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Perceived Effect of Pastoralism on Arable Crop Production in Ido Local Government Area of Oyo State, Nigeria

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Abstract. In recent time, intense pastoralism has been impacting on arable farming across Nigeria. The study assessed arable crop farmers' perception of effect of pastoralism on arable crop production in Ido Local Government Area of Oyo State, Nigeria. Multistage sampling technique was used to select 125 arable crop farmers from 9 villages in 2 functional Agricultural Development Programme (ADP) extension cells noted for pastoralism. Interview schedule was used to collect data on respondents' socio-economic characteristics, pastoralism challenges, consequences of identified challenges, adaptation against pastoralism challenges and opinion on reducing pastoralism challenges. Data were analysed using descriptive and inferential statistics at p=0.05. Majority were ≤50 years old (60.0%), males (90.4%) and had education below secondary school (81.6%). Respondents' average farm size, farming experience and annual income were 2.1 hectare, 26.5 years and ₦236368.00 / $775.00 respectively. Identified pastoralism challenges include crop destruction (99.2%), water pollution (96.0%) and harassment from pastoralists (94%). Consequences of pastoralism include low income (90.4%) and reduced farming hours due to fear of attack (74.4%). Adopted mitigation measures include dialogue (87.2%) and extension intervention (84.8%). Farmers expressed strong view that culpable pastoralists should pay compensations for crop damage (98.4%) and development of hay and silage markets (97.6%). Significant relationship existed between age (χ^2=8.550, p< 0.05) and sex (χ^2=0.107, p<0.05) of the respondents and their perception of effects of pastoralism on arable crop production. Pastoralism is exerting negative effects on arable crop farming activities in the study area. Farmers and pastoralists should therefore pursue dialogue moderated by government for improved relationship.

Keywords: Pastoralism, Arable Crops, Effect, Mitigation

1. Introduction

Pastoralism is an integral part of Nigerian livestock farming. Cattle, sheep and goats

contribute to the protein and diary needs of the country. Like in other sub-Saharan countries in Africa, Nigerian pastoralists graze animals freely on available pasture and allow herd access to water across the country. According to FAO (2011), movement of pastoralists and their herds is usually opportunistic and largely determined by seasonal availability of pasture and water resources. Cattle rearing is prevalent in the guinea, sudan and sahel savannah belts where crop production is carried out during short season on a small scale. This gives herdsmen access to a vast area of grassland. The herders have to move southwards to the coastal zones where the rainy season is longer and the soil retains moisture for long, in search of pasture and water (Tonah, 2006). The negative consequences of climate change have increased the frequency and population of herdsmen moving into the southern parts of Nigeria, where many farmers grow arable crop. This development implies competition for available land and water resources by crop farmers and herdsmen in the zone. This competition has often times turned into serious overt and covert manifestation of hostilities and social friction in many parts of Nigeria. Herdsmen allow their animals to graze extensively while crop farmers cultivate in the open. Also, the need to take advantage of available water in swamps, streams, rivers and lakes during dry season increases the chance of both herdsmen and crop farmers having close contacts. Natural tensions inherent in competing for scarce resources by the two categories of farmers often impact on food production and food security in the country. Experience has shown an increase in rate of complaints by crop farmers on how herdsmen and their animals have been impacting on crop farming activities in recent time in Nigeria. Blench (2003) noted that farmer-pastoralist conflicts are increasing both in terms of recurrent and intensity. Nweze (2005) also reported that many farmers and herders had lost their lives and herds, while others were experiencing dwindling productivity in their herds.

Frequent destruction of farm land by pastoralists and the resultant conflicts have consequences on arable crop production and livelihood of the farmers. Tonah (2006) observed that since the drought of 1970s and 1980s, and massive increase of herdsmen moving to the fringes of humid forest zone of West Africa, there has been increase in farmers-herders conflict. Over the past decade, the intensity, frequency and geographical scope of these incidents have risen sharply and rapidly. Therefore the increase influx of pastoralists into Ido Local government Area of Oyo state, being an area with ample favourable vegetation for pastoralism is expected to come with some consequences. Olaleye *et al;* (2010) noted that pastoralists do encounter problems with the local people because farmers' crops were being destroyed by their cattle. It is against this background that the study assessed farmers' perception of effect of pastoral farming on arable crop production in the study area.

The main objective of this study was to investigate crop farmers' perception of effect of pastoralism on arable crop farming in Ido Local Government Area of Oyo State, Nigeria. The specific objectives were to:

- describe the socio-economic characteristics of arable crop farmers in the study area;
- identify pastoralism related challenges affecting arable crop farming in the study area;
- ascertain the extent to which consequences of pastoralism related challenges have affected arable crop farming in the study area;
- ascertain measures adopted by crop farmers against pastoralism related challenges in the study area;
- determine arable crop farmers' opinion on reducing pastoralism related challenges in the study area.

1. Methodology

The study was conducted in *Ido* Local Government Area (ILGA) of *Oyo* State, Nigeria. It is located between Latitude 6' 45' and 9' 45' North of the Equator and Longitude 2' 30' and 9' 45' East of Greenwich Meridian. The Local Government shares boundary with Oluyole Local Government, Ibarapa East Local Government, *Akinyele* Local Government,

Ibadan North West Local Government, Ibadan South West Local Government, *Ibadan* North Local Government areas of *Oyo* State and *Odeda* Local Government in *Ogun* State. It covers an area of 986km^2 and a population of 123, 380 persons. Like most cities in Southern Nigeria, ILGA is characterized by dry and the rainy season. The people are predominantly *Yorubas*. The main occupation of the inhabitants of ILGA is farming in food and cash crops such as cassava, maize, yam, vegetable, cocoa, oil palm and kolanut. The ILGA is also blessed with large hectares of grassland which is suitable for pastoral farming.

2.1 Population of the Study

The population of the study comprised arable crop farmers in *Ido* local Government Area of Oyo state, Nigeria.

2.2 Sampling Technique and Sample Size

A multistage sampling technique was used to select sample for the study. *Ido* Local Government Area (IDLGA) is an Agricultural Development Programme (ADP) extension block in *Oyo* state, Nigeria. There are ten extension cells in IDLGA. Two of the cells were purposively selected based on functionality and prevalence of pastoralism. Villages that constitute the selected cells were identified i.e 11 villages in cell 1 and 6 villages in cell 2. Fifty percent (50%) of the identified villages were selected i.e. six villages for cell 1 (*Abiose, Odebode, Akinemi, Idigbaro, Aba asa and Omi onigbabgo)* and three villages (*Aturu, Koguo,Omi Adio)* in cell *2.* All arable crop farmers listed in the selected villages constituted sample for the study, giving a total of 125 respondents (Table 1).

Table 1: Summary of Sampling Procedure and Sample Size

ADP Extension Block	Number of ADP extension cells in ILGA	Selected ADP extension cells based on functionality and prevalence of pastoralism	Villages in selected cells	Selected villages (50%)	Number of arable crop farmers in selected villages (100%)
Ido Local Government Area (ILGA)	10	2 (Cells 1 and 2)	**Cell 1**	**Cell 1**	
			Abiose, Odebode, Akinemi, Ayegoro, Idigbaro,Aba asa, Aba oke, Oyadina Bakatari,Omi-onigbagbo Aba aremu.	*Abiose*	10
				Odebode	11
				Akinemi	8
				Idigbaro	9
				Aba asa	12
				Omi onigbabgo	10
			Cell 2	**Cell 2**	
			Akufo, Aba afa, Aturu, Koguo,Ifasan Omi adio	*Aturu*	15
				Koguo	30
				Omi Adio	25

Source: *Oyo State Agricultural Development Programme (OYSADEP), 2016*

2. Results and Discussions

3.1 Social Economic Characteristics of Arable Crop Farmers in the Study Area

Table 2 presents results on social economic characteristics of the respondents. Result reveals that 60.0% of the respondents were not more than 50 years of age. This implies that majority of the arable crop farmers in the study area were still in their active years. This is expected to have positive impact on respondents' capacity for improved arable crop production for improved food security. Result on sex shows 90.4% of the respondents were males. This is indicative of less female participation in arable crop farming in the study area. This could be a consequence of the age long problem of poor access of women to farm land. Also, 81.6% of the respondents had education below secondary

school. This implies that majority of the crop farmers in the study had low level of education. This could limit arable crop farmers' level of understanding of issues relating to relationships with pastoralists. On land ownership, result indicates that 47.2% of the respondents operated on family land while 34.4% of them farmed on rented land. This situation could limit control and decisions on infrastructure such as barriers to prevent encroachment of pastoralists into farmland. Result on farming experience reveals an average of 25.5years for the respondents. This implies arable crop farmers with appreciable experience to comment on effect of activities of pastoralists on arable crop farming in the study area. Result on farm size reveals that 79.2% of the respondents operated on less than 5 ha of land. This is an indication that majority of arable crop farmers in the study area were peasant farmers. Peasant farmers are vulnerable to devastating shocks that may arise from any unpleasant activities of pastoralists. Average annual income of the respondents as shown in the table was ₦236368.00 or $784.73. The low income is an evidence of the peasant nature of arable crop farming activities of the respondents. This implies that negative effect of activities of the pastoralists will further bring down the income of the respondents.

Table 2: Distribution of respondents based on socio-economic characteristics (n = 125)

Variables	Frequency	Percentage	Mean
Age (years)			
0 – 20	1	0.8	
21 – 30	7	5.6	
31 – 40	36	28.9	
41 – 50	31	24.8	
51 – 60	20	16.0	
61 and above	30	24.0	50.0 years
Sex			
Male	113	90.4	
Female	12	9.6	
Highest level of Education			
Non formal	57	45.6	
Primary	45	36.0	
Secondary	22	17.6	
Tertiary	1	0.8	
Status of farmland ownership			
Rented	43	34.4	
Family	59	47.2	
Community	1	0.8	
Others	22	17.6	
Farming experience (years)			
0 – 10	14	11.2	
11 – 20	50	40.0	
21 – 30	22	17.6	
Above 30	39	31.2	26.5 years
Farm size (ha)			
0 - 5ha	99	79.2	
5 - 10	19	15.2	2.1 ha
> 10	7	5.6	
Annual Income {₦}			
< 50000	3	2.4	
50001 – 100,000	4	3.2	
100,001 – 150,000	14	11.2	
150,001 – 200,000	47	37	
Above 200,000	57	45.6	₦ 236368.00/ $ 784.73

Source: *Field Survey, 2016*

3.2 Arable crop farmers' perception of effects of pastoralism-related challenges on arable crop farming

Results on pastoralism related challenges affecting arable crop production as ranked by the respondents are presented in Table 3. Prominent challenges being experienced by the respondents in order of degree of concern include destruction of arable crops by cattle (99.2%), pollution and depletion of water for dry season farming (96.0%) and harassments of arable crop farmers with dangerous weapons by pastoralists (94.4%). Destruction of crops poses threat to food supply to farm families and income of the farmers. Pollution of water bodies by cattle will not only cause friction between crop farmers and the pastoralists, it also has implications on their health. Serious health hazards are introduced when cattle are reared to water bodies that serve rural communities (Adisa and Adekunle, 2010). Other challenges identified by the farmers include theft of crops on farmland (92.8%), soil compaction due to overgrazing (86.4%) indiscriminate bush burning (71.2%) and rape of female farmers on the farm (56.6%). All the challenges would have negative consequences on farming activities of arable crop farmers. This will in turn result in decreased arable crop production, low income for the farmers and reduced food security for the country.

Table 3: Distribution of respondents based on identified pastoralism-related challenges affecting arable crop farming (n = 125)

VARIABLES	YES		No		Mean score	Rank
	F	%	F	%		
Harassment of farmers with dangerous weapons	118	94.4	7	5.6	1.94	3rd
Cattle overgraze fallowed ground causing soil compaction	114	91.2	11	8.8	1.91	5th
Cattle defecate in water and deplete water for dry season farming	120	96.0	5	4.0	1.96	2nd
Overgrazing of cattle has led to reduction in soil fertility	108	86.4	17	13.6	1.86	6th
Pastoralists steal crops on farmland	116	92.8	9	7.2	1.93	4th
Rape of female farmers on farm	70	56.6	55	43.4	1.56	8th
Cattle destroy farm crops	124	99.2	1	0.8	1.99	1st
Indiscriminate bush burning by pastoralists	89	71.2	36	28.8	1.71	7th

Source: Field Survey, 2016

3.3 Respondents' perception of extent of effects of pastoralism-related challenges on arable crop farming

Table 4 represents results on the extent to which pastoralism related challenges have affected arable crop farming in the study area. Consequences that were of great effects as identified by majority of arable crop farmers in order of magnitude include reduced income due to destruction and theft of crops (90.4%), reduction in hours and days spent working on the farm due to fear of possible attack (74.4%) and reduction in number of hired farm labour due to fear of attack from pastoralists (61.6%). These consequences have the potentials to reduce arable crop production thereby posing threats to improved living conditions of crop farmers in particular and food security of Nigeria in general. This is in line with the position of Blench (2004) who noted that crop farmers had developed fear of being attacked on farmland. This no doubt comes with negative consequences on food crop production. This has the potentials of increasing poverty level of resource poor farmers. However, majority (82.4%) of the respondents failed to recognise the soil fertility contribution potentials of cow dung. This may be due to the overwhelming perceived negative effects of pastoralism on their farming activities. The overall result on effects of pastoralists related challenges on arable crop farming indicates that majority (75.2%) of the respondents were negatively affected by the activities of pastoralists. This result derives from the cumulative impact of unpleasant experiences of the respondents in form of destruction and theft of crops, fear of possible attacks among other factors. This is in line with the submission of Suleiman and Ja`afar-Furo, (2010). They referred to Farmer-Pastoralist conflicts as a negative phenomenon which often lead to loss of lives and properties, which invariably impacts negatively on the community. Adebayo and Olaniyi (2008) also reported that pastoralism exerted negative effects on farming activities of crop farmers in the savannah belt of Oyo State, Nigeria.

Table 4: Distribution of respondents based on perception of extent of effects of pastoralism-related challenges on arable crop farming (n = 125)

S/N	VARIABLES	Great	Minimal	Mean	Overall

		Extent		Extent		score	Effect		
		F	%	F	%			F	%
1	Reduced income due to destruction and theft of crops	113	90.4	12	9.6	1.90			
2	Reduction in hours and days spent working on the farm due to fear of attack	93	74.4	32	25.6	1.74			
3	Reduction in hired farm labour due to fear of attack from pastoralists	77	61.6	48	38.4	1.62	Negative	94	75.2
4	Loss of lives due to conflicts between crop farmers and pastoralists	47	37.6	78	62.4	1.38	Positive	31	24.8
5	Giving up arable farming due to harassment by pastoralists	34	27.2	91	72.8	1.27			
6	Water pollution with cow dung increases water borne diseases	12	9.6	113	90.4	1.10			
7	Increased soil fertility	22	17.6	103	82.4	1.82			

Source: *Field Survey, 2016*

3.4 Mitigation measures adopted by respondents against pastoralist related challenges

Table 5 represents crop farmers' adopted mitigation measures against pastoralists' related challenges in the study area. Prominent among measures relied upon by majority of the respondents include dialogue with settled pastoralists (87.2%) and intervention of extension agencies (84.8%). These measures have potentials to douse tension and prevent conflicts of interests between crop farmers and pastoralists as parties involved are directly engaged. However, achieving desirable results may be hindered by the fact that some of the pastoralists are non-settled. The ever moving pastoralists in most cases are more aggressive and often perpetrate destruction of farms at night and disappear before dawn, leaving the resident pastoralists with blames (Sule, 1998). Similarly, intervention of extension agencies may be limited by inadequate number of Extension Agents and other challenges facing extension service delivery in developing countries including Nigeria. The use of barriers such as bamboos and rope (57.6%) to demarcate farmland is in use by 57.6% of the respondents. This measure may prove ineffective as only very small area of farmland could be demarcated by resource poor crop farmers. Rampaging Pastoralists and their herd may also destroy barriers out of desperation for food.

Table 5: Distribution of crop farmers adopted mitigation measures against pastoralist' related challenges (n = 125)

Variables	Yes		No		Mean score	Rank
	F	%	F	%		
Early farming	3	2.4	122	97.6	1.01	9th
Intervention by government agency (extension agents)	106	84.8	19	15.2	1.85	2nd
Use of native charms to keep pastoralist off farm	26	20.8	99	79.2	1.21	5th
Going to farm in mass	49	39.2	76	60.8	1.40	4th
Dialogue with settled pastoralists	109	87.2	16	12.8	1.87	1st
Demarcation of farmland with bamboo and ropes	72	57.6	53	42.4	1.58	3rd
Abandonment of arable crop farming	6	4.8	119	95.2	1.05	7th
Relocation to site off pastoralist route	23	18.4	102	81.6	1.02	8th
Diversification into crops that cannot be eaten by animals	19	15.2	106	84.8	1.15	6th

Source,: *Field survey, 2016*

3.5 Arable crop farmers' attitude towards measures aimed at reducing pastoralism related challenges

Table 6 presents the opinions of arable crop farmers on reducing pastoralism-related challenges in the study area. Using the grand mean of 3.90 as the threshold, results reveal that majority of the respondents expressed the strong views that government should encourage development of hay and silage markets for feeding cattle ($\overline{X}$ = 5.0) and that Pastoralists should be made to compensate victims of their negative activities ($\overline{X}$ = 4.9). They also expressed strong support for mass and compulsory western education for juvenile pastoralists ($\overline{X}$ = 4.9), educating pastoralists on how to grow pasture all year round for their stock ($\overline{X}$ = 4.7) and that grazing area should be created and dedicated for ranching ($\overline{X}$ = 4.6). Views expressed by crop farmers are not out of place. Strong opinions expressed by the respondents are development-oriented and are indeed achievable. It is important to note that respondents did not express positive disposition towards the use of arms and ammunitions for defending themselves ($\overline{X}$ = 2.9). This is laudable as taking up of arms for self-defence will only escalate conflicts between pastoralists and crop farmers

Table 6: Distribution of arable crop farmers based on attitude towards measures aimed at reducing pastoralism related challenge (n = 125)

	SA		**A**		**U**		**D**		**SD**		**Mean**
	F	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**	
Grazing area should be created and dedicated for pastoralism.	99	79.2	7	5.6	12	9.6	7	5.6	0	0.0	4.6
Identified pathway should be created leading to grazing lands.	59	47.2	7	5.6	14	11.2	31	24.8	14	11.2	3.5
Arms and ammunitions should be given to farmers to defend themselves.	28	22.4	4	3.2	10	8.0	41	32.8	42	33.6	2.9
Inter- tribal marriage consent should be encouraged between crop farmers and pastoralists.	27	21.6	5	4.0	11	8.8	60	48.8	22	17.6	2.6
Pastoralists to compensate victims of their negative activities.	116	92.8	3	2.4	3	2.4	2	1.6	1	0.8	4.9
All arable crop farmers in the study area are to fence off their farmland	63	50.4	11	8.8	6	4.8	18	14.4	27	21.6	2.5
Setting up securities at the border to prevent outright entrance of pastoralists into the study area.	64	51.2	16	12.8	9	7.2	25	20.0	11	8.8	3.8
Educating pastoralists on how to grow pasture all year round.	107	85.6	6	4.8	3	2.4	7	5.6	2	1.6	4.7
All pastoralists should be required to register with the government.	101	80.8	4	3.2	2	1.6	8	6.4	10	8.0	4.4
Mass and compulsory western education for juvenile pastoralists.	120	96.0	1	0.8	0	0.0	4	3.2	0	0.0	4.9
Government should encourage development of hay and silage markets.	122	97.6	0	0.0	3	2.4	0	0.0	0	0.0	5.0

Grand mean = 3.90

Source: *Field Survey, 2016*

3.6 Test of hypothesis

Results of test of relationship between selected socio-economic characteristics of the respondents and their perception of effects of pastoralism related challenges on arable crop production are presented in Table 7. The results established a significant relationship between age (χ^2 = 8.550 and sex (χ^2 = 0.107) of the respondents and their perception of effects of pastoralism related challenges on arable crop production. This implies that sex and age of respondents influenced their perception of effects of pastoralism on arable crop farming.

Table 7: Chi-square result of test of relationship between crop farmers selected socio- economic characteristics and perceived effect of pastoralism related challenges on arable crop production.

Variables	χ^2	Df	P value	coefficient	Decision
Age	8.550	5	0.207	-0.059	S
Sex	0.107	1	-0.209	0.015	S
Religion	1.164	2	0.008	0.035	NS
Level of education	125.00	4	0.304	0.139	S
Farming years	4.032	6	-0.083	0.042	NS
Income	1.203	4	0.076	0.038	NS

3. Conclusion

The study concludes that activities of pastoralists in form of destruction and theft of crops, harassment of farmers with dangerous weapons and indiscriminate bush burning have resulted in reduced arable crop farming activities in the study area. Dialogue with settled pastoralists, creation of grazing lands with nutritious forages and development of hay and silage markets are recommended to promote co-existence between arable crop farmers and pastoralists. This will ensure enduring peace for increased arable crop production for improved food security of Nigeria.

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