

African Multidisciplinary Journal of Development (AMJD)

AN ASSESSMENT OF THE ACCESS TO HERBICIDE AMONG SMALLHOLDER FARMERS IN BEBEJI LOCAL GOVERNMENT AREA OF KANO STATE

Tijjani Bukar-Lawan

Department of Geography, Yobe State University,

P.M.B 1144 Damaturu, Nigeria

E-mail: tijjanibl@ysu.edu.ng

Phone: +2348036192755

Abstract

The study assesses the access of herbicide among smallholder farmers in Bebeji Local Government area, Kano state. The advancement in technology in past and present years lead to improvement in weed control. Moreover, the introduction of chemical herbicides is slowly weeping out the traditional method of managing weeds that improves agricultural productions which make farmers cultivate several hectares of farmland, but farmers were facing challenges in accessing the farm inputs. The study focused on primary data collection method in other to have clear information of the challenges farmers are facing in the process of accessing herbicides in the study area. The findings of the study show that 95% of the formers access their herbicides from commercial sellers and open markets. 55% and 33% of farmers were satisfied with the availability of herbicide in the study area. The study found that 96% of the farmers disclosed that lack of adequate funds is the major problem farmers have in accessing herbicides in the study area, as majority of the smallholder farmers are low incoming earners. 63% of the farmers use pre-emergent herbicides, 22% of the farmers use both pre-emergent and post-emergent herbicides and 15% of the farmers use post-emergent only. The research carried out has clearly presented the current situation of smallholder farmers in accessing herbicide in the chosen study area. Smallholder farmers in the area have been experiencing difficulties in purchasing herbicide. The research clearly indicated that Government and non-Governmental organisations were not providing herbicides at designated time which give chance for marketers to sell herbicide at higher price. There is need for the government to intervene and come to the aide of the farmer's as to make farm inputs available and sufficient in the study area. As Nigerian agriculture is growing and becoming competitive in the continent providing farm inputs among smallholder's farmers in the study area will be of great benefits. Committee should be set in all necessary areas as to reach out people with all interventions given by government and none governmental organization.

Keywords: herbicides, smallholder, farmers, and utilisation.

1. Introduction

For over a decade, it has been noted that rural farmers rely on native knowledge and traditional approaches (manual weeding, crop rotation etc.) to eliminate weeds and develop farming system. Such native or local experience refers to the skills and knowledge obtained from local teaching and practice in the past generations (Kellog et al. 2000). Achievement of such basic abilities by our rural farmers has not assists in developing agricultural harvest. As result of the system adopted the rural farmers, decrease in farm product, animal diseases, weed that are resistant and outdated farm inputs etc. were all the challenges observe due to lack of access to farm inputs (Obidiki, 2011). The advancement in technology in past and present years leads to improvement in weed control. However, the introduction of chemical herbicides is slowly weeping out the traditional method of managing weeds that improves agricultural productions which make farmers cultivate several hectares of farmland, but farmers were facing challenges in accessing the farm inputs (Obidiki, 2011).

The word Herbicides is derived from the Latin word herb meaning plant “bi” meaning life and “cide” kill or killer (Land of potters, 2010). According to the environmental protection agency EPA (2007) herbicides is defined as a chemical substances or combination of elements mainly made to eliminating un-wanted plants which can be applied or spray on a target plant or by using different method to apply. Research has shown that weeds have consistently been one of the major restricting factors that red uce the capacity to cultivate as much food as required for the growing populace of the world with the intention of eliminating hunger and starvation, as weeds are accountable for the downfall of more than 14% of world harvest (Sonia and Marcelo, 2011).Moreover, Sonia and Marcelo (2011) further revealed that the utilization of herbicide is the easiest way of controlling weed and is the less expensive techniques that give chance to most profitable crops to grow without constraint.

There are many different herbicides commercially on sale, and there is need to have good information about their effectiveness and ingredients this will minimise problems encountered when buying the herbicides. Mamun et al. (2011) form important classification based on (a) Application time (b) the category of weed to be controlled, and (c) Whether the influence is mainly through the leaf or root. Nevertheless, Mamun et al. (2011) also gave another classification that herbicides can be categorised in different ways depending on how or where can be use and its effectiveness in or on the plants. Herbicides can be either plant applied or soil applied and it can be selective and non-selective. Some herbicides can be effective either on plant or soil applied. Whether herbicide is selective or non-selective it relies on many reasons such as the crop or weeds existing, time of application and degree of application. However, Mallory-smith and Retzinger (2003) also give different suggestions that herbicides classification is depending on location action. The classification framework was established with the thought that if the location of herbicide application will be accessible, recommendations for herbicides resistance management would be simpler. However, this publication was reviewed in 2013 by the writers where it was revealed that herbicides with similar location action were given a group number. The International Herbicide Resistance Action (HRAC) published similar classification structure, which used alphabet in the position of figures for a group designation. According

to Rao (2006) the categorisation of herbicides depends on the techniques of application, chemical effectiveness, component similarity and nature of the action. Moreover, herbicides use is decided by; time, weed classes, germination period, weed and crop floras, and plants development level and herbicides are mostly in a form of liquid sprays applying with ground apparatus that differ in design best on the area to be sprayed. While Qasem (2012) considers his classification for various reasons these are; selectivity (eliminate or inhibit weeds and do not damage the harvest beyond the stage of economic regaining), action (eliminate plant portions that become in touch with) and techniques of application. Therefore, for this reason herbicides are categorised into three (3) forms based on its effectiveness, the effect of herbicides is associated with the impact of the chemical on development of weeds or crop, effective herbicide prevents or stops the germination and development processes of the weeds. The classifications are as follows:

1. Pre-planting herbicides: This type of herbicides is usually sprayed on top of the soil as the first process before the plantation took place. The herbicides are mixed into the soil as pre-plant treatment. This herbicide is applied in an area where the seeds of the weed grow without reliant on rainfall. Herbicide that has strong toxicity on the developing crop seedlings are sprayed onto the soil before plantation of the crop (Qasem, 2012).
2. Pre-emergence herbicide: This type of herbicide is mainly applied on top of the soil or surface of the soil at developmental stage of plant or weeds by avoiding the main enzymes. The herbicides are usually transported or sink into the soil by rainfall or irrigation water deep down to the soil (EPA, 2007).
3. Post-emergence herbicide: This type of herbicide is sprayed after the weeds have grown. The herbicides are mainly applied two weeks after the plant or weeds have developed. The herbicides can be selective or non-selective, where selective herbicides are purposely made to act on a particular plant species or pest (EPA, 2007).

Nevertheless, the selectivity of herbicides is a process to eliminate target plant species among diverse plant without harming other plants in the surrounding. This shows that there are different types of herbicides available that farmers can get access to depending on the nature of the weeds and pest intend to eliminate on farm or by farmers.

Herbicides utilisation was introduced in Nigeria through agricultural reforms of 1970's with immediate creation of the River Basin Development Authority (RBDA) and Agricultural Development Projects (ADPs) in order to reinforce the process of herbicides use and its implementation Trigonix (2014). According to Kolo and Amusa (2008) herbicides utilisation by Nigerian farmers is becoming more satisfactory and is on it improving stage. Iyagba (2013) further revealed that approximately 80% of the global herbicides production are utilised in developed nations while only 20% is been used in developing nations including Nigeria. Jamala et al. (2013) stated that the economy of most African nations depend on agricultural product which make use of massive amount of chemicals which comprises herbicides. Since access to and utilization of the herbicides might have considerable effects on farm yields, it could be imperative for a study of such magnitude to be conducted, especially in Kano region, which is ecologically classified as semiarid. It is against this background that this study is aimed at assessing small holder farmers' access to herbicides in

Bebeji Local Government Area of Kano State. This may go a long way in exposing the farmers' challenges in accessing and utilizing the herbicides, as well as its implications on the crop yields in the study area.

2. Study area

Kano state is one among the most important area of agricultural activities in Nigeria. The agricultural system of Kano state it normally took place under rain-fed and irrigation farming which produces food and cash crops such as cowpea, millet, wheat, sorghum, maize, and various vegetable crops (Tanko, 2001). Bebeji Local Government is among Kano State Local Government areas that plays a vital role in producing such crops. Bebeji Local Government Area is located within latitude 8°16'E and longitude 11°40' N of the equator, in the southern part of Kano. It is bordered by four (4) local governments (GPS coordinates of Bebeji, Nigeria. Latitude: 11.6677 longitude: 8.2620, 2016).

3. Methodology

The study focused on quantitative methods in a form of questionnaires as this will give the researcher more responses from the participants, information will be collected using a structured questionnaire tool. However, this method of primary data collection will give a quantifiable number of information on how smallholder farmers' access herbicides in the selected study area and will also give a way of evaluating and comparing the data achieved from the study area. A total of one hundred and thirty (130) farmers were selected as sample size and distributed within 14 wards of Bebeji Local Government Area of Kano state Nigeria. According to Nwana (1981) cited in Nassa et al. (2016) to determine the proportion of respondents in a population less than 500, 50% of the population can be used as sample size. Based on the total number of registered farmers 50% of the farmers were selected to 'participate in this questionnaire survey. However, Secondary sources of information are also a significant part of the study that functions as a basis on which the study also depends on. The Secondary source in this study supports the primary sources and provides the necessary information required for this research. This includes information from past literature, journals, articles, textbooks, internet, website, and electronic material, this provided significant information on how farmers access herbicides in the study area of Bebeji Local government Kano state of Nigeria. Data from the different sources were obtained, reviewed, and then analysed and compared the raw data to form an essential finding or conclusion. In this study, all sets of data generated using questionnaires were compared and analysed using statistical techniques. The tool used in analysing the data is Microsoft Excel 2007. Data generated and analysed in this research is presented using descriptive, statistics, tables, graphs, and charts with the intention to provide a clear understanding, meaning, and interpretation of the data obtained.

4.0 Results and Discussion

Utilisation of Herbicides

Due to the increasing climatic and anthropogenic effects on farming and farm yields, some farmers have started resorting to the use of agro-chemicals to supplement the soil fertility, thereby increasing harvests. Though it is an adjustment to modern reality, the intensified use of the chemicals may have health implications. However, the use of such herbicides requires one to have some degree of know-how in order to avoid being affected by it.

Greater share of the smallholder farmers in the study area are now adopting the use of herbicides in improving soil fertility or weeding, engaging less in human labour of weeding activity. While the use of such chemicals is reducing labour cost, it is also an alternative to weeding. This is in line with a study conducted by Jackqeline (2013) which stated that herbicide utilisation can replace 80% of the labour in manual weeding by farmers. This is in line with the early findings in literature review that farmers have adopted the use of herbicide in order to eliminate weed on farm. This clearly shows that farmers in the study area have adopted use of herbicide in order to reduce labour challenges faced in weed elimination in the study area.

Availability of herbicide

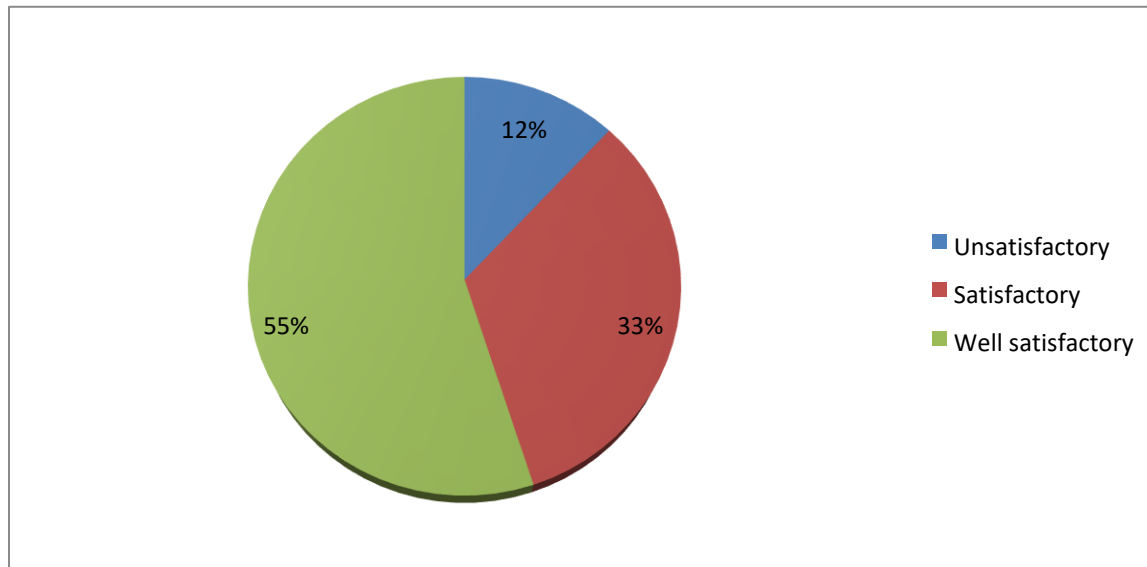


Figure: 1.1 indicating satisfaction of herbicide base on it availability

The above figure shows farmers' satisfactory level of the availability of herbicides in Bebeji local government area where the study found that the majority of the farmers 55% and 33% were satisfied with the availability of herbicide in the area. The farmer's reason for their satisfaction to the availability of herbicides is because herbicides are constantly available in the local market without any restrictions. Twelve (12) of the respondents (i.e.12%) were not satisfied with the availability of the herbicide due to the distance to travel in accessing the product, in the local market, from their residences and farms. It is evident that herbicide is available since majority of the respondents were satisfied with its availability in the study area.

Sources of herbicides.

The study revealed that the majority of the farmers buy herbicides in open market without considering the cost which is very expensive than going to government and non-governmental organisations. The farmers believe in easy accessibility of the inputs which is not so in other sources.

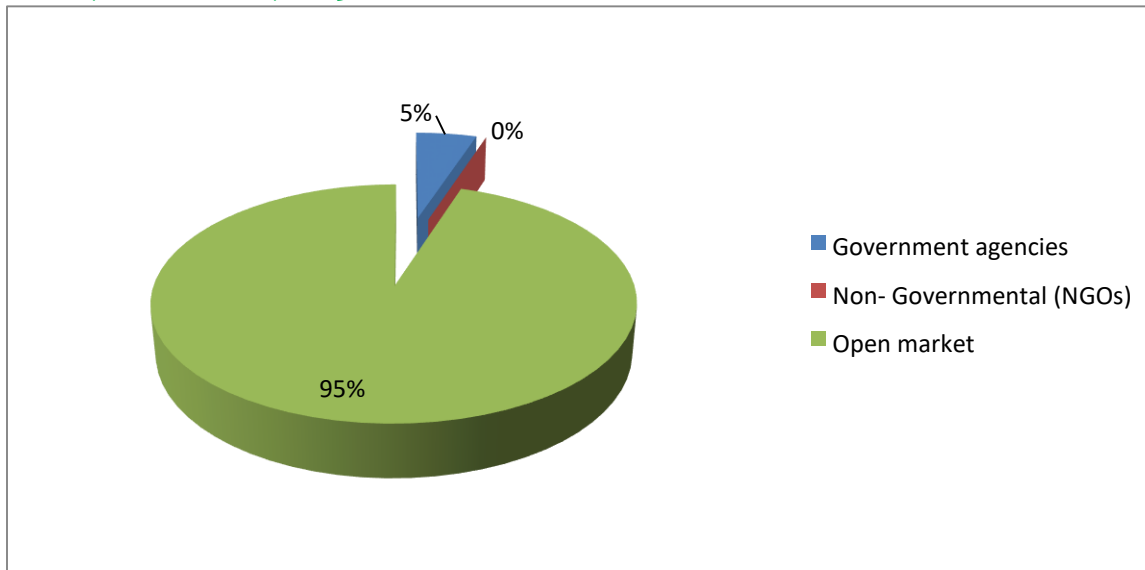


Figure: 1.2. A bar chart indicating farmers' source of herbicide

The table above shows that 95% of the formers access their herbicides from commercial sellers and open markets, 5% of the respondents buy from governmental organisations which are distributed by officials within the ministry of agriculture. Study revealed that the majority of the farmers purchases herbicides in the open market despite high price and lack of funds. The reason given by the farmers why they buy herbicide in open markets and not government or non-governmental organisations, is that government is not providing available herbicides for smallholder farmers where in some instance they only get the herbicides during rainy season from government which is also not enough and difficulties in accessing the herbicide. However, this affects the farming activities of the communities in the study area. Similarly, Imoloame (2013) found in a study conducted in Moro of Kwara State, Nigeria that the majority of rural farmers buy herbicide in open market which is similar to the situation in Bebeji Local Government area. Moreover, Mada et al. (2013) also found in a study conducted in southern Adamawa state, Nigeria that 72% of their 98 respondents buy herbicide in open market. According to Iyagba (2012) the majority of farmers in Niger State and Rivers state of Nigeria buy herbicide at open market and this increases or lead farmers to possible risk and hazards of buying expired, impure and expensive herbicide. This clearly shows that majority of farmer's purchase herbicide in a market.

Accessibility of herbicides

The study found that 96% of the farmers disclosed that lack of adequate funds is the major problem they have in accessing herbicides in the study area, as majority of the smallholder farmers are low incoming earners, this lead to difficulties in affording or purchasing enough and right herbicide for their cultivation, 4% of the farmers revealed that market location where herbicide is being sell is their main problem when accessing herbicide. Considering that the majority of the farmer are low income earners and the market location is at distance travelling to purchase herbicide will be very difficult for the farmers. This clearly shows that the farmers are facing challenges in accessing herbicide for their farming activities as it is early mentioned that the majority of the farmers purchase herbicide in an open market which believes to be

expensive and further revealed that lack of money is their major challenge. A similarly Okwoche (2011) found in a study conducted in Makurdi Benue State, Nigeria that the incomes of rural farmers is very low that is lack of adequate funds to purchase herbicides, and 30% of their 105 famers in the study area also complained on cost of herbicide in market. However, Aminu et al. (2014) found in a study conducted in Kwara State, Nigeria that 62% of the respondents are having difficulties in accessing herbicide due lack of agro-chemical dealers in the area. This is a clear indication that smallholder farmers in rural area are facing challenges of accessing herbicide.

Type of Herbicides used

The findings of this study also found that the use of herbicides varies among the farmers as majority of the farmers use herbicides base on its effectiveness experienced and it functions noticed in years of application. Majority of the respondents use pre-emergent herbicide which stops the development of weeds seeds at early stage, while others used post-emergent herbicides which are usually use after plant has grown and this herbicide can be selective or non -selective as mentioned early in literature review.

Graph below indicating type of herbicide used by smallholder farmers

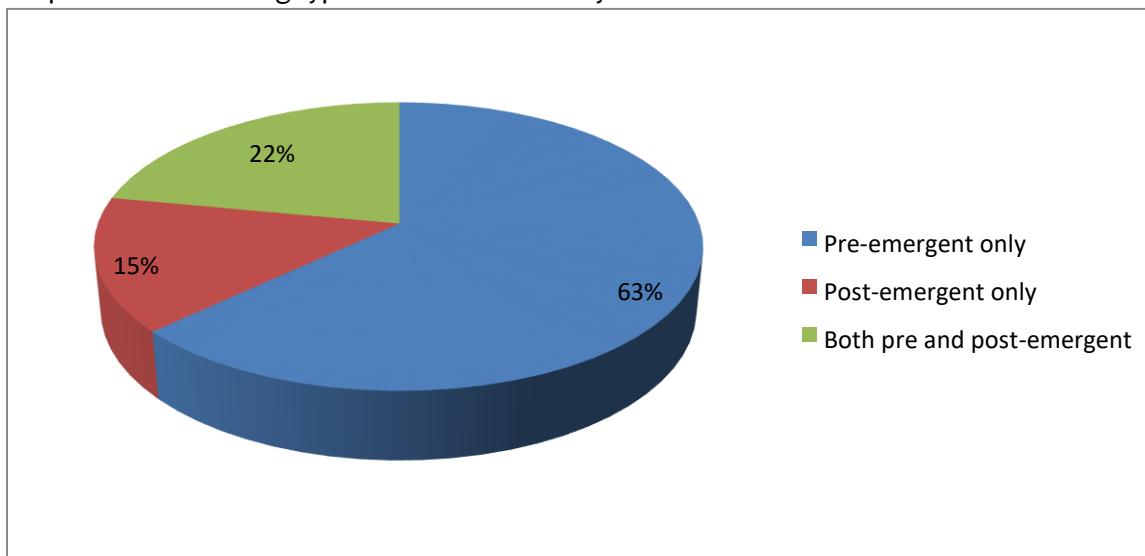


Figure: 1.3 a pie chart indicating types of herbicides use by the respondents

The above figure indicates that 63% of the farmers use pre-emergent herbicides, 22% of the farmers use both pre-emergent and post-emergent herbicides and 15% of the farmers use post-emergent only. The author finds out why pre-emergent herbicide are mostly use in the study area, the response is that they intended to monitor weeds before it develop and cost of monitoring at that stage is minimal compare to other type of herbicide. The farmers also believe, based on their experience, pre-emergent herbicides have less effect on crop if use properly. However, pre-emergent can affects the soil environment as small mistake in gauging amount of herbicide can result to huge problem, as previously discussed that majority of the farmers have less experience of using herbicide in the study area, this can also be related to absence of reliable information on herbicide to be used as they use it base on the action they have seen. Aminu et al.

(2014) found in a study conducted in Idofian, Ifelodun Local Government area of Kwara state that 81% of their 100 respondents use pre-emergent herbicide. While Imoloame (2013) found in a study conducted in Moro local Government of Kwara state, Nigeria that the majority of rural farmers in the area often used post-emergent herbicide than other herbicide, this is because their cultivation is more of tuber and root crops. This is an indication that smallholder farmers in the study area used pre-emergent more than any other herbicide which could have more effects to the soil environment.

5. Conclusion

This research investigates the processes of accessing herbicides among smallholder farmers using primary data in the study area. The research carried out has clearly presented the current situation of smallholder farmers in accessing herbicide in the chosen study area. Smallholder farmers in the area have been experiencing difficulties in purchasing herbicide. The research clearly indicated that Government and nonGovernmental organisations were not providing herbicides at designated time which give chance for marketers to sell herbicide at higher price. Moreover, it is also confirmed that lack of adequate funds among farmers is a vital issue that affects herbicides accessibility in the study area, this is because majority of the smallholder farmers are low income earners which lead to difficulties in affording or purchasing enough and the right herbicide for their cultivation. Farmers in the study area are experiencing delay in Government intervention on herbicides which also affect the outcomes of the farm products, this is as result of using pre-emergence herbicides which majority of the farmers consider at the early stage of the farming. While the information provided has clearly shown the situation of smallholder farmers in accessing herbicide in the study area, the responsible government and none-governmental organization should put in this information into consideration as Nigeria is at the stage of agricultural revolution. Moreover, this research give chance for further investigations in other to find out more on smallholder farmers situation in accessing farm inputs in Nigeria at large.

6. Recommendations

Considering the results in this research, there is need for the government to intervene and come to the aide of the farmers as to make farm inputs available and sufficient in the study area. As Nigerian agriculture is growing and becoming competitive in the continent providing farm inputs among smallholder's farmers in the study area will be of great benefits. Committee should be set in all necessary areas as to reach out people with all interventions given by government and none governmental organisation. Monitoring committee should also be set in other to avoid commercialization of herbicides and other farm inputs given to farmers by delegations. There is need for government to look into different products and brand of herbicides in market, this will aides in detecting fake and in effective products of herbicides in circulation in the study area.

References

- Aminu, S., Babalola, .K. J. A.J. and Joseph, A. (2014) Factors Influencing Adoption of Chemical Weeding Among Farmers in North Central Nigeria; A case Study of Farmers in Idofian, Ifelodun Local Government Area, Kwara State. *Global Journal of Current Research*, 31(3), pp. 28–35. <http://crdeep.com/wp-content/uploads/2014/10/Vol-3-1-3-GJCR.pdf>

- Environmental Protection Agency (EPA) (2007). Safe and Effective Herbicide Use, (A Handbook Near Water application), EPA South Australia.
- Iyagba, A.G. (2013). Assessing the Safety Use of Herbicide by Horticultural Farmers in Rivers State, Nigeria', 9(15), pp. 1857–788. <http://eujournal.org/index.php/esj/article/viewFile/1094/1128> (Accessed 10 February 2016)
- Imoloame E. O. (2013). Herbicide Utilization by Farmers in Moro Local Government Area of Kwara State. International Journal of Agricultural Sciences, 3(7), pp. 2167–447.
- Jackson-Michel, S. (2015) the effects of herbicides & pesticides on humans. Available at: <http://www.livestrong.com/article/246750-the-effects-of-herbicides-pesticides-on-humans/>.
- Kellog, R.L., Grube, N.R., Goss, D.W. and Plotkins, S. (2000). Environmental Indicators of Pesticide Leaching and Runoff from Farm Fields. Available at: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/?cid=nrcs143_014053
- Mallory, C.A., Smith, A. and James, E. (2003). Education Revised Classification of Herbicides by Site of Action for Weed Resistance Management Strategies. Weed Technology, 17, pp. 605–619. http://ucanr.org/sites/Weed_Management/files/74291.pdf
- Mamun. M. A. A., Mridha. A.J., Akter, A. and Parvez, A. (2011). Bio-efficacy of Acetochlor 50% EC Against Weed Suppression in Transplanted Rice Ecosystem. Journal of Environmental Science and Natural Resources, 4(2), pp. 73–77.
- Obidike. N. A (2011). Rural Farmers' Problems Accessing Agricultural Information: A case study of Nsukka Local Government Area of Enugu State, Nigeria. <http://www.webpages.uidaho.edu/~mbolin/obidike.htm>.
- Qasem, J.R. (2012). Herbicides Applications: Problems and considerations. Available at: <http://cdn.intechweb.org/pdfs/12606.pdf>.
- Rao, V.S. (2006). Principles of Weed Science 2nd Edition, published by Oxford and IBH Publishing Co. PVT LTD, New Delhi
- Sonia, S. and Marcelo L.L. (2011). Herbicides, Theory and Applications Available at: <http://library.umac.mo/ebooks/b28109739.pdf> (Accessed: 20 March 2016).
- Trigonix, S. (2014). The Changing Structure of Nigeria's Agriculture and Prospects for the River Basin Development Reorganisation Programme. Available at: <http://ageconsearch.umn.edu/bitstream/182549/2/IAAE-CONF-183.pdf>
- Okwoche, V.A. (2008). Adoption of Herbicides and Fertilizers Among Rural Farmers of Zone B Area of Kogi State Agricultural Development Project, Kogi State, Nigeria. Available at: <https://www.researchgate.net/researcher/2098131231>