded that knowledge of both male and female vegetable farmers in Kwara state on recommended handling and application practices was considered high but the level of use was low. Age and income of the respondents were main challenges to the use of recommended practices by male and female vegetable farmers in Kwara state.

The study recommends that extension organizations should train and improve the practical knowledge of female vegetable farmers on the importance of keeping first aid for safe handling and application practices of pesticide. Female farmers should also be encouraged to attend meetings, on-farm demonstrations, trainings and workshops organized by the extension workers for farmers. This will equip them with correct and adequate knowledge on safe pesticide usage.

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