

AN ASSESSMENT OF FARMERS PERCEPTION ON THE USE OF PESTICIDE IN CROP PRODUCTION AMONG THREE COMMUNITIES IN DASS, BAUCHI-NIGERIA.

¹Adamu, S. J., ²Muhammad, H., and ³Mahmoud, A.B.

¹ Department of Geography, Gombe State University,

²Environmental Management Technology Programme, Abubakar Tafawa Balewa University, Bauchi, Bauchi State.

³Department of Biological Sciences, Gombe State University, Tudun-wada, Gombe, Gombe State.
E-mail- sanidaddy@gmail.com

ABSTRACT

The aim of this research is the assessment of farmers perception on the use of pesticide in crop production among three communities in Dass, Bauchi-Nigeria. A total of one hundred questionnaires were used and oral interview were also employed for the farmers for detail discussion on the perception and prospect of using pesticide in crop production. The data collected were analyzed using simple descriptive statistics. The research confirmed the mis-use of pesticide and lack of taking precautionary measures in handling and application of the pesticide by farmers in the study area because there are illiterate and lack the requisite knowledge on how to handle and use the pesticide in crop production. Therefore, government should sent their extension workers to the area to enlighten the farmers at area on how to handle and apply the pesticide on their farmlands for the purpose of controlling weed, pest and other diseases, as well as precautionary measures to be taken in the course of using the pesticide for attainment of food security and prevention of any medical complication as a result of pesticide poisoning in the area.

Keywords: Communities, Crop Production, Perception of Farmers, Pesticide

INTRODUCTION

National developments always go along with agriculture, because no nation can be developed without attaining certain level of food sufficiency to feed its population. This is the reason why many countries including Nigeria are constantly engaged in many agricultural development programmes to facilitate food production (Ani, 1998). Historical development of agriculture in Nigerian since during the Paleolithic period (old stone age) the dominant agricultural practice involved hunting, fishing and gathering of wild leaves fruits, roots snails and insects (Ani, 1998). At the time, man's survival was based on change, as man was exposed to grave dangers from rampaging wild animals. The human population was yet very small (Ani, 1998). When man started as settled life, the cultivation of crops and domestication of animal began, at this time, the population of the world was estimated at only five million people. This marked the first step to human civilization (Ani, 1998). In view of this change in human life style, the club which was used for hunting was abandoned and the digging stick adopted instead, and used as cultivation implement, this underwent further improvement in wooden plough. During the Iron Age the metal plough was introduced, which has under gone several changes in to the present day plough. Over the many years that followed the plough developed in to one which could be coupled to tractor which used thermal engine (Ani, 1998). The agricultural

system themselves have also change over years. In earliest times, shifting cultivation was the main system, under this system, the farmer cultivated piece of land for some years and abandoned it for another piece of land, usually with no intention of returning to it. However, with population growth which led to land scarcity in later years, the bush fallow (land rotation) system was adapted. Under this system a farmer cultivated a piece of land and abandoned it for some time, to allow it to regain its fertility before he return to it. With further growth in populating, other systems, such as crop rotation, continuous cropping, pastoral farming lay cropping and zero tillage where adopted (Ani, 1998). With the development of new agricultural system and skills came the need for specializations. In the practice of these agricultural specialization today include animal science, agronomy, soil science, agricultural economic and extension, rural sociology, crop protection and agricultural engineering (Ani, 1998).

The changes in agriculture just discussed have been greatly aided by the construction of science and technology through the development of new farm input e.g. fertilizer, pesticide etc and improve animal and crop varieties. Improve farming implements, processing and storage facilities. More nutritive animal ration and. improve farming practice and soil management. (Ani, 1998). In Nigeria, the efforts to promote agricultural development have been complemented by the introduction of various programmes. Some of these include National Accelerated Food Production Programmes (NAFPP) in 1972. Operating Feed the Nation (OFN) in 1976. Green Revolution in 1980. Gor back programme in 1984. Directorate of Food, Road's in Rural Infracsture (DFRRI) in 1986. People's Bank of Nigeria (PBN) in 1990 (Ani, 1998). Role of agriculture in the development of nation in west Africa can not be over emphasize, agricultural production is a major source of income for the people and also many industries depend on the agricultural sector to supply them with raw materials, in the farm, plant and animal products are use for processing in to useful end products. The expanding industrial sector makes a heavy demand on agriculture. (Ani, 1998). Soil is a dynamic natural body on the surface of the earth In Which Plant grows and is composed of minerals organic Matter and Living Organism according to farmers perspective.

LITERATURE REVIEW

Pesticide

According to Saleh (2011) pesticide is any substance or mixture of substance intended for preventing, destroying, repelling or mitigating any pest. He further added that, though often misunderstood to refer only to insecticides, the term pesticide also applies to herbicides, fungicides and various other substances intended for used to control pests. According to him pesticide is also any substance or mixture, of substance intended for use as a plant regulator, defoliant, or desiccant. It should be noted that many household products are pesticides for instance:

- Cockroach sprays and baits
- Insect repellents for personal use
- Rat and other rodent poisons
- Flea and tick sprays, powders, and pet collars
- Kitchen, laundry, and bath disinfectants and sanitizers.

- Product that kill mold and mildew.
- Some swimming pool chemicals

He also grouped the types of pesticides according to:

- i. Their chemical composition.
- ii. The source they are derived.
- iii. The type of pest they control

According to Richard (2009) define pesticide as the chemical agents called pesticide include Herbicides (or weed control) insecticides and fungicides and any chemical which control pest. According to the Oxford Medical Dictionary (2002). Pesticide as a chemical agent used to kill insect or other organisms harmful to crops and other cultivated plants. According to Saleh (2012) define pesticide as manufacture synthetic agro-chemical use for controlling any pest. A pesticide is any substance or mixture of substances used to destroy, suppress or alter the life cycle of any pest. A pesticide can be a naturally derived or synthetically produced substance. A pesticide can also be an organism, for example, the bacterium *Bacillus thurigiensis* which is used to controls a number of insect pest, or even genetically modified crops. Pesticide include bactericide, baits, fungicides, herbicides, insecticide, lures, rodenticide and repellent. They are using in commercial, domestic, urban and rural environments. Pesticide and unique among toxic substances. Most environmental toxics are an unwanted byproduct of another process (for example outflow from a manufacturing plan or emission from an automobile engine). Pesticide are chemicals designed to be harmful to a target pest and purposely introducing in to the environment to do their job of managing insects, bacteria, weeds, rodents other pests. Oxford Medical Dictionary(2012). Pesticide can be toxic to humans and lower animals. It can take a small amount of some toxins to kill. And other toxic that are slower acting, may take long time to cost harm to the human body. Pesticide production can be dangerous, too. One disaster at a pesticide manufacturing plant was in Bhopal, India. The plant accidental the released forty tones of an intermediate chemical gas, methylisosynate, used to produce some pesticide. In that disaster nearly Three Thousand (3000) were killed immediately overall approximately 15,000 deaths occurred. Today nearly 100,000 people surfer from mild to severe permanent damage as a result of that disaster. In China, it is estimated that 500,000 peoples suffered pesticide poisoning annually, and some 500 of them die Oxford Medical Dictionary (2012). The environmental impact of pesticide is often greater than what is intended by those who use them. Over 98% of sprayed insecticide and 95% of herbicides reach a destination other than their target species, including not target species, air, water, bottom sediment, and food. Though they can be benefit using pesticide, inappropriate use can be counterproductive, increase pest resistance and kill the natural enemies of pests. Many users are inadequately informed about potential short and long time risks, and the necessary precaution in the correct application of such toxic chemical are not always made. Pesticide can contaminate unintended land and water when they are sprayed aially or allowing to run off field, or they escape from production sites and storage terms or are inappropriately discarded. Oxford Medical Dictionary (2012).

Below are some beneficial effect of using pesticide and vice-versa

Benefit of Pesticide

- Cost effectiveness. Farm chemicals are an economical way of controlling pests. They require low labor input and allow large areas to be reached quickly and efficiently.
- Timeliness and flexibility. A suitable farm chemical is available for most pest problems with variation in activity, selectivity and persistence. The best product can be chosen for the situation. These allow more flexibility in management options and better timeliness of pest control.
- Prevention of problems. Farm chemical are frequently used to prevent pest problems from occurring, e.g. preventing weeds in gardens, and lawns; treatment of export and import produce to prevent the spray of pest; treatment of storage products to prevent pest attack and destruction during storage.
- Protection of pets and humans. Without farm chemicals the treatment spider, cockroaches, etc in house; fleas on pets, etc will be most difficult.

Despite their many advantages, there are some potential hazards or risks when using farm chemicals. These risks may be associated with all chemical whether they be industrial chemicals, pesticides, household products, or even natural chemicals found in the environment. Undesirable side effects of farm chemical use usually stem of a lack of understanding of the impact of the chemical on the environment, compounded by indiscriminant of overuse of the product. These side effect do not always occur when farm chemicals are used and damage does not necessarily result Oxford Medical Dictionary (2012).

Harmful effect of pesticide

- Reduction of the beneficial species. Non-target organisms, including predators and parasites of pests, can also be affected by chemical application. The reduction of these beneficial organisms can result will change in the natural biological balances. Loses of honeybees and other pollinating insects can also be a problem.
- Drift of spray and vapour during application can cause severe damage and residues problem in crops, livestock, waterway and the general environment. Care in the methods of application and the weather conditions under which it is carry out can reduce drift. Environmental pollution from careless application and round up can result in wildlife and fish loses. This should be concern for all of us.
- Residues in food for human and feed for livestock can be consequence of direct application of a chemical to be food source, by the presence of pollutant in the environment or by transfer and biomagnifications of the chemical along a food chain. Not all residues are undesirable although good agricultural practice most be observed to prevent unnecessary and excessive level of residues.
- Ground water contamination by leached chemical can occur in high use area if persistent products are used.
- Resistance to the pesticide used can develop in target pests due to overuse and incorrect use of chemical.
- Poisoning hazards and other health effects to operators can occur through excessive exposure if safe handling procedures are not followed and protective

clothing not worn. Poisoning risks depend on dose, toxicity, duration of exposure and sensitivity.

- Other possible health effect due to indiscriminate use of farm chemical also concern many people in the community.

Problems result from misuse, abuse and overuse. Farm chemical can be used safely and effectively without these undesirable effects although there is always a risk associated with any activity. Many commonly used substances like aspirin or common sand are more toxic than many pesticides. Despite the relative risks being low, all users of farm chemical whether on a large scale or in the home have a responsibility to use them correctly.

MATERIAL AND METHOD

Dass Local Government Area has a land mass of 456,737 square kilometers of 0.69 of the state and a population of about 115,000 people according to 2006 census, is located in south-west of Bauchi state and it is about 52 kilometers from Bauchi, the state capital. It is located between longitude $9^{\circ} 13' 49''$ and $9^{\circ} 30' 49''$ and latitude $10^{\circ} 00' 28''$ (Ayuba 2008). It is bounded in the south by Tafawa Balewa Local Government. On the north by Bauchi Local Government and west by Toro Local Government (Ayuba 2008). The area is characterized by two distinct seasons, the wet and dry season. The wet season starts in mid May and ends around early October, and dry season which normally spans between October and April. The season is the period when tropical maritime air mass travels northwards over the study area from the Guinea progressively dropping its moisture in form of precipitation; consequently rain fall diminishes from south to north (Ayuba 2008). The mean annual rain fall of the study area is about 1015mm, while the dry season is characterized by arid wind or tropical continental air mass originated from Sahara desert (Ayuba 2008). The three study communities are Tak-kwanshinge, Tak-bundili and Dhurza Villages. The two villages are located south-west from Dass town and approximately about 2.5 kilometers (2.5km) Tak-kwatshinge and Tak-bunduli, while Dorza village is about 5km distance from Dass town. The two villages separated from each other by the main river in the town that is river Kamal (Ayuba 2008). The two villages played a vital role in the production of agricultural products in the town both raining and dry season (irrigation) in crop production because of the presence of the river and natural endowment of the fertile soil in the areas. While the Dorza village is situated between Tak-bundili and Garam village, in this village only raining season crop production takes place due to the absence of river in the area irrigation activities does not take place due to the absence of flowing water (river). Ayuba, 2008. The principal occupation of the area is farming and petty trading. The various agricultural crops cultivated in the area include Rice, Maize, Ground nut, Guinea corn, Millet, Beans, Soya beans, poultry, Sheep and Goat and Cattle rearing which is mostly done by Fulani Nomads and few farmers (Ayuba 2008).

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FARMER AT WORK IN THE STUDY AREA



HOW FARMERS ARE DILUTING PESTICIDE IN THE STUDY AREA



RESULT AND DISCUSSION

FARM SIZE DISTRIBUTION

Farm size has an important role in describing the types of agricultural operation that is taking place in the study area. Distribution of the respondent base on farm size, shown than 1 to 2 hectare of farm size has a 45% follow by less than one hectare 30% and 3-5 hectares 25%. This shown than most of the farmers in areas produce subsistence level due the nature of their farm size.

Table: Farm Size Distribution

Farm size	No. of respondent	Percentage
Less than 1 ha	45	45%
1-2 ha	30	30%
3-5 ha	25	25%
Total	100	100%

Source field survey 2014

PRIMARY OCCUPATION DISTRIBUTION

Primary occupation will clearly explain that whether the selected areas are deserve to carry the study or not. The distribution of the respondent base on primary occupation showing that, the primary occupation areas is 90% are farmers followed by 4% civil servant, 3% business and 3% others.

Table: Primary Occupation Distribution

Primary occupation	No. of respondent	Percentage
Farming	90	90%
Business	3	3%
Civil servant	4	4%
Other	3	3%
Total		100%

Source field survey 2014

TYPES OF CROP DISTRIBUTION

The type crops produce in any given area determine by some of the following factors, e.g. climatic factors such as rainfall, temperature soil Fertility or nature of the soil, sun shine, humidity etc. The type of crops cultivated in the area indicate either for commercial farming e.g. legumes such groundnut, bean, and soyabean or for consumption like cereal like maize guinea lorn, millet, rice etc. the distribution of the respondent base on types of crops shown that both cereal legume and vegetable has a 74% follow by cereal only 21% legumes 3% and vegetable 2% while other 0%.

Table: Distribution of Crops

Crop distribution	No. of respondent	Percentage
Cereal	21	21%
Legumes	3	3%
Vegetables	2	2%
Both vegetable, cereal and legumes	74	74%
Other	0	0%
Total	100	100%

SOURCE OF FARM INPUT DISTRIBUTION

The source of farm input will indicate whether the farmers are getting assistance from government or not. The result shows that the distribution of respondent farmers 72% get their farm input from market and 20% from government/market while other 8%. This Clearly showed that government are giving minimum concern towards agricultural development in the country.

Table: Source of Farm Input Distribution

Sources of farm input	No. of respondent	Percentage
Market	72	72%
Government	0	0%
Government/market	20	20%
Other	8	8%
Total	100	100%

Source field survey 2014

LONG TIME FARMING PRACTICE DISTRIBUTION

This shown the long time farming operating engage by a farmer probably indicate the specialization of the farmers due to long time practicing in the system. Respondent shown that 63% practicing farming over 10 years 7-9 years long time distribution 15% and 1-3 years 5%.

Table: Long Time Distribution of Farming Practice

Time taken for practicing farming activities	No. of respondent	Percentage
Over 10 years	63	63%
7-9 years	17	17%
4-6 years	15	15%
1-3 years	05	05%
Total	100	100%

Source field survey 2014

FARMERS THAT ARE USING PESTICIDE IN FARMING DISTRIBUTION

This table clearly indicate the perception of farmers in using pesticide, the acceptance level of farmer in adopting using of pesticide (herbicide and insecticide) during crop production due some certain advantages of pesticide in controlling weed, pest and diseases in crop production as cost effective than other method, free pest and disease crop produce and also less time it required that other method. The result from respondent shown that 97% farmers are using pesticide in their farm while only 3% farmers that are not using pesticide in their farm.

Table: Farmers That Using Pesticide in farming Distribution

Farmer that are using pesticide or not during crop production	No. of respondent	Percentage
Farmers that are using pesticide	97	97%
Farmers that are using pesticide	3	3%
Total	100	100%

Source field survey 2014

LONG TIME THAT FARMER USED PESTICIDE DISTRIBUTION

The result from respondent has shown that about 40% farmers used pesticide between 7-9 years, 23% 4-6years while 7% percent and above 10 years 7%. The longer time that you used the pesticide the more perfect you will be.

Table 17: Showing Time Spend That Farmer Used Pesticide Distribution

Time spend	No. of respondent	Percentage
Above 10 years	7	7%
7-9 years	40	40%
4-6 years	23	23%
1-3 years	27	27%
Not use pesticide	3	3%
Total	100	100%

Sources field survey 2014

FARMERS THAT CAN READ PESTICIDE LABEL OR NOT DISTRIBUTION

Literate farmer have found to be use pesticide base on the prescription on the manufacture which will be less risk and achieving good result on the handling of pesticide. The result shows that majority of farmer can not read understand the instruction and precaution governing the use of pesticide, and about 75% farmers can not read pesticide label while only 25 percent can read the label.

Table: Farmers that can Read and those that can Not Write the Pesticide Label.

Farmer ability on pesticide label	No. of respondent	Percentage
Farmers that can read pesticide label	75	75%
Farmers that can not read pesticide label	25	25%
Total	100	100%

Source field survey 2014

TYPE OF SPRAYER DISTRIBUTION

The type sprayer using in applying pesticide is very important because the type of sprayer is associated with level of exposure to pesticide by famers e.g. when there are using it. Using handy sprayer the operator has less exposure to pesticide farm because the nozzles is at the back of operator but when you are using knapsack sprayer the nozzle is at the front of the operator which high level of exposure to pesticide farm. And known the popular sprayer is knapsack sprayer because of some certain advantages associated with it, such accuracy, economically and less time is required. The respondent shows 75% are using knapsack sprayer, 18% handy sprayer and 7% other.

Table: Type of Sprayer Distribution

Type of sprayer	No. of respondent	Percentage
Knapsack	75	75%
Handy sprayer	18	18%
Other	7	7%
Total	100	100%

Sources field survey 2014

PRECAUTION MEASURES WHEN USING PESTICIDE DISTRIBUTION

The respondent shows that only 25% are used face mask while spraying pesticide 1% used overall cloth, 4% used rain butt farmer that used all of the above are 15% and about 42 are not using any types precaution measures. Which clearly indicate that illiteracy is the reason that make farmer ignoring the precaution measures.

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Table: Precaution Measures Distribution

Nature of precaution used	No. of respondent	Percentage
Mask	35	35%
Overall cloth	1	1%
Rain butt	4	4%
All of the above	15	15%
Non of the above	42	42%
Farmer that are non used pesticide	3	3
Total	100	100

Source field survey 2014

Farmer idea on effect of pesticide in environment or human health distribution both literate and illiterate farmer agree that pesticide has adverse effect on the health. The result shows that 98% has no idea on the effect of pesticide but still used empty containers of pesticide to collect water or other purpose but 2% respondent does not have an idea of the effect pesticide.

Table: Shows Effect of Pesticide Distribution.

Showing idea on effect of pesticide	No of respondent	Percentage
Farmers with an idea	98	98%
Farmers with not an idea	02	02%
Total	100	100%

Sources field survey 2014

PROBLEMS ENCOUNTER BY FARMERS DISTRIBUTION

The result shows that only few farmers encounter problems associated with the spraying of pesticide. Only 9% facing problems while 91% of respondent are free from associated with pesticide as shown in table.

Table: Showing Farmers Encounter Problems Distribution

Farmer encounter and those that did not encounter problems	No. of respondent	Percentage
Farmer encounter problems	09	09%
Farmers that are from problems	91	91%
Total	100	100%

Sources field survey 2014

NATURE PROBLEMS ENCOUNTERING DISTRIBUTION

The result shows that about 4% of respondent farmers facing stomach up set, 3% out of caution and 2% facing rooming while 91% farmer are free these problems.

Table: Nature of the Problems Distribution

Nature of the problems	No. of respondent	Percentage
Stomach up set	04	04%
Out of caution	03	03%
Vomiting	02	02%
Total	09	09%

Sources field survey

Ways the Farmer Solved the Problem Distribution

The respondent result from farmers shows that all the 9 problems are solved in houses while hospital and other are not attained.

Table: Way the Farmers Solved Problems Distribution

Ways of solving the problem	No. of respondent	Percentage
Hospital	0	0%
House care	09	09%
Other	0	0%
Total	09	09%

Sources field survey 2014

Farmer That Acquired Training and Those That Did Not Acquire Training Distribution

The result of respondent farmers shows that majority of the farmers did not acquired training, and the rise of pesticide required technical knowhow since from selection of the chemical, dose, application procedure and precaution measure to be taken base on the manufacture instruction. 77% of the respondent farmers lacking training while only 23 have get training.

Table: Show Farmers with Training and with not Training Distribution

Nature of the farmer training	No. of respondent	percentage
Farmers without training	77	77%
Farmers with training	23	23%
Total	100	100%

Source field survey 2014

Farmer's perception for need of training distribution result shows that all the farmers are need of training because of the importance of training to them, which make them use handy pesticide easily and safely.

Table: Farmers Need for Training or Not Description

Farmers need for training or not	No. of respondent	Percentage
Need for training	100	100%
No need for training	0	0%
Total	100	100%

Source field survey 2014

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Type of Pesticide Used In the Farm Distribution

The result from respondent shows that many farmers used both herbicide and insecticide because they produce both cereal, legumes and vegetable which frequent applying of insecticide in order to get quality products. Number of respondent to both herbicide and insecticide are 93%, herbicide only 2% and insecticide 2%.

Table: Type of Pesticide Used by Farmers Distribution

Type of pesticide used in farm	No of respondent	Percentage
Both herbicide and insecticide	93	93%
Herbicide only	2	2%
Insecticide	2	2%
Other	0	0%
Total	97	97%

Source field survey 2014

NUMBER OF TIMES THAT FARMERS USED PESTICIDE DISTRIBUTION

The result indicates that most of the farmers used pesticide more that one times i.e. pre- emergency and post-emergency herbicides due to it advantages. Result shows 2-3 times 62%, 1-2 times 25 and 3-4 times is 10% this mostly is insecticide for beans and vegetables which required frequent application.

Table: Time that farmers used pesticide distribution

Number of times used pesticides	No. of respondent	Percentage
2-3 Times	62	62%
1-2 Times	25	25%
3-4 Tines	10	10%
TOTAL	97	97%

Source field survey 2014

Alternative Than Can Substitutes or Not Substituted Pesticide Distribution

Alternative than can substitute pesticide if any distribution result has shown most of the farmers appreciate the used of pesticide that cannot be substitutes with any method of pest control according to them, because of it advantages. About 96% respondents have not substitutes while only 4% accepting the alternative.

Table: Alternative Than Can Substitutes or Not Substituted Pesticide Distribution

Substitutes and not substitute	No. of respondent	Percentage
Not substitute	96	96%
Substitute	4	4%
Total	100	100%

Source field survey 2014

Alternative than can Substitute of Chemical Pesticide Distribution

The result shows that only 4% respondent seen that pesticide can substitutes by cultural practice (manual weeding) while 96% not agree that the chemical pesticide can substitute by any methods.

Table: Pesticide Substitutes Alternative Distribution

Type of alternative	No of respondent	Percentage
Chemical pesticide	96	96%
Cultural practice (manual weeding)	4	4%
Total	100	100%

CONCLUSION AND RECOMMENDATIONS

The research confirmed the mis-use of pesticide and lack of taking precautionary measures in handling and application of the pesticide by farmers in the study area because there are illiterate and lack the requisite knowledge on how to handle and use the pesticide in crop production. Therefore, government should sent their extension workers to the area to enlighten the farmers at area on how to handle and apply the pesticide on their farmlands for the purpose of controlling weed, pest and other diseases, as well as precautionary measures to be taken in the course of using the pesticide for attainment of food security and prevention of any medical complication as a result of pesticide poisoning in the area. Finally farmer should be encourage by the extension workers to be using spot application of pesticide than broad application and also to be using less persistence pesticide in order to degrade quickly in the environment.

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Biographical Note

Adamu, Sani Jauro is a Lecturer at Geography Department, Gombe State University and; he went to Ibrahim Bako Primary School Bauchi and did his secondary education at Gombe Science Secondary School respectively. Thereafter, he proceeded to Abubakar Tafawa Balewa University Bauchi for his B.Tech. in Environmental Management Technology and graduated in the year 2008. In his pursuit of academic excellence, he has also finished his M.Sc. In Geography with specialization in Land Resources Development) at Bayero University Kano, Geography Department.

Muhammad Haruna he was born in the eighties at Dass, Bauchi State and he went to Abubakar Tafawa Balewa University where he obtained his B.Tech in Environmental Management Technology.

Mahmoud Aisha Babayo, She was born in the nineties and she went to Gombe State University where she is currently a final year student at the Department of Biological Sciences.
