

COMPLIANCE OF AGROCHEMICAL MARKETERS WITH BANNED COCOA PESTICIDES IN SOUTHWEST NIGERIA

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Abstract: This study investigated the compliance of marketers of agrochemicals with the approved and banned cocoa pesticides in selected cocoa producing states of southwest Nigeria. Primary data was collected through the use of structured questionnaire administered to randomly selected agrochemical marketers. All the marketers (100%) were aware of the recently banned cocoa pesticides, however, majority still have the pesticides in stock. About 70.6% of the marketers in Osun state and 58.8% in Ogun state stated that they did not receive information on the banned pesticides from government agencies but through other channels. More than half of the marketers (52.9% in Ogun, 55% in Kwara and 47.1% in Osun) strongly disagreed that government should place a ban on pesticides. Availability of banned pesticides in their stock, insufficient information from the concerned government agricultural agencies, and fear of short supply of approved pesticides are among the reasons proffered by the marketers for not supporting the ban of pesticides. Relevant government regulatory agencies should conduct a comprehensive inventory of pesticides offered for sale by the marketers of agrochemicals. There should be massive public awareness programme, and well-coordinated association for all the marketers of agrochemicals. Agrochemical manufacturers should translate instructions and warnings on pesticide labels to local languages understood by the farmers.

Key words: agrochemicals, retailers, banned pesticides, awareness.

Introduction

Cocoa (*Theobroma cacao* L.) is a perennial crop mainly cultivated in Africa, the Caribbean, South America and Asia (UNDP, 2010). It is the leading cash crop

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in West Africa with over 70% of world cocoa production cultivated in the region (Afrane and Ntiamoah, 2011). Ranking on the top of the 10 countries with significant global production of cocoa is Côte d'Ivoire, followed by Ghana and Indonesia, and Nigeria ranked fourth (UNECA, 2013). Cocoa is the primary non-oil economic resource in the West African states (Acquaah, 1999) and is currently the largest non-oil foreign exchange earner after crude oil in Nigeria representing about 35% of earnings from non-oil exports (UNECA, 2013). Cocoa played an important role in Nigeria's economy before the discovery of petroleum in Oloibiri, Rivers State (Folayan et al., 2006). However, cocoa was abandoned for oil and this brought about a downslide of the cocoa economy. In recent years, the government has shifted attention to cocoa production, processing and marketing (Nkang et al., 2007).

Along the marketing chain of cocoa, there are many producers and buyers at the local level, followed by traders and exporters. However, there are few processors within the chain, especially the manufacturer of chocolate, and cocoa as produce is buyer-driven. Despite the vast potential of cocoa as a major foreign exchange earner as well as the creation of employment opportunities and household income generation, its production is crippled by a lot of factors among which are pests and disease incidence (Entwistle, 1972; Owusu-Manu, 1977; Opoku et al., 2007; Uwagboe et al., 2011) and this has led to the application of various pesticides to suppress the pests and diseases.

Some of the problems associated with cocoa pesticides are scarcity and high cost thereby making them beyond the reach of local cocoa farmers (Adefila, 2013). High probability that pesticide use and pesticide cost will induce side effects in developing countries has also been envisaged (Yudelman et al., 1998). The problem of high cost is also complicated with many intermediaries and marketers along the marketing chain of pesticides (Adefila, 2013). Apart from their impact on the final selling price, marketers of agrochemicals also play important roles in provision of information to the local farmers (NPAS, 2012). The marketers in most cases perform the role of extension agents in provision of information to the farmers on handling, application and general usage of the chemicals. They also inform the farmers on which chemical to use in treatment of insect pest infestation and diseases affecting cocoa tree and pods in the field as well as cocoa bean in storage. However, many of the pesticide dealers do not have licenses to operate and lack adequate knowledge about the products (NPAS, 2012). These may therefore affect the type of information they provide to the farmers about appropriate and safe use of pesticides.

Banned chemicals are common in local markets, utilized in various locations in the society and are considered potential threats to the environment and health of the people (PAN AP, 2010). The inappropriate use of pesticides has been observed more in the rural areas of developing countries (Williamson 2003; PAN AP, 2010).

Inappropriate pesticide handling and application have been observed around the world and this has led to an annual poisoning of about three million people with acute severe symptoms, about 20,000 deaths and about 735,000 chronic illnesses (WHO, 1990). Pesticide poisoning has been discovered to occur more in developing countries, affecting women, children and infants (Goldmann, 2004).

The efforts toward addressing pesticide poisoning in developing countries has led to the adoption of the International code of conduct on the distribution and use of pesticides (Code of Conduct) (FAO, 2002). As stated in this code, among others objectives, it was “designed for use within the context of national legislation as a basis whereby government authorities, pesticide manufacturers, those engaged in trade and any citizens concerned may judge whether their proposed actions and the actions of others constitute acceptable practices”. Adoption of the Code made the Food and Agriculture Organisation of the United Nations (FAO) renew its commitment by banning highly hazardous pesticides (FAO/COAG, 2007). In line with this, the Federal Government of Nigeria recently reviewed the pesticides used on cocoa to conform with the requirements of the 2008 European Union (EU) Regulation on pesticide maximum residue limits (MRLs) (Mokwunye et al., 2012).

The major factors affecting quality control of agrochemicals in circulation are weak regulations on importation and use of dangerous chemicals, and the inactivity or absence of control agencies at the international border (Tijani, 2006). Cocoa Research Institute of Nigeria (CRIN) has a national mandate to screen pesticides for use on cocoa farms for their efficacy and low environmental toxicity. Table 1 presents the list of pesticides currently approved for use on cocoa farms in Nigeria. This survey was therefore carried out to determine the level of awareness of banned and approved pesticides as well as compliance among the agrochemical retailers who are a major stakeholder along the cocoa value chain in Nigeria. This was with the view to determine the level of awareness among the concerned marketers of cocoa agrochemicals as well as to sensitise the general public regarding the health and environmental concerns of pesticides in circulation.

Material and Methods

The study was a field survey targeted at marketers of cocoa agrochemicals in three cocoa producing states of southwest Nigeria. The locations selected for the study include Iwo (Osun state), Mamu (Ogun state) and Ifelodun (Kwara state). These locations cut across high, medium and marginal cocoa producing states of Nigeria. Cocoa is one of the major cash crops produced in these locations and constitutes main stake in the sustenance of rural economy and income generation. The majority of the cocoa farmers in the area use pesticide on their cocoa plantation. Pesticides are usually purchased from local agrochemical retailers.

Table 1. List of pesticides currently approved for use on cocoa farms in Nigeria.

Trade name	Active ingredient	Commercial form	Test pests
<i>Insecticides</i>			
Actara25 WG	Thiamethoxam	Wettable granule	Mirid
Esiom 150 SL	Acetamiprid + Cypermethrin	Soluble concentrate	Mirid
<i>Fungicides</i>			
Funguran ^{-OH}	Copper hydroxide	Wettable powder	Black pod
Champ DP	Copper hydroxide	Dustable powder	Black pod
Ridomil Gold 66WP	Cuprous oxide + Metalaxyl-M	Wettable powder	Black pod
Copper Nordox 50 WP	Cuprous oxide	Wettable powder	Black pod
Kocide 101	Cuprous oxide	Wettable powder	Black pod
Kocide 2000	Cuprous hydroxide	Wettable powder	Black pod
Ultimax plus	Metalaxyl + Copper hydroxide	Wettable powder	Black pod
<i>Herbicides</i>			
Touch Down	Glyphosate	Soluble concentrate	Weed
Round Up	Glyphosate	Soluble concentrate	Weed
Clear Weed	Glyphosate	Soluble concentrate	Weed
<i>Fumigants</i>			
Phostoxin	Aluminium phosphide	Tablets	Storage pests

Source: Mokwunye et al., 2012.

The primary data used for this study were collected through the use of structured questionnaire with open- and closed-ended questions. Using simple random technique, twenty agrochemical marketers were selected from each of the location giving a total of sixty marketers. The marketers were mainly retailers who sell agrochemicals directly to cocoa farmers. Out of the administered copies of the questionnaire, fifty-four were eventually analysed and used for the study.

Specifically, data collected from the marketers include demographic information, awareness of banned and approved cocoa pesticides, sources of information about pesticides, sources of agrochemicals sold by the marketers and people that purchase the chemicals. The data collected through the questionnaire was coded and analysed using Statistical Package for Social Science (SPSS) version 12. Both descriptive and inferential statistics were used for the analysis. Frequency and percentages were adopted for the descriptive analysis. For the inferential analysis, Pearson correlation was used to assess the sources of agrochemicals available to the marketers, health hazard of banned chemicals, and buyers of the products.

Results and Discussion

The age distribution of the sampled agrochemical marketers across the three study areas shows that their mean age ranged between 42 and 49 years (Table 2).

This indicates that most of the marketers were in their productive age. The male gender was the dominant among operators and distributors of cocoa agrochemicals in southwest Nigeria. This could be observed from the sampled population of 58.8%, 76.5%, and 65% in Osun, Ogun and Kwara states respectively (Table 3). The dominance of males in the business might be attributed to the level of risk involved in the business of agrochemicals. The majority of marketers were also married.

Table 2. Age of the sampled agrochemical marketers.

States	Number	Minimum	Maximum	Mean	Standard deviation
Ogun	17	25.00	60.00	42.47	9.77
Osun	17	28.00	70.00	48.94	13.15
Kwara	20	25.00	70.00	49.00	10.63

More than half of the marketers had secondary education. This implies that the majority had attained some level of literacy pertinent to the business of agrochemicals. Involvement in the business of agrochemicals required some level of education especially for reading the chemical labels and other instructions on the packages. This general level of education of the marketers also presents an advantage to the concerned authorities in formal training of the marketers on the approved chemicals. This can also be useful for awareness creation and information dissemination to end-users. Marketing of agrochemicals was the primary occupation of more than half of the sampled marketers (Table 3). This implies that the marketers depend on the sale of agrochemicals as a major source of income to sustain their livelihoods.

All the marketers in the three locations indicated that they were aware of the recently approved pesticides for use on cocoa (Table 4). With regards to the banned cocoa pesticides, all the marketers (100%) in Ogun and Osun states and 95% of marketers in Kwara state were aware of the banned chemicals. Since the placement of ban on some cocoa agrochemicals was made by the Federal Government through the Ministry of Agriculture, it was envisaged that the information would be disseminated effectively through the various Cocoa Associations in the country and concerned government agencies. However, from the responses of 70.6% of the marketers in Osun state and 58.8% in Ogun state, it was found that they received the information through other sources such as mass media (radio, newspapers), major distributors of the chemicals, among others. Also, 40.0% of the marketers in Kwara state stated that they obtained the information from other agrochemical dealers while only 35.0% received the information from agricultural extension agents. More than 82% of the marketers affirmed that there are health hazards associated with use of banned cocoa pesticides. However, from all indications, it was apparent that the marketers still offer for sale the banned pesticides.

Table 3. Demographic information of sampled agrochemical marketers.

Variable categories	Ogun state (n=17)		Osun state (n=17)		Kwara state (n=20)	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
<i>Gender</i>						
Male	10	58.8	13	76.5	13	65.0
Female	7	41.2	4	23.5	7	35.0
<i>Education</i>						
No formal education	1	5.9	0	0	1	5.0
Primary	4	23.5	5	29.4	5	25.0
Secondary	10	58.8	9	52.9	10	50.0
Tertiary	2	11.8	3	17.6	4	20.0
<i>Marital status</i>						
Married	12	70.6	11	64.7	15	75.0
Single	4	23.5	4	23.5	5	25.0
Divorce	0	0	0	0	0	0
Widower	0	0	0	0	0	0
Widow	1	5.9	2	11.8	0	0
<i>Primary occupation</i>						
Chemical marketer	9	52.9	11	64.7	11	55.0
Civil servant	0	0	0	0	2	10.0
Student	8	47.1	6	35.3	6	30.0
Artisans	0	0	0	0	1	5.0
Others	0	0	0	0	0	0

Table 4. Awareness of approved and banned cocoa agrochemicals.

Awareness variables	Ogun state (n=17)		Osun state (n=17)		Kwara state (n=20)	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
<i>I am aware of recently approved cocoa pesticides</i>						
Yes	17	100	17	100	20	100.0
No	0	0	0	0	0	0
<i>I am aware of recently banned cocoa pesticides</i>						
Yes	17	100	17	100	19	95.0
No	0	0	0	0	1	5.0
<i>Sources of information on recently banned cocoa pesticides</i>						
Cocoa Association of Nigeria (CAN)	1	5.9	1	5.9	2	10.0
Agricultural extension agents	3	17.6	3	17.6	7	35.0
Agrochemical marketers	3	17.6	1	5.9	8	40.0
Others	10	58.8	12	70.6	3	15.0
<i>I am aware of health hazard of the use of banned cocoa pesticides</i>						
Yes	14	82.4	14	82.4	17	85.0
No	3	17.6	3	17.6	3	15.0

As presented in Table 5, the majority (between 35% and 52%) of the marketers purchased pesticides from chemical importers and chemical

manufacturers. The majority of the marketers (between 40% and 70%) deal in different types of the agrochemicals. However, insecticides, fungicides and rodenticides were the commonly traded agrochemicals by all the sampled marketers. This might probably be due to high incidence of insect pests, diseases and rodent attacks of cocoa trees, pods, and beans in the selected locations. In addition, between 52.9% of the marketers in Ogun state and 82.4% in Osun state sold the pesticides directly to farmers. Along the marketing chain of agrochemicals, the marketers are closest to the farmers and end-users. However, the inappropriate regulations of agrochemicals may possibly lead to circulation and use of banned pesticides in the study areas.

Table 5. Sources of cocoa agrochemicals and selling variables.

Sources and customer	Ogun state (n=17)		Osun state (n=17)		Kwara state (n=20)	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
<i>Source of cocoa agrochemicals</i>						
Chemical retailer	0	0	0	0	2	10.0
Chemical marketer	0	0	4	23.5	1	5.0
Chemical importer	8	47.1	7	41.2	8	40.0
Chemical manufacturer	9	52.9	6	35.3	8	40.0
<i>Major agrochemical that you offer for sale</i>						
Fungicide	2	11.8	2	11.8	3	15.0
Insecticide	2	11.8	3	17.6	5	25.0
Herbicide	1	5.9	0	0	1	5.0
Rodenticide	2	11.8	0	0	0	0
Acaricide	0	0	0	0	0	0
Disinfectant	1	5.9	0	0	3	15.0
All of the above	9	52.9	12	70.6	8	40.0
<i>My major customer of agrochemicals</i>						
Farmers	9	52.9	14	82.4	16	80.0
Corporative societies	2	11.8	0	0	0	0
Local buyers	4	23.5	1	5.9	1	5.0
Local traders	2	11.8	2	11.8	3	15.0
<i>Reason why banned cocoa pesticide should not be sold</i>						
Health hazard	14	82.4	14	82.4	13	65.0
No patronage	3	17.6	3	17.6	7	35.0

Perception of the marketers regarding different issues raised on banned and approved agrochemicals are presented in Table 6. Generally, the marketers disagreed that the ban of some previously approved cocoa pesticides was a political move to close some chemical manufacturing industries. Although the majority of the marketers agreed that the banning of some obsolete pesticides can save the lives of cocoa consumers, yet almost half of them strongly disagree that government should ban agrochemicals.

Table 6. Perception of cocoa agrochemical marketers in southwest Nigeria.

Perception variables	Ogun state					Ogun state					Kwara state			
	A	UD	D	SD	SA	A	UD	D	SD	SA	A	UD	D	SD
Government should not ban any pesticide used by cocoa armers.	35.3	11.8	0	0	47.1	29.4	23.5	0	0	55.0	30.0	10.0	5.0	0
Banning of some previously approved cocoa pesticides is a political move to close some chemical industries.	17.6	11.8	35.3	35.3	0	5.9	11.8	35.3	47.1	5.0	35.0	10.0	15.0	35.0
Some of the banned pesticides are cheaper therefore government should lift ban on them.	11.8	11.8	29.4	47.1	0	0	17.6	35.3	47.1	5.0	25.0	5.0	45.0	20.0
Regular training on banned cocoa pesticides should be organized.	23.5	0	0	0	64.7	23.5	11.8	0	0	55.0	45.0	0	0	0
There should be awareness creation on radio and/or television of the recently banned cocoa pesticides.	0	0	0	0	70.6	17.6	11.8	0	0	85.0	10.0	5.0	0	0
Banning of some cocoa pesticides can save the lives of cocoa consumers.	41.2	17.6	11.8	5.9	52.9	17.6	11.8	11.8	5.9	25.0	30.0	30.0	10.0	5.0
There is need for public enlightened programme in remote areas on recently banned cocoa pesticides.	23.5	0	0	0	70.6	29.4	0	0	0	60.0	25.0	10.0	5.0	0
Government should provide subsidies on approved cocoa pesticides and make them available.	5.9	17.6	35.3	29.4	11.8	0	17.6	35.3	35.3	10.0	10.0	20.0	25.0	35.0
Recent banning of some cocoa pesticides is to discourage cocoa production.	0	11.8	29.4	52.9	0	11.8	17.6	35.3	35.3	15.0	5.0	25.0	30.0	25.0

Note: All values are expressed as percentage. SA = strongly agree; A = agree; UD = undecided; D = disagree; SD = strongly disagree.

The results of the study also showed that 55.0% to 76.5% of the respondents strongly agree that regular training should be organized for the marketers on banned cocoa pesticides. Most of the marketers (70.6% in Osun state, 100% in Ogun state and 85% in Kwara state) strongly agreed that there should be awareness creation on mass media such as radio and television on the recently banned cocoa pesticides. Also, the majority of the marketers (60.0% to 76.5%) strongly agreed with public enlightened programme in remote areas on recently banned cocoa pesticides. However, there were different views among the marketers on provision of subsidies by the government on the approved cocoa agrochemicals. The responses were skewed to the marketers that are not in support of the provision of subsidy or other forms of monetary incentive.

Marketers of pesticides play significant roles in both distribution and provision of information to the end-users. However, it has been reported that some of these marketers do not have the necessary qualifications, thereby posing danger to the users and the general populace. Surveys conducted among pesticides retailers in Cambodia, China, India, Indonesia and Malaysia (PAN AP, 2010) revealed that retailers sold pesticides alongside food and clothing, and they do not consider pesticides harmful and this attitude is carried over to their customers. In addition, store owners do not normally read labels, and also do not encourage buyers to read the label. Non-reading of labels is again complicated by the information written by manufacturers in languages not understood by local farmers.

From findings of the survey, almost half of the marketers were not in support of government banning some of the cocoa agrochemicals. The marketers still have some of the banned agrochemicals in stock. One of the reasons given by the marketers for having the banned pesticide in stock was that they have procured them before they were banned, hence they have to sell all the products in stock to the farmers to prevent total loss of their money. As reported by Tijani (2006), banned agrochemicals found in stock of the marketers include pesticides like Aldrex 40, Perenox, Sandoz, Copper sulphate, Basudin 60 EC, Thionex and Unden 20EC. These pesticides have been classified as 'highly' or 'moderately' hazardous by the World Health Organization and have been banned or restricted in many economically advanced countries. A survey in Ghana discovered that fake, adulterated and banned pesticides are still sold in local markets (NPAS, 2012).

The issue of pesticide poisoning among farmers in rural areas has been observed around the world (PAN AP, 2010). A number of symptoms associated with the use of herbicides in Plateau state of Nigeria has also been reported by Gushit et al. (2013) where about 26% of sampled farmers and 34% of marketers were reported to have encountered respiratory related symptoms (irritation, coughing, choking and tight chest), neurological (17%) and dermatological (25%) symptoms on exposure to herbicides. In addition, 52% of marketers encountered haematological symptoms such as tiredness and weakness (anaemia) and about

36% had respiratory infections from inhalation of herbicides stored in their warehouse. Human poisoning as a result of chemicals has also been discovered in other cocoa producing countries (NPAS, 2012), which calls for adequate intervention especially on the part of the marketers who import and release such products into circulation. It is pertinent that activities of the marketers should be carefully monitored by the government regulatory agencies to ensure that safety measures are taken to protect farmers and other end-users from harm caused by pesticides.

The marketers were not in support of the ban on some agrochemicals because they are not sure of the availability and constant supply of the newly approved agrochemicals, which will affect their business. According to Asogwa and Dongo (2009), the EU regulation has reduced the number of cocoa pesticides in Nigerian market. The marketers were also afraid that farmers may not easily accept the newly approved pesticides, which may affect patronage. However, the major reasons why these pesticides were banned was because of the dangerous and poisonous active ingredients (organochlorines such as aldrin, endosulphin, endrin and DDT), which are sometimes non-biodegradable in the environment and harmful to human health. Chemicals like Gammalin 20, Copper sulphate, Basudin and Aldrex 40 have been tagged “Dirty dozen” and were subsequently banned, restricted or unregistered by a number of countries around the world. Health hazard and toxic poisonous symptoms of pesticides have been reported. For instance, Watterson (1988) reported that toxic symptoms of Gammalin 20 include headaches, nausea, blueness of lips, skin irritation, anaemia, and eye, nose and throat irritation. Tijani (2006) reported implication of occupational use of Copper sulphate to include itching, eczema, conjunctivitis, pneumoconiosis, and kidney and liver damage in extreme cases. Northern Presbyterian Agricultural Services and Partners (NPAS, 2012) discovered that farmers in Ghana died from chemical poisoning from poor storage of cocoa pesticides.

Another reason given by some of the marketers for not supporting the ban of some of the agrochemicals was that there may not be adequate information from the concerned government agricultural agencies and authorities on the newly approved chemicals, thereby creating a huge information gap for the marketers and the end-users. To corroborate this perception, the majority of the marketers had earlier stated that they did not obtain information on the banned agrochemicals from government agency. It has been discovered that information on agrochemicals may be distorted if not passed by appropriate sources or experienced extension agents to the end-users (Tijani, 2006). These, among other reasons, given by the marketers not in support of the banned agrochemicals should be given urgent and adequate intervention in order to make introduction and acceptance of the newly approved cocoa agrochemicals a success.

According to Wetterson (1988), a number of agrochemical agencies and industry provide little or no health and safety information on pesticides beyond the label, which reaches pesticide users in the field. In some places, the labels may be in the language not understood by the illiterate users. Recently, farmers in parts of Nigeria, specifically Kogi and Kwara states, protested and rejected agrochemicals considered “dangerous” by Federal government of Nigeria. In their opinion, the farmers claimed that the agrochemical sold to them by the Federal Ministry of Agriculture and Rural Development is different from the one they requested and is capable of causing harm to cocoa trees. The farmer’s association believed the action of the Ministry was confusing and could adversely affect their cocoa farms, thereby destroying the future of cocoa in the economy. From this report, it could be inferred that there are misconceptions and lack of adequate information on approved cocoa pesticides in Nigeria. With respect to this information gap, marketers of agrochemicals are considered vital to the local farmers and other end-users. They are needed to be up-to-date with regard to information on agrochemicals prescribed by the concerned authorities and agencies. If the marketers are well educated and accept regulation on banned and recommended chemicals, this will go a long way in implementing policies on usage of chemicals that are not harmful to the farmers, environment as well as the general public.

The marketers are not in support of government providing subsidy on approved agrochemicals. They believe that if subsidy is provided by the government, it may not reach the targeted audience. Some people may also hijack the subsidy to their selfish and personal benefits, thereby defeating the intention of the programme. This incident has been observed in the case of subsidy provision for fertilisers. Major distributors of fertilisers as well as some government officials and political actors are the categories of people and intermediaries that benefited most from the fertiliser subsidy. They hoard the fertilisers with the intention of inflating the price before the product gets to the local farmers. As a result of these malpractices along the marketing chain of fertilisers, there are always scarcities of fertilisers and the subsidy does not get to intended users (that is, the local farmers) as they purchased the product at inflated prices.

Conclusion

From the findings of the study, the following are recommended:

1. Relevant government regulatory agencies should conduct a comprehensive inventory of pesticides offered for sale by the marketers of agrochemicals. For effective enforcement of the marketers to comply with the regulation of selling only approved pesticides, any banned, fake and adulterated pesticides found in the market should be confiscated and destroyed.

2. The activities of agrochemical importers should be monitored at every point of entry into the country with strict enforcement of compliance with importation of only approved agrochemicals that meet the regulation of EU directives.

3. The marketing chain of agrochemicals should be well regulated and coordinated for effective distribution of approved cocoa pesticides.

4. There should be massive public awareness programme with the aim of educating farmers, agrochemical marketers, and the general public on the banned chemicals and their effects on human health and the environment.

5. There is need for well-coordinated association for all the marketers of agrochemicals in the country and making membership compulsory for all the marketers. This association should be used as an avenue for information dissemination to all the agrochemical dealers and also as an avenue for training on various aspects of chemical handling, storage, usage, and safety. The marketers should also be taught on how to disseminate the information to the end-users.

6. Agrochemical manufacturers should be required to translate instructions and warnings on pesticide labels to local languages understood by the farmers for safe and appropriate handling and usage.

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