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Factors influencing pesticide use among cocoa farmers in Ondo State, Nigeria

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Abstract	Cocoa production in Nigeria is constrained by insect pests and diseases. The brown cocoa mirid (<i>Sahlbergella singularis</i>), the swollen shoot virus transmitted by mealy bugs and the black pod disease (<i>Phytophthora palmivora</i> and <i>P. megakarya</i>) are the biggest constraints of cocoa production. Pesticides have been the cornerstone of managing these pests. However, their use has been abused, resulting into excess residues in the exported product. Consequently, the EU banned cocoa imports from Nigeria unless acceptable chemicals were used and a maximum allowed chemical residue adhered to. In response, the government of Nigeria listed the approved chemicals for use in cocoa production destined for the EU market. This study was therefore carried out to assess the level of adoption of these chemicals and factors affecting their adoption. Membership to a cooperative society increased adoption. It is therefore recommended that area farmers be encouraged to join cooperative organizations and benefit from the collective effort. Key words: Adoption, chemical residue, pesticide use, <i>Phytophthora megakarya, Phytophthora palmivora,</i> <i>Sahlbergella singularis</i>
Résumé	La production de cacao au Nigeria est limitée par les insectes ravageurs et les maladies. Les mirides de cacao brun <i>(Sahlbergella singularis)</i> , le virus de pousse enflé transmis par des cochenilles et la maladie de la pourriture brune <i>(Phytophthora palmivora</i> et <i>P. megakarya)</i> sont les principales contraintes de la production de cacao. Les pesticides ont été la pierre angulaire de la lutte contre ces ravageurs. Toutefois, leur utilisation n'a pas été fameuse à cause des résidus en excès dans le produit exporté. Par conséquent, l'UE a interdit les importations de cacao en provenance du Nigeria, à moins que les produits chimiques acceptables soient utilisés et un maximum autorisé de résidus chimiques soit respecté. En réponse, le gouvernement du Nigéria a dressé la liste des produits chimiques approuvés pour être utilisés dans la production de cacao destiné au marché de l'UE. Cette étude a donc été

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menée pour évaluer le niveau d'adoption de ces produits chimiques et les facteurs affectant leur adoption. L'adhésion à une société coopérative a augmenté l'adoption. Il est donc recommandé que les agriculteurs de la région soient encouragés à adhérer à des organisations de coopération et de bénéficier de l'effort collectif.

Mots clés: Adoption, résidus chimiques, utilisation des pesticides, Phytophthora megakarya, Phytophthora palmivora, Sahlbergella singularis

Cocoa is the backbone of the economy of South-Western Nigeria, and accounts for more than 70% of total cocoa production in the country (Ocholi, 2009). Cocoa production in Nigeria is unfortunately on a decline due to pests and diseases among other factors. The brown cocoa mirid, *Sahlbergella singularis* remains the major insect pest of cocoa capable of reducing yield by a minimum of 30% in a season. The other two scourges of cocoa are the swollen shoot virus disease transmitted by mealybugs, and the black pod disease caused by *Phytophthora palmivora* and the more virulent *Phytophthora megakarya* (Anikwe *et al.*, 2009).

Management of cocoa insect pests and disease in Nigeria relies on pesticides. About 125,000 - 130,000 metric tons of pesticides are applied in cocoa fields every year in Nigeria (Asogwa and Dongo, 2009). Pesticides in Nigeria have not been judiciously used. A lot of pesticide residues remain on cocoa, making it unfit for human consumption.

In 2008, the European Union resolved to boycott cocoa beans with pesticide levels exceeding the recommended limits (Jones, 2008). The pronouncement is a threat to the livelihood of the cocoa farmers as 90% of Nigeria's processed cocoa and raw cocoa is exported to the European market. As a result of this pronouncement key stakeholders have been compelled to act and mitigate the negative impact it will certainly have on cocoa farmers in Nigeria. Stakeholders have formed a new national cocoa extension programme, which will be responsible for educating farmers on the proper use of recommended pesticides.

As a result of these efforts, the Nigeria government has banned the use of about 20 commonly used chemicals in cocoa farming. It has listed the recommended pesticides for use on cocoa farms in Nigeria. This study was carried out to assess the extent of

Background

	adoption of the approved pesticides by cocoa farmers in Ondo State.
Study Description	Ondo State lies between latitudes 5°45' and 7°52'N and longitudes 4°20' and 6°5'E with a land area of about 15,500 square kilometers (Ondo State Government, 2004). The main revenue source for the region is cocoa. The region is indeed the core of the Nigerian cocoa belt accounting for over 60% of Nigeria's annual cocoa output.
	The study was conducted in seven (7) cocoa producing local Government Areas in Ondo State. The seven local governments are Akure, Ondo, Akoko, Okitipupa, Ile-Oluji, Owo, and Ifon. The survey, conducted between May and November 2009 based on the production activities in 2007/2008 and 2008/2009 cropping seasons. Data were collected through the use of a structured questionnaire, administered on two hundred farmers selected using a multistage sampling procedure. The data extracted from the questionnaires were entered into Statistical Package for Social Sciences (SPSS) software and analyzed using descriptive statistics, chi-square test of independence, paired sample t-test and logistic regression.
Research Application	The modal age bracket of the respondents was 55-75 years, majority of them were literate (67.05%), had at least primary education (68%) and were experienced (mean = 30 years) in cocoa cultivation.
	Most of the respondents (73.86%) were aware of the approved pesticides through cooperative organizations and the proportion (69%) of the respondents who adopted / used the approved pesticides in 2008/2009 season depicts this high level of awareness among the respondents. Chi-square test result confirmed positive association between membership of cooperatives and compliance with EU directive among cocoa farmers.
	The estimated logistic regression shows that awareness of European Union pronouncement had a significant positive effect on farmers' adoption of approved pesticides in 2008/2009 for controlling blackpod disease.
Recommendation	The study has shown that Nigerian cocoa farmers had considerably changed from using banned pesticides to approved pesticides for controlling blackpod disease in the study area. It has also demonstrated the importance of collective efforts in

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effecting desirable change in the community. However, a detailed analysis is required to determine the economic success of adopting the approved pesticides by cocoa farmers.

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