EFFECTS OF AUDIENCE SIMULATION ON THE KNOWLEDGE OF DIEBACK DISEASE MANAGEMENT AMONG COCOA FARMERS IN IFE EAST LOCAL GOVERNMENT AREA OF OSUN STATE, NIGERIA

Olajide Bamidele Rasak and Oladipupo Olasunbo Kafila
Department of Agricultural Extension and Rural Development, University of Ibadan, Nigeria
Corresponding Address: r.olajide@gmail.com

Abstract

Tonnes of annual cocoa production are lost to pest infestation. Several interventions have been employed to promote alternative pest management for sustainable pest management. This paper examines the potency of audience simulation experimentation on management of dieback diseases of cocoa in Ife East Local Government Area of Osun State, Southwestern, Nigeria. A multistage sampling procedure was used to select 120 cocoa farmers. Data were obtained on farmers' socioeconomic and enterprise characteristics as well as knowledge of dieback disease management before and after exposure to audience simulation. Results show that farmers averaged 60 years old, mostly male (65.0%) and with no formal education (51.7%). Most respondents (66.7%)) were favourably disposed to the use of audience simulation in pest management information dissemination. There was a general improvement in respondents' knowledge level of issues on traditional management of dieback. In addition, more farmers correctly answered questions on environmental friendly practices such as prevention through keeping cocoa seedling in the nursery (75.8%). It is concluded that communication intervention to promote environmental friendly pest and disease management practices could be one of the drivers of transition to alternative pest and disease management. Development agencies should establish community viewing and broadcast centers where extension clientele can be reached in groups.

***Keywords**: Audience simulation, dieback diseases, Pest and disease management*

Introduction

Pest and disease management has played its role in doubling food production in the last 40 years, but pathogens still claim 10–16% of the global harvest (Charkraborty and Newton, 2011). According to the Food and Agriculture Organization of the United Nations (2001), 20 to 40 percent of the world's potential crop production is already lost annually because of the effects of weeds, pests and diseases. Specifically, tonnes of potential annual cocoa production are lost to pest infestation.

In the view of Padi and Owusu (2001), cocoa is perhaps the most important export crop for countries in the forest zone of West Africa and is the main source of foreign exchange for some of them. The cocoa industry in West Africa is dominated by a large number of peasants who cultivate small farms of about 0.5 to 5.0 hectares and who lack the resources (including access to information) to expand or improve their farms. This and other factors combine to plague the industry with serious problems leading to dwindling production levels.

Since the conscious effort of agricultural research is to move productivity from a lower level to a higher level in order to increase the income of farmers and enhance agricultural development (Farinde and Ajayi, 2005), it is therefore important to constantly inform the farming populace about the importance of pest and diseases management. Just as information is vital in every other facet of life, agricultural information is a key component in improving small-scale agricultural production and linking increased production to remunerative markets (Yahya, 2009), thus leading to improved rural livelihoods, food security and national economies. According to (Munyua, 2000) cited in Obidike (2011) the rural urban drift in recent decades in sub-Saharan Africa could be attributed to rural farmers' lack of access to information that would help them achieve maximum agricultural yield, hence they are frustrated. Obidike (2011) points out that the least expensive input for improved rural agricultural development is adequate access to knowledge and information in areas of new agricultural technologies, early warning systems (against drought, pests and diseases outbreak) and improved seedlings.

According to Phrampus, Metro and Williams (2009), human patient simulation; a subset of radio and animation has emerged as a powerful educational modality across the continuum of learners. Simulation is used to demonstrate physiologic principles, physical examination skills, along with bringing topics to life with regards to disease process or variants of physiology. Like other methods that work well with adult learners, it is typically used and most effective in very small groups. A simulation of a system is the operation of a model of the system. In its broadest sense, simulation is a tool to evaluate the performance of a system, existing or proposed, under different configurations of interest and over long periods of real time (Anu, 1997).

Many radio agricultural programmes targeted at farmers are regularly and continuously aired to bring farmers up to beat on new innovation and technologies (Olajide and Amusat, 2012) to bridge information gap occasioned by traditional prints and library based information sources. These radio programme have been evaluated to generate feedback on effectiveness or otherwise of such (Yahaya and Badiru, 2002; Olajide 2011; Olajide and Amusat, 2012). However, previous attempts of evaluation of radio broadcast were based on the assumption that farmers are regular listeners of these radio programmes. This has treated farmers as homogenous groups with no difference in needs and has left them with no option than to make do with whatever information they gather from around them; adequate or otherwise.Little wonder, the desirable impact for which information are disseminated are mostly not achieved.

In view of the position above and considering that much as information is an essential ingredient in agricultural development programmes, farmers seldom feel the impact of agricultural innovations either because they have no access to such vital information or because it is poorly disseminated occasioned by wrong choice of channels. For a significant level of intended change to be achieved, therefore, access to required information and ability to utilise such places a high premium on the channel used.

It is against the aforesaid that audience simulation experimentation with information on pests and diseases that affect cocoa as observed in the study area were of interest in this study. The study identified the socio-economic characteristics of cocoa farmers in the study area; described their enterprise characteristics, ascertained their attitudes to the concept of audience simulation for information on disease management dissemination; and determined changes in knowledge of dieback disease management of cocoa farmers before and after exposure to audience simulation.

Methodology

The study was undertaken in Ife East Local Government Area (LGA) of Osun state, Souhwestern, Nigeria with an area of 9,251 square kilometer and a population size of 34,137,627 (NPC, 2006). The population for this study was cocoa farmers in the LGA. A multistage sampling procedure was used for selection of respondents. In the first stage, purposive sampling technique was used to select Ife-East LGA because cocoa farming is prominent in the LGA. In the second stage, one ward known for highest cocoa output in the LGA was chosen. In the third stage, three farming communities were selected randomly from the selected ward. In the fourth stage, from each community, 40 cocoa farmers were systematically sampled from every other household. From each selected households, one person who has been in cocoa production in the last ten years was interviewed resulting in 120 respondents from the three communities

The study used a quasi-experimental research design. The study was undertaken in three phases with the first phase involving collection of baseline quantitative data on farmers' knowledge of cocoa dieback disease management. Thereafter, farmers were exposed to audience simulation through a tape recording of management practices of the cocoa dieback disease. This was carried out by developing messages on management practices of dieback disease of cocoa in form of audio and selected farmers were organized in groups to listen continuously to the recorded message for three weeks. In the third phase, post-exposure quantitative data on the dieback disease management was collected after three weeks of continuous exposure to messages from the same groups to determine any change in the knowledge of respondents in management of dieback disease of cocoa. This was to ascertain the impact of the intervention.

The dependent variable of this study was the change in knowledge of dieback diseases management among

cocoa farmers. The change in knowledge was generated from difference between mean scores of the pre and post knowledge (measured with 20-item knowledge statements) scores of the farmers. Response options for the questions were Yes and No. An increase in knowledge was expressed with higher mean score of post intervention compared to pre-intervention mean score. Data obtained were analysed using both descriptive (frequencies, percentages and mean) and inferential (t-test) statistics at p=0.05.

Result and discussion

Respondents' socioeconomic and enterprise characteristics

The age distribution of the respondents ranged between 18 to 88 years with the mean age at 59.01±16 years. More than one-third (35.0%) of the respondents fell between the ages of 50-65 years, while only about 6.7% were less than 33 years of age; as shown on Table I. This shows that majority of the farmers are old and less energetic which explains the reason for hired labour by respondents. This is in line with Gul Unal (2008) that old age might pose a disadvantage in agriculture because most of the work is physically demanding and older folks might be too conservative to try new and more efficient technologies.

Data further reveals that while males were 65.0% of the respondents, females were 35.0%. This suggests that more males than females are involved in cocoa production in the study area. This supports the findings of Durodola (2014) who reported that there are more males than females in agriculture. This also agreed with the findings of Olujide and Adeogun (2006) in assessment of cocoa growers' farm management practices in Ondo state, Nigeria which confirms that cocoa farmers are mostly male.

Information on respondents' educational level reveals that only 17.5% of respondents had up to secondary education. A higher percentage of the respondents (51.7%) had no formal education, while only 2.5% of respondents had tertiary education. This implies that majority of the respondents had no form of education. This corroborates the view of Kumar and Quisumbing (2010) that in sub-Saharan Africa many farmers have low level of education and that improving their education would probably increase agricultural productivity and reduce poverty. Table I further shows that 45.9% of the respondents had been engaged in agricultural production for more than 23 years, while 29.2% of the respondents had been in farming for 23years or less. This supports the findings of Ugwuja *et al* (2011) who found that majority of farmers have more than 15 years of farming experience.

Furthermore, result shows that a majority (66.7%) of the respondents had less than 5 hectares while less than 1.0% had up to 16 hectares of land for cocoa production. This is in agreement with Padi and Owusu (2001) who pointed out that majority of cocoa farms in West Africa are small holdings owned by a large number of peasant farmers. The result on farm outputs shows that 40.8% of the respondents recovered up to 10 bags of cocoa and 49.2% of the respondents made output of between 11 and 20 bags in the season preceding the year of this survey and only 9.2% produced 21 to 30 bags of cocoa. This implies that cocoa production is affected greatly by a number of challenges which include dieback disease especially if one considers size of farm holdings of these farmers.

Result on number of farm locations shows that 51.7% of the respondents had two farm locations and only 25.0% had more than three farm locations. Results on sources of farm labour show that 93.3 % of the respondents engaged hired labourers for farming while 6.7% use family members as their source of labour. This might be possible because higher percentages of the respondents are old and perhaps are less active. Also**,** 95.0% of the respondents' source of finance was by self, while 1.7 % of respondents got financed by family and only 0.8% sourced finance from cooperatives.

Table 1: Distribution of cocoa farmers based on their socioeconomic and enterprise characteristics

Variable	Categories	Frequency	Percentage
Age (years)	18-33 years	1	6.7
	34-49 years	46	20.8
	50-65 years	40	35.8
	66-81years	22	31.7
	>81	13	5.0
Sex	Male	78	65
	Female	42	35
Education	No formal education	62	51.7
	Primary education	34	28.3
	Secondary education	21	17.5
	Tertiary education	3	2.5
Farming experience (Years)	2-23 years	35	29.2
	24-45 years	30	25.0
	46-67 years	38	31.7
	68-89 years	17	14.2
Farm size	Less than 5ha	80	66.7
	6-10ha	34	28.3
	11-15ha	5	4.2
	16-20ha	1	0.8
Number of farm location	1	25	20.8
	2	62	51.7
	3	3	2.5
	More than 3 locations	30	25.0
Last season output	Less than 10bags	59	49.2
	11-20bags	49	40.8
	21-30 bags	11	9.2
	More than 30 bags	1	0.8

Source: Field survey, 2014

Attitude of respondents towards the concept of audience simulation

The favourable disposition of farmers to use of audience simulation approach is not in doubt as they responded positively to most of the issues raised in their attitudinal disposition to the broadcast method. For instance, while majority (75.8%) were affirmative on social desirability of audience simulation, 65.0% also agreed that messages from audience simulation may be more easily understood (Table 2). The farmers could be coming from the background of what they stand to gain in listening to a broadcast that addresses their problem in groups. It might also be a forum to proffer solution to common problem that confronts them as well as another opportunity to create an alliance to combat the disease frontally in group. From the position of majority who opined that the message could be easily understood, it is given that debate and discussion would ensue soon after the broadcast is over. This would no doubt engender better understanding as individual farmer seeks clarifications (Adesina and Zinnah, 1993).

Furthermore, while a reasonable proportion (53.3%) were in doubt about whether the simulation broadcast methodology is for small scale farmers, 50.8% debunked the fact that it offers no room for feedback, while more than two-third (69.2) equally disagreed that they will easily forget message received from audience simulation channel. The farmers' position of doubt of audience simulation being for them is understood considering neglect they experience on regular basis from several facets of their livelihood.

The latter optimism expressed in respect of feedback opportunity as well as retention of messages thereof, perhaps, was reinforced by the conviction of 59.2% of the respondents that audience simulation provides direct contact to object of dissemination, therefore makes it sound more like live broadcast. Again, while 59.0% believed that audience members' composition especially mixed audience will impact the use of audience simulation, 73.3% were not in any doubt that participation in audience simulation will help in better management of pest and diseases on their farms.

The positive rating of audience simulation by this set of respondents was reinforced by 76.6% who unequivocally asserted that audience simulation is a good communication approach and that its message could enhance their understanding of dieback disease.

In all, it can be safely concluded that most cocoa farmers (66.7%) were favourably disposed to the use of audience simulation in disseminating diseases management information.

Table 2: Distribution of respondents based on their attitude towards the concept of audience simulation n=120

	Statement	SA	A	U	D	SD
1	Audience simulation is socially desirable	75.8	7.5	15.8	0 .0	0.8
2	Message is easy to understand with audience simulation	65.0	20.0	15	0 .0	0 .0
3	Audience simulation is not for small scale farmers	1.7	14.2	53.3	15	15.8
4	Audience simulation does not give room for feedback	5.0	11.7	32.5	38.3	12.5
5	I easily forget messages from audio audience simulation	1(0.8)	3.3	26.7	26.7	42.5
6	Audience simulation provides direct contact to object of dissemination, therefore makes it sound more like live broadcast	25.0	34.2	39.2	1.7	0.0
7	Audience members' composition especially mixed audience will impact the use of audience simulation.	59.0	22.5	18.3	0.0	0.0
8	My participation in audio simulation will help in managing pest and diseases on my farm better	73.3	0.0	9.2	15.8	10
9	Audio audience simulation is not a good communication approach	2.5	2.5	18.3	8.3	68.3
10	Audience simulation further compounds problem of understanding messages.	1.7	0.0	15.0	11.7	71.7
	Overall attitudinal disposition	Favourable 66.7			Unfavourable 33.3	

Source: Field survey, 2014 Figures are in percentages

Farmers' knowledge of dieback disease management practices after exposure to audience simulation

From available data in Table 3, there was a general remarkable improvement in respondents' knowledge level in the post intervention period of simulation. Notable among items that recorded at least two-third improvement in the post intervention performance of the farmers were the realisation that dieback disease affects cocoa from seedling (94.2%), the effect is felt during dry season (75.0%), dieback kills cocoa stems (90.8%), internal discoloration of stems (91.7%) and prevention through keeping cocoa seedling in the nursery and free of moisture (90.%) as against 36.7%, 27.5%, 29.2%, 38.3% and 38.3% of respondents who got these correctly in the pre intervention period. However, two items recorded a drop in the performance of farmers in the post test period. Though insignificant, more respondents (63.3%) and (39.2%) respectively, correctly answered the questions on potency of dieback disease both at the nursery and field levels as well as the prevention of dieback through proper spacing during the pre-simulation intervention compared to 62.5% and 37.5%, respectively, in the post intervention phase. The result on proper spacing leaves so much to be desired as the proportion that got it right at both pre and post intervention era were abysmally low. This might be due to deep rooted belief in the traditional practices that the farmers are familiar with and had stuck to.

While the result above may leave one in doubt about the effects or impact of the simulation on respondents' knowledge of dieback disease, the picture painted by the set of data in Table 4 reflects the significance of the simulation intervention. While less than a quarter of the respondents (22.5%) had high knowledge of the dieback disease in the pre-intervention phase, the proportion of respondents with high knowledge (52.5%) was more than double those that had high knowledge in the pre-intervention period. In concrete term, whereas, the mean score was 10.8 in the pre-intervention phase, it rose to 15.1 in the post-intervention stage.

Table 3: Distribution of respondents by pre and post audience simulation knowledge of dieback disease management

S/No	Item	Before %	After %
1.	The mortality rate of dieback on infected farm could be total.	76.7	95.8
2.	Dieback does not affect cocoa tree at seedling stage of development.	36.7	94.2
3.	The younger the seedling at the time of infection, the greater its chance of being killed.	71.7	83.3
4.	Dieback can affect trees both in the nursery and on the field.	63.3	62.5
5.	Dieback only affects older cocoa trees.	31.7	68.3
6.	An infected tree starts by showing some little yellow spots on the leaf at the tip of the tree.	59.2	70.8
7.	Dieback affects cocoa in all seasons.	56.7	77.5
8.	The effect of dieback is not felt during dry season.	27.5	75.0
9.	Colour changes of cocoa leaves from green to yellow are not dieback symptoms to look out for.	70.0	75.8
10.	Spotted leaves are one of the critical symptoms of dieback.	54.2	92.5
11.	Dieback cannot kill cocoa stem.	29.2	90.8
12.	Dropped leaves signify advanced dieback infection.	90.8	92.5
13.	Internal discoloration of stem occurs in trees affected by dieback?	38.3	91.7
14.	Planting of disease free seedlings cannot prevent dieback.	48.3	85.0
15.	Ensuring that prepared field for cocoa planting is disease free is a means to prevent dieback outbreak.	58.3	89.2
16.	Keeping cocoa seedling in the nursery and free of moisture can help prevent dieback.	38.3	90.0
17.	Mealy bug is a suspected vector of dieback.	52.5	90.0
	Ants crawling up cocoa tree and building soil tunnels may play host to sources of diseases.	50.8	92.5
	Adequate shading in the nursery is a measure to prevent dieback.	45.8	75.8
	Adequate or proper spacing will not prevent dieback.	39.2	37.5

Source: Field survey, 2014

Table 4: Categorization of respondent's level of knowledge before and after the simulation (n=120)

Level of knowledge	High	Low	Mea score
Before	27 (22.5)	93 (77.5)	10.1
After	63 (52.5)	57 (47.5)	15.1
Change	66 (55.5)	54 (45.0)	

Test of difference between knowledge of dieback disease in the pre and post simulation intervention

The result of the inferential statistical analysis of the test of the difference between the pre and post intervention phases of the simulation (Table 5) indicates that there was a significant difference between knowledge possessed by the respondents in the two periods. This is in tandem with the position of Gershon, Rinku and Jaime (2004) in their study of the acquisition and diffusion of knowledge in pest management in Indonesia.

Table 5: Paired sampled t-test between the knowledge before stimulation and the knowledge after simulation.

Hypothesis	Mean	SD	Df	t-value	p-value	Decision
Difference in knowledge before and after	14.50	4.36	119	-6.25	0.000	Significant difference

Level of Significance=0.05

Conclusion and recommendation

Evidences from the results of the study show that cocoa farmers in the study areas are mostly male, old and experienced but had small farm holdings in scattered locations. They were mostly favourably disposed to the audience simulation broadcast method and benefited greatly as the audience simulation recording enhanced their knowledge of the dieback disease. It is recommended that all stakeholders, (government agencies and non-governmental establishments) should evolve the use of audience simulation in reaching out to farmers This can be achieved by establishing community viewing and broadcast centers where extension clientele can be reached in groups.

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