

# Agrochemicals Usage in A Tropical Mid-Altitude Areas of JOS Plateau, Nigeria

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**Abstract:** *Application of agrochemicals on the Jos Plateau has become very necessary due to diminishing availability of labour and the desire of farmers to synchronize farm operations for maximum production. This study was carried out to investigate the problems that led to some mishaps in the application of the agrochemicals. The findings revealed that 26% of the agrochemical products sold to farmers are inadequately packaged and that about 29% the labels on these packages were not very legible. The result also indicated that 22% of the information read from the labels was not helpful in equipping the farmers for adequate agrochemical application.*

## 1. Introduction

Crop production in tropical agriculture, perhaps more than any other agricultural enterprise, requires very extensive manual labour for field/cultural activities most especially when the need to time these farm cultural operations fairly precisely remains an absolute necessity to ensure meaningful output (crop yields).

The need to apply agrochemicals for crop production and for agriculture generally has become very necessary not only to circumvent high cost of and scarcity of available farmlabour but to synchronize and time field operations in order to ensure maximum productivity. These reasons may be responsible for the ever increasing demand for and usage of agro-chemicals, at least in Nigeria. The apparent rise in the volume of chemical usage has attendant drawbacks like detrimental environmental impacts (Jeong and Foster, 2003; Griffins and Malburg, 2012), severe and or chronic health problems (Atreya, 2008; Bhandari, 2014) and great dependence on imported chemicals with far reaching economic implications. It is generally believed that the recent shift in agricultural production most especially crop production to accommodate extensive usage of agrochemicals will pose these very serious challenges and others that may not have been assessed adequately.

The Jos- Plateau is a tropical mid-altitude location covering about 700 KM<sup>2</sup> with the following co-ordinates [ 9<sup>0</sup>,33<sup>1</sup>N-9,088<sup>1</sup>N; 8<sup>0</sup>,61<sup>1</sup>-9<sup>0</sup>.18<sup>1</sup>E] situated about 1500M above Sea Level. The area can sustain the production of both tropical and some temperate crops because of heavy rainfall and moderate temperature that are favorable for the cultivation of Potato (*Solanum tuberosum*), Wheat (*Triticum aestivum*) and Barley (*Hordeum vulgare*), as well as a wide range of temperate vegetables and fruits such as celery, radish, strawberries, cauliflowers as well as apples, grapes. These moderate climatic conditions have attracted a lot of animal nomads from all over West Africa, a major factor that led to the establishment of the National Institute For Veterinary Research (NVRI) located in K-Vom (09<sup>0</sup>, 44<sup>1</sup>N and 08;45<sup>1</sup>E).

In recent times, there has been indiscriminate introduction of some of these temperate crop varieties without adequate quarantine, appropriate seed certification procedure and adhering to necessary bio-safety measures. This has partly

been blamed for the upsurge in some crop pests and diseases as exemplified by the recent upsurge in potato blight epidemic recorded on the Jos Plateau (Chuwang, 2014). In order to control these pests, diseases and weeds, the farmers are compelled to use all sorts of agro-chemicals with varying degrees of success and most importantly, unquantifiable levels of impact to the environment. It has also been fully documented that synthetic chemicals used for agriculture have deleterious impacts on ground and surface water, composition of atmospheric gases, soil properties, responses of organisms to stimuli etc (Bhanbari, 2014; Gregg, 2015)

There had been an increase in the reported cases/incidences of food poisoning from consuming farm produce such as cowpea and grains as well as fruits and vegetables that had been preserved with chemical substances (Anon, 2013, Adejumo et al, 2014; Anon, 2015). The consumption of other farm produce is similarly likely to pose danger to consumers if the issues of inappropriate agrochemical usage is not addressed.

The object of this paper is to provide some information on the level and scope of agro-chemical usage for agricultural production in the Jos area. It is also hoped that this information will provide a basis for making sound decisions on the problem at hand.

## 2. Methodology

The field assessment of the farming system(s) of the study area was carried out through oral/written interviews where questionnaires were administered to 10 respondents in 10 selected locations namely Barkin-ladi, Bokkos, Heipang, K-Vom, Vwang, Gassa, Mangu, Kerang, Ampang-West and Gindiri. Most of these areas are located on the higher plains of the Jos Plateau, North Central Nigeria.

Information was collected from personal aspects (biodata) of the farmer's life, duration of farming experience and agrochemical (types, forms, availability supply outlets, mode of usage, reliability, effectiveness, problems etc). Other information was obtained from perceived environmental impact indices, frequency of usage, packaging, labeling and the reliability of all the packages and the composition of the active ingredients of the chemicals.

The data collected was analyzed statically using the simple percentage technique and the deductions and conclusions asserted in this study were based on the outcome of this analysis.

### 3. Results/Discussion

#### Farmer's Background

The age distribution of the respondents in the area of study is as contained in Fig 1. The majority of the farmers were mainly old people (over 40 years). The farmers that were less than 20 years made up only 6% of the population which may due to the fact that these people were still in school and do not have access to land for crop production. The older people on the other hand have access to and own land for farming.

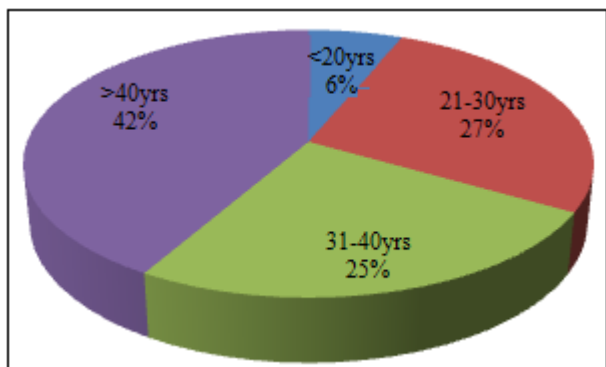


Figure 1: Age distribution of farmers on the Jos Plateau, 2015

The distribution of respondents by sex shows that 62% of them are male while 38% are female. This observation tends to agree with the global/regional figures that reveals a X:Y ratio of male to female involvement in Agriculture. Out of these, a majority were married (67%) and 23% were not. The rest were either divorced, widows or widowers (Fig 2)

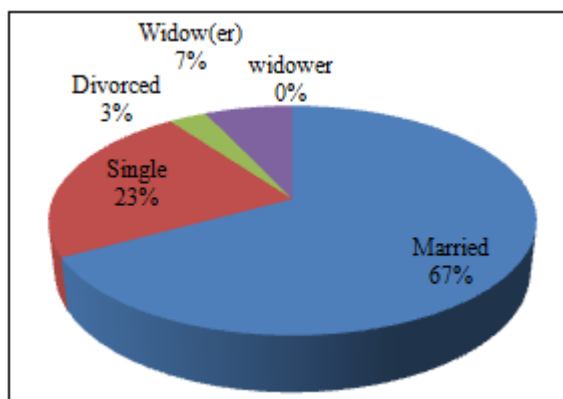


Figure 2: Marital orientation of farmers on the Jos Plateau, 2015

#### Farming Experience

The data on the experience of the farmers and the scope of involvement like farm size are in Fig 3.

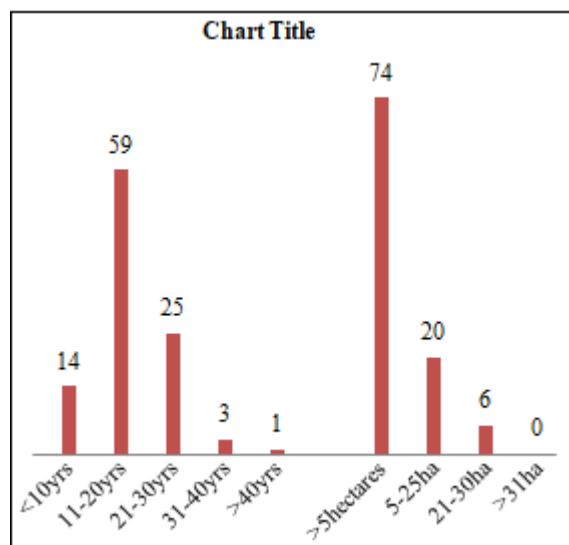


Figure 3: Duration of farming experience (years) and farm size (ha) of farmers on the Jos Plateau, 2015

From the Fig, it can be observed that the largest group of the farmers in Jos Plateau had been in the business of crop production for between 11 and 20 years. The next most populated category were those that had been involved for between 21 and 30 years. The group having the oldest farmers over 40 years farming experience seem to be fast disappearing considering the very small figure recorded. Going by the farm size, it can be deduced that most of the farmers on the Jos Plateau are small scaled farmers because most (74%) of them operate/cultivate less than 5 hectares.

#### Farming Systems

The farming system as it relates to agrochemical usage is presented in Fig 4. Evidently most of the chemicals used are associated with the traditional cereal, legumes and roots/tuber crops.

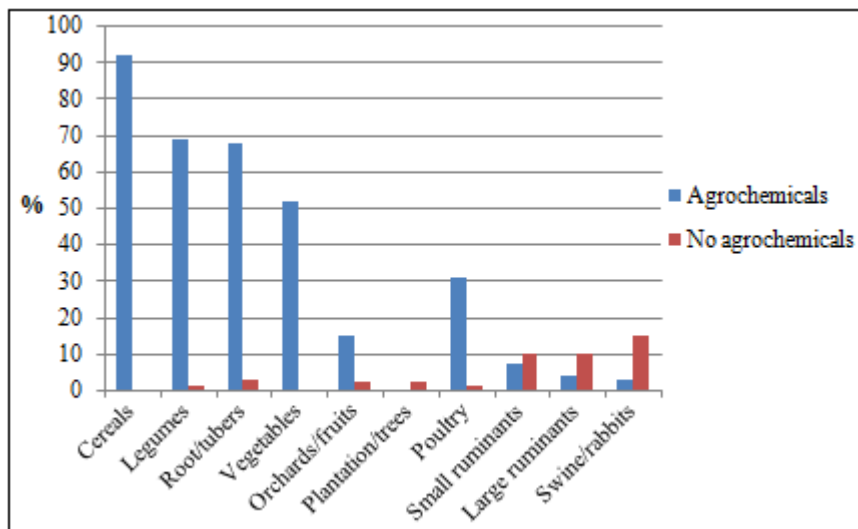


Figure 5: Farming system of the Jos Plateau as it relates to Agrochemical usage, 2015

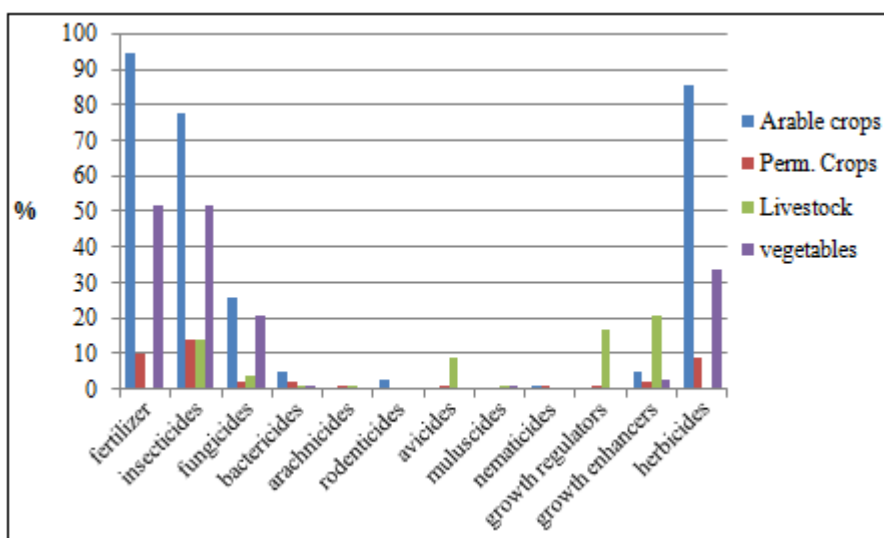


Figure 6: Types of agrochemicals used and the types of crops on the Jos Plateau

Figs 5 and 6 describe the farming system and the types of chemicals used and on what crops or livestock. The intensity of usage is higher for crops, most especially, cereals, legumes, roots/tubers (mainly Irish potato) and vegetables production. The chemicals mostly applied are fertilizers, herbicides and insecticides and on a less extensive scale, the farmers apply fungicides, avicides etc. The reasons for this include the need to replenish the fast rate of soil fertility degradation due to continuous cropping occasioned by increased population pressure on the land. Application of insecticides and herbicides are very necessary in order to control insect pests and curb the detrimental effects of weeds on crops. Uncontrolled weeds can lead to significant crop lost while the labour required for manual weed control can amount to very considerable crop production cost (Isaac,

2019). Crops like vegetables, fruits and potato normally attract a lot of diseases and pests hence the need to apply insecticides and fungicides for their control

**The availability and reliability of the sources of Agrochemical used on the Jos Plateau.**

The chemicals used for farming everywhere in the world are specialized products manufactured by agrochemical companies that have specific channels of delivery to the farmers. In this segment, we assessed the sources of the agrochemicals, their availability and reliability of these delivery channels. The information is captured in Figs 6 and 7. Fig 6 shows that the most available of all the chemicals seem to be fertilizers, insecticides and herbicides and to a less extent fungicides.

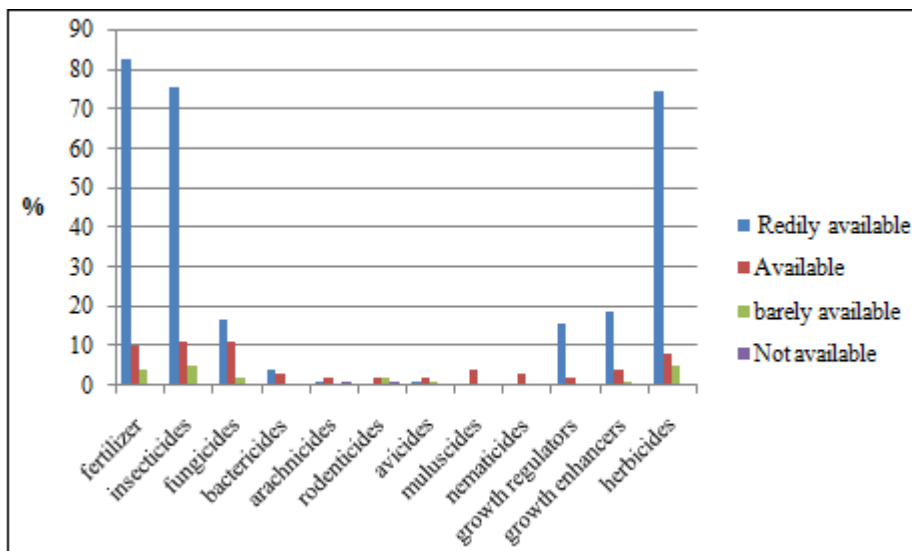
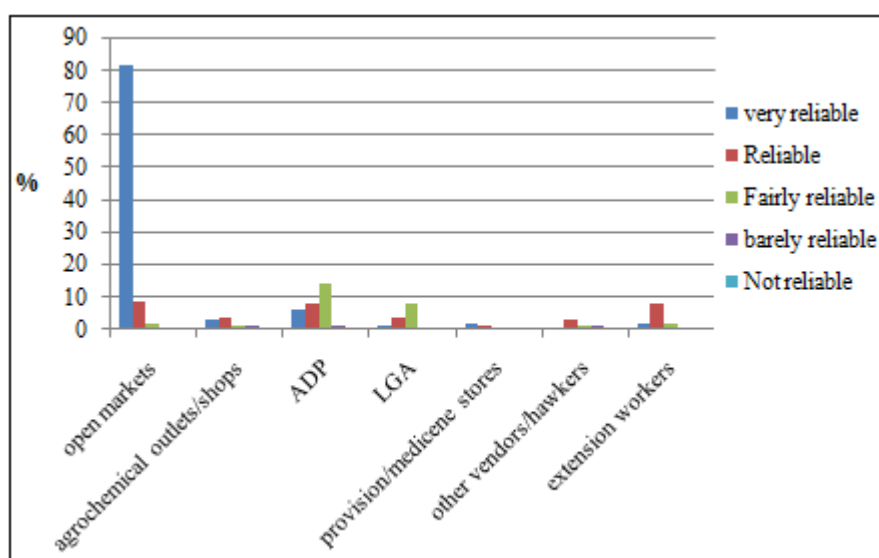


Figure 7: Availability of agrochemicals on the Jos Plateau, 2015



ADP= Agricultural Development programme  
LGA= Local Govt. Area

Figure 8: Reliability of the sources of agrochemicals on the Jos Plateau, 2015

From the data analyzed it appears that the most reliable source of supply of agrochemicals is the open markets as most of the farmers obtain their chemicals from that source. In the open village and township markets the chemicals are sold without due process, code of ethics and regulations because they are handled like any other market wares and goods. The chemicals are not properly stored and their handling lives much to be desired as a result the efficacy of the chemicals could have been seriously compromised.

#### 4. Conclusion

This study showed the Jos Plateau farmers to be mostly older, married people that had been farming for more than 20years. In view of their age and the need to carry out major farm operations like weed controls, pests and disease control, storage and preservation, they are increasingly compelled to use agrochemicals to help them carry out these farm operations. They use these chemicals on crops like cereals, legumes, vegetables and potato but their most reliable supply route is through the open village/town

markets. The absence of basic regulatory measures to prevent and control any accidents or unwanted occurrences is a major source of concern.

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