SPECIALIZED INFORMATION SERVICE DELIVERY FOR APPROPRIATE USE OF AGROCHEMICAL PRODUCTS IN GHANA

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ABSTRACT: *Agrochemical products are meant to increase agricultural productivity and consequently ensure food security in the world. Agrochemicals are used to protect crops and animals against harmful effects of weeds, pests and diseases. Farmers have better yield, when weeds, pests and diseases are controlled. However, some farmers abuse the chemicals, especially in the developing world. The abuse of these chemicals poses serious problems to the environment, the farmer, and the general food consumer. Owing to the effects of the abuse of agrochemicals on society, scholars made efforts towards ensuring that farmers get the right information on how to appropriately use the products in some countries, but no such studies have been conducted in Ghana. The purpose of this study was to explore the use of specialised information service delivery as a tool of ensuring appropriate use of agrichemicals in Ghana. The main research question of the study was: How can specialised information service delivery be used to ensure effective use of agrochemicals in Ghana? A survey strategy with questionnaire instrument was employed to collect the needed data from 60 farmers in a selected farming community. The results were analysed using descriptive statistical methods with MS Excel. The results revealed that the information needs of the farmers include information on agrochemicals functions, their negative effects and the protective measures against the harmful effects of the chemicals. The preferred format of such information is pictures/diagrams, text and audiovisual and preferred channels of dissemination are extension officers, radio programmes and agrochemicals distributors.*

KEYWORDS: *specialized information services, information service delivery, agrochemical products use, Ghana.*

INTRODUCTION

Agrochemical products are meant to increase agricultural productivity and consequently ensure food security in the world. Agrochemicals are used to protect crops and animals against harmful effects of weeds, pests and diseases. All things being equal, farmers have better yield, when weeds, pests and diseases are prevented or controlled. Therefore, in the modern agricultural industry, agrochemical products are very critical. However, the chemicals are sometimes abused or inappropriately used by some farmers, especially in the developing world, partly due to illiteracy, lack of information or misinformation about how to use the products.

The abuse of agrochemical products poses serious problems to the environment, the farmer, and the general food consumer. Owing to the dangers the misuse or abuse of agrochemical poses to the world, scholars are making efforts to ensure effective use of agrochemicals, especially in the developing world. Studies investigated the general factors that influence farmers' adaptation and use of the chemicals. For instance, Mariyono, Kuntariningsih, and Kompas (2018, 305-323) analysed factors that affect the use of pesticides in vegetable farming in Indonesia in order provide appropriate policies that would lead to lesser use of pesticides and to minimize their effects on human and environment.

From information service delivery perspective, scholars have investigated the kind information farmers need, its sources and how it can be disseminated to them for effective use of agrochemicals. Benard, Dulle, and Hieromin (2018, 209-225) assessed the information needs of fish farmers in Tanzania and how such information could be obtained. In a similar study, Elly and Silayo (2013, 547-566) explored the information needs of rural farmers and the sources of such information, and found that the farmers basically needed information about crop and livestock husbandry, marketing, and funding options, which came from interpersonal communications. Furthermore, Msoffe and Ngulube (2017, 82-90) investigated the preferred information sources of poultry farmers in accessing poultry management information in Tanzania. The study found that farmers in the study communities preferred acquiring poultry management information through interpersonal and informal sources. Nyareza and Dick (2012, 494-508) investigated the benefits of using community radios stations to communicate agricultural information to peasant farmers in Zimbabwe and how to incorporate that into the country's agricultural extension service programmes.

In Ghana, similar efforts have been made towards providing relevant information to farmers. For instance, Osei et al. (2017, 72-79) assessed the sources of information for vegetable farmers in Accra. The study found that most vegetable farmers use radio as a source of agricultural information and that farmers strictly go by the supplier information or prescription when applying agrochemical products such as fertilizer, weedicides, and pesticides. Egyir, Owusu-Benoah, Anno-Nyako, and Banful (2011, 83-97) identified key factors that influence the adoption of agrochemicals on plantain farms in Ghana. Among others, the study found being literate, having higher income from sales, having access to hi-tech machinery and being linked to extension services and financial institutions as factors that influence Ghanaian plantation farmers to use agrochemicals. Despite the local efforts made regarding the use of agrochemicals, no study has been conducted in the country to explore how information can be specially packaged and delivered to farmers for effective use of agrochemical products. The purpose of the study is to explore the best ways of packaging and disseminating information about agrochemical products to farmers in Ghana. The main research question the paper seeks to answer is how can specialised information service delivery be used to ensure effective use of agrochemicals in Ghana? The rest of the paper is arranged as follows: Method, results, discussion, conclusion and recommendations.

METHODS

The study employed a survey strategy in its investigation. A structured questionnaire was used to collect the needed data from sixty farmers in Tokokoe, a farming community in the Volta, Ghana. The sample was randomly selected using member lists of three farming groups in the community. Questionnaires were administered face-to-face to the participants by the researchers with a research assistant who is a native of the community. The role of the research assistant was to read the questionnaire to participants who could not read and to explain to others who did not understand certain concepts or questions.

All participants, before the process, were informed of the purpose of the study, their right to voluntarily participate and to withdraw from process anytime they wished to do so. They were also assured that the information to be collected was for academic purpose only and would be treated with the utmost confidentiality. The data collected was analysed using descriptive statistical methods and MS Excel. Frequencies and percentages of the participants' responses were calculated using the software. The data was presented in simple tables and in percentages.

FINDINGS

This section presents the results of the study. The information gathered can be categorised into three main types: participants' farming profile, participants' use of agrochemicals and participants' agrochemical information needs. These three types of information represent the main headings under which the results are presented.

Participants' farming profile

This section presents results about participants' level of education, number of years in farming and the types of crops they farm.

Level of education

The results as show that 29 (48.3%) of participants have basic education. In Ghana basic education currently consists of 9 years of education: 6 years in primary school and 3 years in Junior High School. Middle school leaving certificate has next high figure with 20 (33.3%) responses, which consisted of 10 years of education: 6 years in primary school and 4 years in middle school. The two qualifications are almost of the same level in Ghana education system. The qualification at that level used to be Middle School Leaving Certificate but was replaced with Junior High School Certificate after educational reforms. The two certificates recording the highest responses indicate that majority of the participants' highest qualification is basic. Nonetheless, 4 (7%) respondents have Higher National Diploma, and 2 (3.3%) have first degree. This implies that all the participants ever attended school; however, majority of them can be described as semi-literate, as many may not have appreciable level of reading, writing and analytical skills.

Numbers years in farming

The responses to a question on the number years of farming indicate that majority of the participants, 21 (35%), have been farmers for 6 to 10 years, and only 4 (7%) have been farming for over 26 years. Fourteen (23%) participants have least experience as their farming activities spans only 5 years. Nonetheless, all participants can be described as experienced farmers albeit different levels of experiences.

Types of crops cultivated

The results in responses to a question of the type of crops participants cultivate show that 28 out of 60 representing (47%) cultivate cocoa, 27 (45%) engage in planting plantain, 24 (40%), and 18 (30%) involve in cocoyam and cassava farming respectively. Many farmers are engaged in cultivating cocoa probably because cocoa farmers get incentives from Ghana Cocoa Board, a body responsible for purchasing cocoa from farmers. Again, coco is a cash crop, so farmers who are interested in making more money are likely to engage in cultivating the crop. Plantain has the next highest responses of 27 (45%). Plantain is used to prepare different kinds of local dishes in Ghana. It is also cultivated on large scale for commercial purposes. This could explain why it is being cultivated by many farmers. The third highest grown crop in the community is cassava, but its position is surprising, in that cassava is used to prepare different meals in Ghana, especially in the forest areas like the study community, so 30% of the participant engaging in cassava farming is unexpected.

None of the participants cultivate rice, meanwhile many Ghanaians eat rice. Rice depends on available water to do well. It could be that the community does not have stable water that supports rice cultivation, or the land might not be good to do rice farming. None of the crops recorded 50% and above responses. This could suggest that the farmers are engaged in mixed cropping.

Farmers' use of agrochemicals

This section presents results on participants' use of agrochemicals. The section consists of responses regarding whether or not the participants use the chemicals, how long they have been using it, whether or not they understand and follow instructions when using the chemical.

A YES or NO question was asked to ascertain whether or not the participants use agrochemical products in their farming activities. 52 (87%) respondents responded YES, while 8 said no. This suggests that almost all the farmers in the community use agrochemicals to farm.

Types of agrochemicals used

A question was asked to find out the types of agrochemicals farmers in the study community use. A list of agrochemical products was provided for them to select from. The products were grouped into: weedicide, pesticide and fertilizer. The results indicate that most of the participants use glamozone (42%), 24D- calipherps (42%), sunphoshate (37%), Atrazin powder (37%), and nikokine (37%). For pesticides, the chemicals used most are confidor (33%), desban (32%) and akati master (27%). However, the only fertilizers used are ammonia (33%) and NPK (22%). The results imply that the participants used a range of agrochemicals.

Years of using agrochemicals

Table 4 contains responses to a follow up question that was asked to find out how long farmers have been using the agrochemical products. 35 (58%) of the respondents have been using the chemicals for 6-10 years while 19 (32%) use it for 1-5 years. This implies that the farmers know what agrochemicals are and have been using them for quite a number of years.

Availability of instructions on the use of agrochemicals

A YES or No question was asked to find out whether farmers have access to instructions on how to use the agrochemicals. 56 participants representing (93%) responded that the instructions on the use of the products are always available and only 4 responded no. This suggests that most of the agrochemical products used in the study community come with usage instructions.

Understanding usage instructions

A follow up YES or NO question was asked to ascertain whether or not farmers understand instructions that come with agrochemical products. 48 (80%) responded that the instructions are understandable while 20% said no, which is a good sign towards effective use of the chemicals.

Following instructions of the use of agrochemicals

In response to the question whether farmers follow instructions when using the agrochemical products, majority (70%) responded yes, while (30%) do not follow. Nonetheless, having majority following the instructions could lead to effective use of the chemicals in the community studied in particular and Ghana in general.

Reasons for not following instruction

In responding to a question why farmers do not follow instructions when using agrochemical products. Only 34 participants out of 60 responded to the question. Among those responded 19 indicated that they do not follow instructions because they do not have the required tools to do so. For instance, if farmers are required to wear protective cloths when using particular chemical, they may not wear the cloth if they do not have it. Yet, 12 (20%) respondents do not follow instructions because they cannot read. This could be understandable because most of the instructions are in text form and mostly in foreign languages, so farmers who cannot read will find it difficult to follow the instructions.

Farmers' information needs

To determine the best way of disseminating information about agrochemical products to farmers, the researchers tried to find out their information needs. The results, in Table 1, indicate that 49 (82%) of the participants need information regarding the functions of the products, while 45 (75%) need information on how they can protect themselves against the harmful effects of the chemicals. Yet, 44 (73%) want to know the negative effects the chemical will have probably on them, the land and the food that would be produced. This suggests that the information needs of agrochemical users in the community ranges from the function of the chemical, through the expiring date of the product; the negative effects of the products to where to find the needed material that will enable them use the product effectively. Hence, agrochemical producers should make conscious efforts to accompany their products with such information.

Table 1. Information needs of agrochemical users

Information need of chemical users	Frequency	Percentage
The functions of the chemicals	49	82
the negative effects of the chemicals	44	73
Expiring date of the chemicals	43	72
the steps or processes of using the chemicals	36	60
How I can protect myself during and after using the product	45	75
Where to find the needed materials for the use of the chemicals	39	65

Farmers' preferred format of information

A question was asked to find out farmers preferred format of information about agrochemical products. Table 2 below represents participants' responses regarding choice of information format. Thirty-eight (63%) prefer information in the form of pictures or diagrams, 33 (55%) want textual information, while 14 (23%) participants choose audio-visual information. This suggests that to ensure effective use of agrochemical information, such information should exist in multiple formats: text, picture and audio-visual. This is to satisfy the divergent choice of information formats.

Table 2. Farmers preferred information format

Preferred information format or form	Frequency	Percentage
Text	33	55
Audi	9	16
Audiovisual	14	23
Picture/diagram	38	63
Total		

Farmer preferred channel of information dissemination

The value of information, arguably, depends on how it is being used in making better decisions. We further argue that an effective use of information depends on how it is communicated to the people who need it. Based on these arguments, a question was asked to find out the preferred channel of disseminating agrochemical information to farmers in ToKokoe, the study community. Table 3 displays the participants' responses to the question.

Table 3 shows that 43 (71%) of 60 respondents prefer receiving information about agrochemicals through extension officers. Probably because extension officers are professionals, working with recognised state or private institutions, so information coming from them is more likely to be authentic and reliable. 33 (55%) participants would like to receive the needed information about agrochemicals from the distributors of the chemicals. Probably because they are sellers or distributors of the products, they will know better about the products than anyone else, hence it might be prudent to hear from the horse's own mouth. Although, majority of the respondents prefer receiving information from extension officers and agrochemical product distributors, appreciable number of them wants the information to be delivered to them through radio announcement, local assemblies and as instruction manual. This implies multiple channels of communication should be employed in disseminating of agrochemical information in Ghana; however, priority should be given to engaging the services of extension officers and the chemical distributors.

Table 3. Farmer preferred channel of information dissemination

Preferred channel of information distribution	Frequency	Percentage
Radio announcement	21	35
instruction manual	22	37
Extension officers	43	71
chemical distributors	33	55
Local chiefs	0	0
Information service department (assembly)	22	37
Total		100

DISCUSSION

This paper investigated how agrochemical information can be packaged and disseminated to farmers in Ghana for effective use of the agrochemicals. The results indicate that almost all the farmers in the community studied use various kinds of agrochemicals for many years.

The results also reveal that for effectively use of agrochemicals in the community, farmers need information regarding the functions of the chemicals, the negative effects of the chemicals and how they can protect themselves against the harmful effects of agrochemicals during and after use. However, Benard, Dulle, and Hieromin's (2018, 83-97) found fish farmers' information needs include: information how to treat water, spawning operations, and fish preservation and processing. In a similar study, farmers needed information on crop and livestock husbandry, marketing, and funding options (Silayo 2013). This suggests that information needs of farmers are based on the type of farming they do at a particular place and time. Lwoga, Stilwell, and Ngulube (2011, 383-395) corroborate this conclusion that information needs, and information-seeking patterns of farmers are specific to certain locations.

Furthermore, the results revealed that majority of farmers prefer to receive information from extension officers. This finding relates to that of Inyang's (2015), which states that vegetable farmers in Nigeria receive information mainly from extensions officers. However, in Nyareza and Dick's (2012, 494-508) study extension service programmes was not satisfying the agricultural information needs of peasant farmers because the extension officers were not many and did not have means reach out to every household. This implies that extensions officers or services are considered a reliable and authentic channel of communicating to farmers; however, for such service to be trusted and effective there should be enough officers who are well resourced to do their work. However, some participants prefer being communicated to through radio and manuals.

CONCLUSION

This study investigated information services delivery for effective use of agrochemicals and found that farmers in Tokokoe, a farming community in Volta Region, Ghana use various types of agrochemicals in their farming activities. Though, some of them currently abuse the chemicals, majority of them would be able to use them responsibly and effectively if information about the chemicals is properly packaged and disseminated to them. The farmers need information on what the chemicals do, the negative effects of the chemicals and how they (farmers) can be protected against the harm of the products during and after use. Such information should be presented in the form of pictures or diagrams, text and in audiovisual format, and disseminated through extension officers, radio programmes and agrochemical product distributors.

RECOMMENDATION

Base on the findings the paper recommend that information for agrochemical use should be appropriately and locally package to meet the Ghanaian farmer's need and that more extension officers should be trained and appropriately resourced to disseminate information to farmers for appropriate use of agrochemicals.

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