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PERCEPTION OF "FADAMA" III PARTICIPATING FARMERS ON PESTS AND DISEASES AND THE USE OF INTEGRATED PEST MANAGEMENT CONTROL STRATEGY IN KWARA STATE, NIGERIA

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Abstract

A survey was carried out towards the end of the year 2011and early 2012 to elucidate the perception of "fadama" III farmers, in the 16 local government areas of Kwara state, about Integrated Pest Management (IPM). The study was carried out by flexible semi-structured interview survey method questionnaires which were distributed equally (i.e. 20 respondents per Local Government Area). The results of the survey indicated that 99.7% of the respondents are indigenes of Kwara state; majority are males (87.5%) while 95.6% are married. Eighty percent of the respondents fall between the age bracket of 30 and 59 years with a mean of 46.7 years. Only 20% had no formal education and the mean farming experience is 24.3 years. Forty seven percent of the total respondents practiced livestock farming with the most commonly kept animal being goat (32.8%). Twelve percent of the respondents engage in fish farming, while 80.6% engage in crop production. The most widely planted crop is maize (72.2%), while 18.3% and 10% of respondents, believed insects and diseases respectively to be the most important factors responsible for yield reductions. The results also indicated that farm size and frequency of extension visits to respondents' farm are positively correlated (r = 0.242 and r = 0.219 respectively). Two-third of the respondents were aware of IPM and a large majority (82%), claimed to practice it. The study showed that under environment friendly atmosphere, IPM knowledge by "fadama" III farmers could ensure improved agricultural productivity in Kwara State - Nigeria.

Key words: *Fadama, Self-sufficiency, Disease awareness, Extension agents, Resource Management, Nigerian agriculture*

Introduction

"Fadama" is a Hausa word for wetlands or floodable floodplains along major savannah rivers. The objective of the fadama, project is to increase the incomes of fadama land and water resources users on a sustainable basis (Junk *et al.*, 1989). To ensure that the objective of self-sufficiency in food production is achieved by increased agricultural production during both wet and dry seasons, the National Fadama Development Project was structured into developmental stages for efficiency in implementation strategy (Obiechina 2000). The projects are designed to be a participatory and socially inclusive approach that empowers farmers, to take control of and manage their resources for their own development (Aderinola, 2001). It is expected that the fadama programme will reduce the poverty level of smallholder farmers through increased agricultural production and the attendant increase in income (Ogunlela and Ogunlela, 2008). The main financiers of the project are the World Bank, the African Development Bank and the Nigerian government (NFDO, 2005).

Fadama farmers in Kwara State- Nigeria, utilize the large expanse of fadama lands for both crop production and grazing. Other major activities include fishing/fish farming and afforestation programmes (NFDO, 2007). However, there are numerous challenges militating against optimum derivable benefits that the Fadama has the potential to provide stakeholders. One of the most important of these

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challenges is that of insect pests, diseases and weed management in crop lands and on cattle and small ruminants, which must be dealt with decisively (Van der Wulp and Pretty, 2005).

Pests are commonly considered to be insects, mites, rodents, nematodes, birds, snails, slugs, and any form of plant or animal life or any pathogenic organism that is injurious or potentially injurious to plants, plant products, livestock or people (Africa Recovery, 2001). The intensification of agriculture has often brought with it pest-related problems, harmful chemicals threaten the environment and human health alike (Cooper and Dobson, 2007). Integrated Pest Management (IPM) has emerged as a way towards maintaining or increasing agricultural productivity without over-reliance on synthetic chemical pesticides (Rath and Maity 2005). A fundamental principle of IPM emphasizes the need not only to deal with pests and diseases once they have become a problem but also to promote the growth of healthy crops or livestock while conserving the natural resource base (Nathaniels *et al.,* 2003).

Nigerian agriculture has, to a large extent, not divorced itself from most of the characteristics of a peasant economy that were prominent in the pre-independence period and resource-poor farmers in rural areas, represent over 90 percent of the farming populace (Edache, 2006). Well detailed information about farmers' awareness of pests and diseases is necessary in fashioning programmes that would aid the actualization of the objectives of the fadama III programme. The objectives of the study therefore were to: (1) evaluate the knowledge and awareness of participating farmers about pests and diseases, as well as their perception of their importance in food production; (2) determine the awareness and level of practice by fadama farmers of IPM and (3) recommend effective mitigation measures as part of the IPM diagnostic survey of fadama sites in the 16 Local Government Areas of Kwara State, Nigeria.

Materials and Methods

Survey Methodology

The study was carried out by survey through the instrument of structured questionnaires. The use of flexible semi-structured interview survey method was employed to gain understanding into attitudes, behaviours and opinions of the farmer population at a given point in time (Allan and Skinner, 1991). The questionnaires were designed in such a way as to elicit information on selected socio-economic background of the respondents, knowledge and awareness of pests and diseases on livestock, fishing and crop farms. It also sought information on awareness and practice of IPM. Twenty questionnaires were purposively distributed to each of the local Government areas of the state. In all, three hundred and twenty (320) questionnaires were distributed to respondents. They were distributed and retrieved by assigned facilitators of the fadama office.

Statistical Analyses

Information obtained from retrieved questionnaires were coded and inputted into microsoft excel spreadsheet from where it was analysed using the Statistical Package for Social Sciences (SPSS version 13). The results presented in frequency and percentage.

RESULTS AND DISCUSSION

Socio-Economic Characteristic of Respondents

As shown in Table 1, majority, 318 (99.4%), of the respondent farmers are from Kwara state, while the rest (2) are from Ekiti and Osun state respectively. Majority of the respondents (87.5%) are males while the rest are females. It is the general belief that the tedious aspect of farming is reserved mainly for men. Adebisi-Adelani *et al.* (2011) showed that there is significant difference in all the activities performed by male compared to their female counterpart in fadama vegetable production. This assertion is also in agreement with the findings of Chinyere (1993) who reported that female farmers are not statistically identified as an active population in farm operations and as a result, their productive economic roles are regarded as part of their

domestic and reproductive roles. Majority of the respondents are married (95.6%), while the others are either single or divorced (4.4%). This could have a positive effect on the availability of family labour.

All the respondents are adults with only 3.4 % of them being in their twenties. 62.5% are in their middle ages of between forty and sixty years. The rest are in the age bracket of above 60 years. This shows a statistically normal distribution. This indicates that most of the farmers that participated in the program are in their active productive years. The age of the farmer according to Adewumi and Omotesho (2002) is expected to affect his productivity, output and the adoption of innovations in farming. Akangbe *et al.*(2012) also found the mean age of fadama farmers in Orire Local Government Area of Oyo state, Nigeria to be 36.6 years and attributes this to improvements in the farming environment, profitability and attractiveness of farming practices.

A cumulative of 20.4% of the respondents are without formal education while 28% have primary education. 84 respondents (26.8%) have secondary school education while 78 (24.8%) have tertiary education [i.e. Nigeria certificate in education (NCE), National diploma certificate (ND), Higher national diploma certificate (HND) or a Bachelors degree and above]. The attainment of any type education is expected to have a favourable attitude towards the adoption of agricultural innovations. It is therefore not surprising that a high percentage of the respondents (79.6%), possessed formal education. This finding agrees with Seyoum *et al*. (1998).

A total of 20 respondents (6.9%) have less than 10 years of farming experience while a majority (97; 30.4%) have between 10 and 19 years of farming experience. Following a normal disrtibution, only a minority (5.6%) have over fifty years experience in farming. Simonyan *et al.*(2012), viewed that fadama farming experience was highly significant in determining the technical efficiency of beneficiary farmers. Farmers with more years of farming experience therefore tend to be more efficient in production.

Practice of Livestock Farming

Table 2 shows the classification of respondents according to practice of livestock farming. The results show that of the valid respondents (262), 149 (56.9%) take part in one form of livestock farming or the other. The remaining 113 responded as not practicing it, while 58 people declined to respond at all and only a few respondents considered diseases as important in their livestock, obviously because they had few heads of animals. Ajayi and Nwalieji (2010), noted that the generality of fadama farmers had preference for vegetable cultivation than for livestock production. Blench (1999), had reported that in west-Africa, livestock farming has largely resisted transfer from the traditional sector to modern production methods. The majority of the livestock, especially cattle, are managed by the Fulani ethnic group, who have largely retained a pastoral system. These reasons could be adduced for the low interest in livestock farming by the fadama farmers.

Crop Production Practices

Table 3 shows the distribution of respondents according to crop production practices. It indicates that 87.5% of respondents cultivate one crop or the other. Of the respondents who cultivate crops, 128 (44%), which is the majority; have between 1 and 3 hectares (ha) while 30.2% have between 4 and 6 hectares. The remaining respondents (75; 25.8%) claimed to have over 6 hectares of crop farm. Guinea corn (Sorghum) is planted by 34.4% of the total respondents. Maize is cultivated by 72 %, while 61% cultivate cassava. Cowpea is grown by 9.1%, while yam is cultivated by 14.4%. Other crops including vegetables are grown by 25% of the respondents. Afolabi (2010), in a similar study also reported that majority of the respondents operated small-scale farms and 41.17% of these respondents grew tomatoes while 25% of them grew pepper and 49.17% of them grew maize. Bello *et al.* (1998) reported that majority of the farmers of

Sokoto Rima basin operate on a small - scale basis with only 2-3 hectares of fadama plots under their operation. While Akangbe *et al.* (2012), reported that 40% of the fadama farmers in Orire local government area of Oyo State-Nigeria, operate between 1.61 – 3.2 hectares.

Perception about Pests and Diseases

Table 4 shows the distribution of respondents according to perception about pests and diseases. Majority (59%) of the responding farmers considered weeds as the most problematic of pests on their farm. Insect pests was rated first by 18.3%, while others including wild animals was rated first by only 12.5%. Diseases were rated first by only 10% of the respondents. This perception shows that diseases, despite their importance, are seldom considered by farmers as very important, as they usually confuse their symptoms with other physiological conditions. For example, it is not uncommon to think of viral disease symptoms as that of lack of fertilizer. Balogun *et al.* (2010) had reported similar perception in a study among vegetable farmers in a North Western State of Nigeria. Siam weeds and other broad leaf weeds were rated first by 44.4% of the respondents, while elephant grass was rated first by 13.8% of the respondents. Other weeds not named were rated first by 25%. There is no doubt that weeds are important problems in crop production fields and the respondents were knowledgeable about the adverse effects of weeds as reported by Banjo *et al.*(2010).

Despite being rated first in importance by only 10% of respondents, many have a fair knowledge of the type of diseases on their field. Depending on the crops planted many diseases were listed. They include cassava mosaic, yam rot, sugarcane smut, rice blast bean blight, swollen roots and vegetable yellowing among others. Similarly they were also able to describe the commonly observed insects. Of the 245 respondents that rated severity of pests and diseases, majority (128; 52%) rated the damage caused as moderately substantial, while only 23 (9.4%) rated them as not substantial. Meanwhile, only 21% rated them as very substantial. This finding is in disagreement with the assertion by Ogundele, (2001), that there are fewer occurrences of pests and diseases problems on fadama farms due to low atmospheric humidity.

Integrated Pest Management (IPM) Awareness and Practice

Table 5 shows the distribution of respondents according to their awareness and practice of IPM. Majority of the respondents (186; 66.4%) are aware of IPM. The remaining i.e. 33.6% claimed ignorance. Forty people did not attempt the question. Of the 170 respondents who attempted the question, majority (139; 81.8%) claimed to practice IPM, while 31 i.e. 18.2% responded in the negative. A total of 150 people declined to give any opinion probably out of ignorance of the concept. This is probably due to the fact that implementing IPM requires farmers to understand agro-ecological processes and to make informed decisions on how best to manage crops to avoid pest infestations, as well as managing pests once they become a problem.

As can be seen in Table 5, the combination of chemical, cultural and physical control methods was the most favoured by respondents. Organic agriculture and biological control were the least selected. The findings indicate that there is gap to fill in the aspect of making the farmers embrace organic and biological control methods. This is more so in view of the present day realization that chemical residue may be harmful not only to the environment but the growers and consumers alike.

Access to Extension Services

Table 6 shows the distribution of respondents according to access to extension services. The table shows that majority of the respondents 68.7% enjoy extension services, while 31.4% claimed they do not . 155 farmers, i.e. 78.7 % of the respondents admitted a visit of at least thrice a year, while 6.6% admitted only once. 123 people did not attempt the question.

Concerning the availability of IPM guidelines from extension agents to them, respondents are about even in their response. Whereas 114

(48.5%) were positive, 117 (49.8%) were negative. 1.7 % were indifferent. Meanwhile, 85 people did not attempt the question. 71.5% of respondents found pieces of advice from extension agents very useful. This finding which is in contrast to Baba and Etuk (1998) is encouraging and indicates that more efforts should be made to get the extension services working at all times. Only 6% of the respondents find no usefulness for extension advice and this may even be due to ignorance. Belay (2003), reported that the absence of effective linkage between extension agents and farmers have repeatedly been one of the major reasons for the low productivity of Ethiopian agriculture. The research-extension-farmer relationship should be viewed as an interdependent and inter-related continuum so as to increase agricultural productivity and thereby raise the living standard of the rural population.

Table 1 Distribution of Respondents according to selected socio-economic characteristic of respondents

Variable	Frequency	Percentage
State of origin		
Ekiti	1	0.3
Kwara	318	99.4
Osun	1	0.3
Sex		
Male	40	12.5
Female	280	87.5
Marital Status		
Single	13	4.1
Married	306	95.6
Divorced	1	0.3
Age group		
20-29	11	3.4
30-39	55	17.2
40-49	94	29.4
50-59	106	33.1
60 and above	54	16.9
Educational qualification		
Non formal	64	20.4
Primary	88	28.0
Secondary	84	26.8
Tertiary	78	24.8
Years of farming experience		
<10yrs	20	6.9
10-19	97	30.4
20-29	83	26.0
30-39	57	17.6
40-49	44	13.5
50 and above	18	5.6

Table 2 Classification of Respondents according to Practice of Livestock Farming

Variables	Frequency	Valid percent
Do you practice livestock farming		
Yes	149	56.9
No	113	43.1
Type of animal kept		
Goat	105	32.8
Sheep	58	18.1
Fowls	29	9.1
Pigs	10	3.1
Snails/others	2	0.5
Dominant Pests and Diseases		
Ringworm	8	2.5
Lice	7	2.5
Others (coccidiosis, diarrhoea etc.)	27	8.4

Table 3 Distribution of respondents according to crop production practices

Variables	Frequency	Valid percent
Do you produce crops?		
Yes	258	
No	37	87.5
		12.5
Farm Size (ha)		
1-3	128	44
4-6	88	30.2
Over 6 ha	75	25.8
Crop Type	110	34.4
Sorghum/Guinea corn	231	72.2
Maize	194	60.6
Cassava	29	9.1
Cowpea	46	14.4
Yam	79	24.7
Others		

Table 4 Distribution of respondents according to perception about pests and diseases

Variables	Frequency	Valid percent
Most Important pest of crops		
Diseases	28	10
Insects	51	18.3
Weeds	165	59.1
Others (e.g. wild animals)	35	12.5
Most Important weed		
Elephant grass	44	13.8
Siam weed	142	44.4
Spear grass	21	6.6
Others	80	25
Commonly observed diseases		
Yam rot	25	7.8
Cassava mosaic	75	23.5
Maize streak	15	4.7
Vegetable yellowing	67	20.9
Sugarcane smut	20	6.3
Rice blast	12	3.8
Bean blight	32	10
Swollen root	41	12.8
Others	56	17.5
Commonly observed insects		
Termites	102	31.8
Grasshoppers	93	29.1
Stem borers	20	6.3
Caterpillars	80	25
Ants	90	28.1
White flies	7	2.2
Mealy bugs	22	6.9
others	51	15.9
Rating of disease severity		
Not substantial	23	7.2
Substantial	42	13.1
Moderately substantial	128	40
Very substantial	52	16.3

Table 5 Distribution of respondents according to their awareness and practice of IPM

Variable	Frequency	Percent
Awareness of IPM		
Yes		
No	186	66.4
	94	33.6
Practice of IPM		
Yes	139	81.8
No	31	18.2
Favorite IPM combination		
A (bio,cultural, physical)	10	7.1
B (bio, organic, physical)	1	0.7
C (physical, organic, chemical)	9	6.4
D(chemical, culutral, physical)	120	85.7

Table 6 Distribution of respondents according to access to Extension services

Response	Frequency	Valid percent
Access to Extension services		
Yes	193	68.7
No	88	31.3
Frequency of visits		
Once a year	13	6.6
Twice a year	29	14.7
Thrice or more a year	155	78.7
Availability of guidelines		
Yes	114	48.5
No	117	49.5
Don't know	4	1.7
Usefulness of guidelines		
Not useful	13	6.1
Useful	11	5.1
Just useful	37	17.3
Very useful	153	71.5

Conclusion and Recommendations

Based on the findings from the study, the deleterious effects of pests and diseases on fadama farms could be ameliorated through integrated pest and disease management approaches. The main IPM strategies include crop rotation, crop management, good drainage, flooding (paddy rice), pathogen-free transplants, and quarantine, planting of resistant or tolerant cultivars, the possible use of pesticides such as fungicides, nematicides, bactericides, herbicides and good farm sanitation practises.

IPM, knowledge ensures judicious use of resources under an environment friendly atmosphere. However, such knowledge is not easily shared through traditional technology transfer extension models. The fadama programme adopts a demand – driven approach, where farmers are encouraged to develop participatory and socially-inclusive Plans. The use of IPM is therefore suitable to the fadama farmer. The control of pests and diseases using IPM procedures, would result in sustainable environment, increased farmer income and food security.

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