Research Article

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Assessment of stakeholders' contributions to livestock development in Delta State, Nigeria: Rural infrastructure intervention

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Abstract: The study assessed the contributions of stakeholders to livestock development through provision of infrastructure to rural areas of Delta State, Nigeria. The objectives were to describe the socio-economic characteristics of respondents, appraise the role of external stakeholders in livestock development, verify any existing relationship between livestock development and rural development indicators and identify the challenges faced by respondents. A purposive and simple random sampling techniques were used to select the three major towns and 180 respondents. Data were collected by questionnaire and subjected to descriptive and inferential statistics. Result obtained showed that majority of the respondents were males (68.3%) with higher national diplomat (HND)/First degree (33.3%) and have a mean age of 42 years. The first four highest external stakeholders were skills training and entrepreneurship programme (94%), youth agricultural entrepreneurs programme (90.6%), job creation agency (89.4%) and FADAMA (80.0%) that promoted livestock development. A significant relationship was observed based on infrastructural contributions to livestock development ($p < 0.05$) among the variables: market, water project, market and roads. Serious challenges included high cost of feed facilities (mean = 3.69) and insufficient power supply (mean = 3.49). The study concluded that the more available the rural infrastructure intervention, the more developed the livestock sector. The study recommended that stakeholders should make their extension agent available to livestock farmers.

1 Introduction

It is affirmed that sustainable rural development approaches particularly in relation to agriculture, agro-industrial, agro-allied value chains, and business, if satisfactorily adopted and adapted in Nigeria, could transform the rural communities to desirable elevations in human and socio-economic development (Ndukwe and Omeji 2015). The livestock sector has passed through relative growth in recent years principally powered by worldwide increase in demand for food of animal products. This has been attributed mostly to population growth, urbanization and returns on investment which is liken to livestock revolution (Delgado et al. 1999). The positive relationship between agriculture and development, principally in sub-Saharan Africa, is seen as a yardstick to achieving sustainable development. The adoption of sustainable development goal (SDG) II was one of the community development tools that encouraged rural infrastructural development in African countries, and 70% of the focus target group lives in rural areas and sub-urban areas and is reliant on agriculture for a living (International Livestock Research Institute 2004). Invariably, reducing poverty, improving quality food intake and optimal well-being of the people would mean improving the livelihood of its vast majority and this centres seriously on the achievement of agriculture sector. For example, using world development indicator data from Nigeria for selected periods, we find a strong positive connection among food production, primary school enrolment ratio and gender impartiality, while there is a strong negative relationship between food production and child mortality rates.

As long as it has been established that developing countries like Nigeria has proportional benefit over other countries in the production of agricultural output than

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industrialized countries, it is imperative to highlight that there is a need for such economy to focus its consideration on the agriculture sector development, so that it can encourage progress of the nation (FAO 2002). This is the only sector that provides the ready-made means for country like Nigeria to smooth the progress of industrial development since all the other sectors straightforwardly depend on agriculture either for food to sustain their workforce or as decisive input in their production process. In the meantime, the sector can act by supplying comparatively cheap food to the urban industrial sector to check inflationary tendency of workers' wages, where insufficient food supply may lead to rising food prices as a result of industrial turbulence as workers continue to demand for increase in wages to meet indispensable needs of life. Food importance is not feasible for any determined country for numerous motives which might be governmental, commercial and tactical reasons. So it is demanding of agriculture to offer food above the subsistence level (surplus). In a nutshell, the outstanding role expected to be from the agricultural sector in the developing country like Nigeria cannot be underscored (FAO 2020).

Steinfeld (2014) reported that crop production activities attracted more developmental efforts than livestock productivity. Animals themselves are the main resource, but their mobility makes them a pointed resource to measure. Livestock ownership is more twisted than ownership of or access to land, and, as a consequence, livestock development, particularly if it concerns larger and more costly species such as cattle, tends to produce benefits of low impartiality (Rahman et al., 2020). For the livestock planner, over the years, land ownership has been a serious dilemma for livestock development. These are predominantly multifaceted and sensitive problems that needed to be addressed.

Eisler (2018b) confirmed other researchers that livestock includes raising of sheep, goats, pigs, chickens, rabbits, cattle and horses. The importance of livestock development was mentioned by Eisler (2018a) who explained that livestock farms have been benefiting us in many ways for ages they provide us with eggs, meat and milk. Even the so-called animal wastes are not waste *per se*, but they are recycled and make admirable organic fertilizers.

The nexus between livestock development and rural development is interdependable. Functional roads are great priority in rural development; thus, a prerequisite to livestock development. Investment in infrastructure accounts for more than half of the recent enhancement in economic growth in Africa and has the potential to attain even more. Good infrastructure has other ancillary and equally important effects (Fan et al. 2004). Water project and access to water, particularly in the extensive rangeland systems, are

elementary requirements for livestock production but inadequate accessibility to water has been a great issue during dry season grazing (Steinfeld 2014).

Failure and prevalence of dilapidated infrastructure such as water project, power supply and good roads in the communities constituted unfriendly environment for agricultural development (Kessides 1993; Egbetokun 2009). They further stressed that the provision of rural infrastructure does not only contribute to agricultural development but also increase in commercial activities involving both public and private sectors. Peng (2002) affirmed that negligence or no development of rural areas contributes to general poor economic development. This study sought to bridge the gaps mentioned above as to estimate the contributions of stakeholders to livestock development through the provision of infrastructure. The study also tried to identify the continuation of a long-run relationship between the agriculture sector and the rural development. The intention is to make this topic more researchable in Delta State, so that the government and interventionist agencies will focus more on this area as it is a strategy to solve societal problems, ranging from poverty, low employment creation, poor infrastructure and weak socio-economic development. Knowing that entrepreneurship (agriculture) would stimulate the economic growth and development of the country, it could help our rural areas to be developed into urban area and thereby developing the country in near future.

1.1 Objectives of the study

The specific objectives of the study were to:

- (i) describe the socio-economic characteristics of the livestock farmers,
- (ii) appraise the role of external stakeholders in livestock development sector,
- (iii) verify any existing relationship between various sectors of livestock development and rural development indicators, and
- (iv) identify the challenges faced by livestock development practitioners.

1.2 Hypotheses

H₀₁: There is no existing relationship between poultry sector development and rural development indicators.

H₀₂: There is no existing relationship between pigery sector development and rural development indicators.

H₀₃: There is no existing relationship between rabbitry sector development and rural development indicators.

H₀₄: There is no existing relationship between goat sector development and rural development indicators.

1.3 Conceptual framework for the study

The assessment of the contributions of stakeholders to livestock development in Delta State, Nigeria, through rural infrastructure intervention is similar to the findings of Ovharhe (2019). He opined that the establishment of framework analysis is necessary for the successful implementation of agricultural projects in the Niger Delta area. Arising from Figure 1, it is observed that a nexus exists between rural infrastructure interventions (market, water project, market, roads, etc.) and livestock development practitioners (poultry, piggery, rabbitry and goat rearing) amid various challenges or limitations. This is to say external stakeholders' contributions of rural infrastructural development in various communities support the advancement of livestock development by overcoming challenges posed on the industry and assurance to food security and income generation of farmers.

Figure 1: Conceptual framework for assessing contributions of stakeholders to livestock development in Delta State, Nigeria through rural infrastructure intervention.

1.3.1 The nexus between project performance and rural infrastructural development

It was established that project performance whether high or low level (Figure 2) was impacted by the following increasing or decreasing factors in farmers' knowledge, aspirations, skills and attitude; innovation adoption; poverty reduction; objectives achievement; farmers' constraints; natural environment sustainability and government policy implementation (Ovharhe 2019). Similarly, this phenomenon of high or low performance level of the agricultural projects is associated with the nexus between livestock project performance and rural infrastructural development indicators.

In essence, government infrastructural policy implementation by interventional measures in the provision of roads, pipe borne water, health facilities, power supply, etc., contributes to agricultural development particularly among the livestock enterprises. Livestock objectives and goal achievement by managing farmers' constraints and harnessing the natural environment contribute to the well-being of the livestock farmers and *vice versa* as demonstrated in Figure 2.

1.4 Methodology

The study was carried out in Delta State. Delta State is made up of the three agricultural zones which are Delta North, Delta Central and Delta South zones and 25 local government areas (LGAs) in the south-south geographical region of Nigeria. The state is endowed with oil mineral deposits and agricultural resources in crop and animal husbandry, fisheries and forestry potentials.

It is a rain forest region having coordinates between 5°30'N 6°00'E and 5°30'N 51°6'00'E (Delta State 2017).

The three agricultural zones and 25 LGAs are:

Delta North zone: Ika North and Ika South, Oshimili North, Oshimili South, Ukwuani, Ndokwa West and Ndokwa East, Aniocha North and Aniocha South LGAs.

Delta Central: Udu, Ughelli North, Ughelli South, Sapele, Okpe, Ethiope East, Ethiope West, Uvwie, LGAs.

Delta South zone: Warri North, Warri South, Warri South West, Bomadi, Burutu, Isoko South, Isoko North and Patani LGAs.

1.4.1 Sample technique and sample size

Sample for this study was drawn from a population of livestock farmers in the agricultural zones in the state.

Figure 2: Conceptual framework for evaluating performance of any agricultural projects.

A purposive sampling technique was used to select the three major towns from three LGAs majorly involved in livestock production across the three agricultural zones: Ughelli in Ughelli North, Igbide in Isoko South and Ejeme-Aniogor in Aniocha South. The livestock farmers' record was obtained from Delta Agricultural and Rural Development Authority (DARDA) (formerly Agricultural Development Programme, ADP). This information enabled a sample size of 180 farmers (66%) to be selected from a population frame of 272 various registered livestock farmers in the study areas.

1.4.2 Measurement of variables

The role of external stakeholders in livestock development was measured using dichotomous scale of "yes" or "no."

The respondents were asked to tick a "yes" or "no" on the external stakeholders in livestock development. Examples of the external stakeholders include skills training and entrepreneurship Programme (STEP), FADAMA, state employment and expenditure for result project (SEEFOR), ADP, non-governmental organizations (NGOs), ADP, SDG, among others.

The existing relationship between livestock and rural development was measured by ticking the rural development that contributes to livestock agriculture component. Examples of the rural development project include water project, power supply, town hall, school building, market, hospital road network, hotel, banks and church, while agricultural establishment includes: poultry, piggery, rabbitry and goat.

The constraints faced by livestock farmers were measured by making a list of possible challenges and requested the respondents to rate the challenges. Examples of the

Table 1: Socio-economic characteristics of respondents ($n = 180$)

Variables	Frequency	Percentage
Age		
22–26	3	1.7
27–31	10	5.6
32–36	25	13.9
37–41	35	19.4
42–46	35	19.4
47–51	31	17.2
52–56	21	11.7
57–61	16	8.9
62–66	4	2.2
Gender		
Male	123	68.3
Female	57	31.7
Marital status		
Married	157	87.2
Divorced	14	7.8
Separated	4	2.2
Widowed	5	2.8
Educational status		
No formal education	1	0.6
Primary	9	5.0
Secondary	56	31.1
OND/NCE	50	27.8
HND/first degree	60	33.3
PGD	4	2.2
Farming experience		
2–7	55	30.6
8–12	85	47.2
13–17	28	15.6
18–22	12	6.7
Household size		
1–5	37	20.6
6–10	106	58.9
11–15	31	17.2
16–20	6	3.3
Averaged farm income: (N)		
N50,000–2,49,000	43	23.9
N2,50,000–4,49,000	69	38.3
N4,50,000–6,49,000	37	20.6
N6,50,000–8,49,000	19	10.6
N8,50,000–10,49,000	6	3.3
N10,50,000–12,49,000	4	2.2
N15,00,000–16,99,000	2	1.1
Contact with extension agent		
Annual	2	1.1
Bi-annual	5	2.7
Quarterly	12	6.7
Monthly	53	29.4
None	108	60

Source: field survey responses.

challenges include non-functional government water project, cost of feed, insufficient power supply, non-modern livestock housing, high cost of feed, absence of young

farmers club, distance market location, inadequate veterinary facilities and poor road network. A Likert-type scale was used to access the challenges faced by livestock farmers with scores of 1–4 assigned to strongly disagreed, disagreed, agreed and strongly agreed, respectively. The mean value is 2.50 ($1 + 2 + 3 + 4/4 = 2.5$).

The data generated were analysed using SPSS statistical software (version 20) analysis.

1.4.3 Operationalization of variables

Correlation coefficient was used to analyse the hypotheses. The variables were pairwise ranked in comparative analysis. The dimensions and indicators of the variables were reported in the vertical and horizontal dimensions using each livestock to pair or associate with the concerned stakeholders' indicators as listed. While positive correlation was recorded with both increasing vertical and horizontal axes (dimensions), negative correlation associated with increase or decrease in either vertical or horizontal variables. This approach was adopted by Ofuoku (2017) in the operationalization of correlation variables in rural–urban migrants' remittances to food security in household studies in Delta State, Nigeria.

2 Results and discussion

2.1 Socio-economic characteristics of the respondents

Entries in Table 1 show that the respondents mean age was 42 years. This is in line with the study of Mandal (2006) who discovered that most livestock farmers range from 32 to 47 years. The study area possesses more male (68.3%) than female respondents. This in agreement with the study by Akintunde *et al.* (2015) who reported that majority of livestock farmers in Nigeria are married males. Married respondents (87.2%) were more in the study which also was in tandem with the study of Akintunde *et al.* (2015) and Oluwatayo *et al.* (2012).

The majority of respondents (31.1%) had secondary educational level as the highest attainment. This is in agreement with the study by Alabi and Aruma (2006) that the level of training determines the quality of skills of farmers, their locative capabilities and how well versed they are to the innovations and technologies around

them. The average years of experience in livestock farming is 10. The findings were supported by Oluwatayo et al. (2012) who confirmed that farmers with more familiarity would be well organized and have better understanding of environmental situations and market strategies which contributed to run a more efficient and a gainful farming enterprise.

The average number of persons per household is eight. This agrees with the findings of Ovharhe et al. (2020) who stated that backyard livestock farmers had a household size of 6–10 persons. Respondent's average farm income was observed in categories of annual farm income – N15,00,000–16,99,000 as the highest (1.1%), while N50,000–2,49,000 as the lowest (38.3%). Upon contact with extension agent, from the cumulative analysis, only 40% of livestock farmers had contact with extension agents. This result indicates that the contact with extension agents is very poor and needs to be attended to. According to the findings of Ovharhe et al. (2020), extension workers are not effective in value addition training programmes for maize cropping as a component of livestock feeds in Delta State.

2.1.1 Roles of external stakeholders in livestock development

As presented in Table 2, the degree to which different external stakeholders support livestock development was indicated by the respondents. The stakeholders include STEP (94%), youth agricultural entrepreneurs programme (YAGEP, 90.6%), job creation agency (89.4%), FADAMA (80.0%), SEEFOR (79.4%), multinationals, e.g. Agip (77.8%), SDG (76.1%), delta agricultural and rural development (DARDA, 73.9%), institutions, e.g. Delta State University (DELSU, 65.0%), and NGOs (47.2%).

Majority of the stakeholders recorded good support to livestock development. However, the extent of support varied from organization to organization, with STEP, YAGEP and job creation ranked as the first three highest contributors (Table 2), whereas DARDA, institutions and local NGOs ranked as the lowest three contributors. In view of this, Oyibo (2020) affirmed that the DARDA outreach activities are very weak in the Delta State of Nigeria.

2.1.2 Verify any existing relationship between livestock and rural development

Results in Tables 3–6 show the relationship between various livestock sectors and rural development. The rural

Table 2: External stakeholders' roles in livestock development

S/N	External stakeholders	Yes, <i>n</i> (%)	No, <i>n</i> (%)
1	STEP	169 (94)	11 (6)
2	YAGEP	163 (90.6)	17 (9.4)
3	Job Creation Agency (JCA)	161 (89.4)	19 (10.6)
4	FADAMA	144 (80.0)	36 (20.0)
5	SEEFOR	143 (79.4)	37 (20.6)
6	Multinationals, e.g. Agip	140 (77.8)	40 (22.2)
7	SDG	137 (76.1)	43 (23.9)
8	ADP	133 (73.9)	47 (26.1)
9	Institutions, e.g. DELSU	117 (65.0)	63 (35.0)
10	NGOs	85 (47.2)	63 (52.8)

Source: field survey responses.

development intervention indicators were water project, power supply, town hall, school building, market, hospital, road network, hotels, banks and church. The livestock enterprises in this study were poultry, piggyery, rabbitry and goat. It should be important to state here that, on the majority, the correlation existing among the various enterprises was significantly positive ($p < 0.05$). On a general statistical note, where negative correlations existed, the implication is that there is need gap to develop the variables with negative impact on the assessment rating for better contributions to livestock development.

Ndukwe and Omeji (2015) asserted that agricultural development has serious setback because of poor infrastructural development as related to pipe-borne water availability, tarred road occurrence, electricity functionality and communication accessibility. The rural infrastructural development intervention by stakeholders' contributions to livestock development sectors in Delta State, Nigeria, is specifically assessed in the following nexus.

2.1.3 Relationship between the poultry sector and rural development

The correlation coefficient for poultry is shown in Table 3. It indicated that all indicators of poultry show a positive correlation among variables, an indication that they are a good measure of fitness in poultry.

Specifically poultry, variable correlated positively with water project ($r = 0.128$, 0.05), power supply ($r = 0.293$, 0.01), town hall ($r = 0.234$, 0.01), market ($r = 0.300$, 0.01), road network ($r = 0.376$, 0.01), hotels ($r = 0.304$, 0.01), banks ($r = 0.443$, 0.01) and church ($r = 0.008$, 0.05).

Poultry correlated negatively with school building ($r = -0.023$, 0.05) and hospital ($r = -0.098$, 0.05). The

Table 3: Respondents' relationship between poultry sector and rural development

Correlations											
	Poultry	Water project	Power supply	Town hall	School building	Market	Hospital	Road network	Hotels	Banks	Church
Poultry	Pearson correlation	1	0.128	0.234**	-0.023	0.300**	-0.098	0.376**	0.304**	0.443**	0.008
	Sig. (two tailed)		0.114	0.003	0.778	0.000	0.228	0.000	0.000	0.000	0.926
	N	154	154	154	154	154	154	154	154	154	154
Water project	Pearson correlation	0.128	1	0.365**	0.023	-0.006	-0.231**	0.111	0.195**	0.259**	-0.223**
	Sig. (two tailed)	0.114	0.000	0.000	0.755	0.936	0.002	0.138	0.009	0.000	0.003
	N	154	180	180	180	180	180	180	180	180	180
Power supply	Pearson correlation	0.293**	0.785**	1	0.338**	0.133	-0.284**	0.214**	0.281**	0.322**	-0.259**
	Sig. (two tailed)	0.000	0.000	0.000	0.421	0.075	0.000	0.004	0.000	0.000	0.000
	N	154	180	180	180	180	180	180	180	180	180
Town Hall	Pearson correlation	0.234**	0.365**	1	0.409**	0.071	0.105	0.192**	0.263**	0.306**	0.107
	Sig. (two tailed)	0.003	0.000	0.000	0.000	0.347	0.159	0.010	0.000	0.000	0.154
	N	154	180	180	180	180	180	180	180	180	180
School building	Pearson correlation	-0.023	0.023	0.409**	1	-0.102	0.402**	-0.060	-0.041	-0.086	0.433**
	Sig. (two tailed)	0.778	0.755	0.000	0.000	0.173	0.000	0.423	0.585	0.252	0.000
	N	154	180	180	180	180	180	180	180	180	180
Market	Pearson correlation	0.300**	-0.006	0.133	0.071	1	-0.182*	0.678**	0.303**	0.370**	-0.245**
	Sig. (two tailed)	0.000	0.936	0.075	0.347	0.173	0.014	0.000	0.000	0.000	0.001
	N	154	180	180	180	180	180	180	180	180	180
Hospital	Pearson correlation	-0.098	-0.231**	0.105	0.402**	-0.182*	1	-0.155*	0.157*	-0.114	0.491**
	Sig. (two tailed)	0.228	0.002	0.159	0.000	0.014	0.000	0.037	0.036	0.126	0.000
	N	154	180	180	180	180	180	180	180	180	180
Road Network	Pearson correlation	0.376**	0.111	0.192**	-0.060	0.678**	-0.155*	1	0.483**	0.516**	-0.125
	Sig. (two tailed)	0.000	0.138	0.010	0.423	0.000	0.037	0.000	0.000	0.000	0.096
	N	154	180	180	180	180	180	180	180	180	180
Hotels	Pearson correlation	0.304**	0.195**	0.263**	-0.041	0.303**	0.157*	0.483**	1	0.643**	0.006
	Sig. (two tailed)	0.000	0.009	0.000	0.585	0.000	0.036	0.000	0.000	0.000	0.941
	N	154	180	180	180	180	180	180	180	180	180
Banks	Pearson correlation	0.443**	0.259**	0.306**	-0.086	0.370**	-0.114	0.516**	0.643**	1	0.042
	Sig. (two tailed)	0.000	0.000	0.000	0.252	0.000	0.126	0.000	0.000	0.000	0.580
	N	154	180	180	180	180	180	180	180	180	180
Church	Pearson correlation	0.008	-0.223**	0.107	0.433**	-0.245**	0.491**	-0.125	0.006	0.042	1
	Sig. (two tailed)	0.926	0.003	0.154	0.000	0.001	0.000	0.096	0.941	0.580	0.000
	N	154	180	180	180	180	180	180	180	180	180

**Correlation is significant at the 0.01 level (two tailed).

*Correlation is significant at the 0.05 level (two tailed).

Table 4: Respondents' relationship between piggy sector and rural development

Correlations											
	Piggy	Water project	Power supply	Town hall	School building	Market	Hospital	Road network	Hotels	Banks	Church
Piggy	1	0.371**	0.385**	0.167	-0.056	0.236*	-0.144	0.264**	0.179	0.318**	-0.053
		0.000	0.000	0.075	0.553	0.012	0.127	0.005	0.057	0.001	0.574
	114	114	114	114	114	114	114	114	114	114	114
Water project	Pearson correlation	0.371**	0.785**	0.365**	0.023	-0.006	-0.231**	0.111	0.195**	0.259**	-0.223**
	Sig. (two tailed)	1	0.000	0.000	0.755	0.936	0.002	0.138	0.009	0.000	0.003
	N	180	180	180	180	180	180	180	180	180	180
Power supply	Pearson correlation	0.385**	1	0.338**	-0.060	0.133	-0.284**	0.214**	0.281**	0.322**	-0.259**
	Sig. (two tailed)	0.000	0.000	0.000	0.421	0.075	0.000	0.004	0.000	0.000	0.000
	N	180	180	180	180	180	180	180	180	180	180
Town Hall	Pearson correlation	0.167	0.365**	1	0.409**	0.071	0.105	0.192**	0.263**	0.306**	0.107
	Sig. (two tailed)	0.075	0.000	0.000	0.000	0.347	0.159	0.010	0.000	0.000	0.154
	N	180	180	180	180	180	180	180	180	180	180
School building	Pearson correlation	-0.056	0.023	0.409**	1	-0.102	0.402**	-0.060	-0.041	-0.086	0.433**
	Sig. (two tailed)	0.553	0.755	0.000	0.000	0.173	0.000	0.423	0.585	0.252	0.000
	N	180	180	180	180	180	180	180	180	180	180
Market	Pearson correlation	0.236*	-0.006	0.133	-0.102	1	-0.182*	0.678**	0.303**	0.370**	-0.245**
	Sig. (two tailed)	0.012	0.936	0.075	0.173	0.347	0.014	0.000	0.000	0.000	0.001
	N	180	180	180	180	180	180	180	180	180	180
Hospital	Pearson correlation	-0.144	-0.231**	0.105	0.402**	-0.182*	1	-0.155*	0.157*	-0.114	0.491**
	Sig. (two tailed)	0.127	0.002	0.159	0.000	0.014	0.000	0.037	0.036	0.126	0.000
	N	180	180	180	180	180	180	180	180	180	180
Road network	Pearson correlation	0.264**	0.111	0.192**	-0.060	0.678**	-0.155*	1	0.483**	0.516**	-0.125
	Sig. (two tailed)	0.005	0.138	0.010	0.423	0.000	0.037	0.000	0.000	0.000	0.096
	N	180	180	180	180	180	180	180	180	180	180
Hotels	Pearson correlation	0.179	0.195**	0.263**	-0.041	0.303**	0.157*	0.483**	1	0.643**	0.006
	Sig. (two tailed)	0.057	0.009	0.000	0.585	0.000	0.036	0.000	0.000	0.000	0.941
	N	180	180	180	180	180	180	180	180	180	180
Banks	Pearson Correlation	0.318**	0.259**	0.306**	-0.086	0.370**	-0.114	0.516**	0.643**	1	0.042
	Sig. (two tailed)	0.001	0.000	0.000	0.252	0.000	0.126	0.000	0.000	0.000	0.580
	N	180	180	180	180	180	180	180	180	180	180
Church	Pearson Correlation	-0.053	-0.223**	0.107	0.433**	-0.245**	0.491**	-0.125	0.006	0.042	1
	Sig. (two tailed)	0.574	0.003	0.154	0.000	0.001	0.000	0.096	0.941	0.580	0.000
	N	180	180	180	180	180	180	180	180	180	180

**Correlation is significant at the 0.01 level (two tailed).

*Correlation is significant at the 0.05 level (two tailed).

Table 5: Respondents' relationship between rabbitry sector and rural development

Correlations											
	Rabbitry	Water project	Power supply	Town hall	School building	Market	Hospital	Road network	Hotels	Banks	Church
Rabbitry	Pearson correlation	1	0.076	0.111	0.066	-0.011	0.021	-0.024	0.111	0.107	-0.094
	Sig. (two tailed)		0.579	0.414	0.630	0.935	0.876	0.862	0.417	0.434	0.492
	N	56	56	56	56	56	56	56	56	56	56
Water project	Pearson correlation	0.076	1	0.785**	0.365**	0.023	-0.006	0.111	0.195**	0.259**	-0.223**
	Sig. (two tailed)	0.579		0.000	0.000	0.755	0.936	0.138	0.009	0.000	0.003
	N	56	180	180	180	180	180	180	180	180	180
Power supply	Pearson correlation	0.111	0.785**	1	0.338**	-0.060	0.133	0.214**	0.281**	0.322**	-0.259**
	Sig. (two tailed)	0.414	0.000		0.000	0.421	0.075	0.004	0.000	0.000	0.000
	N	56	180	180	180	180	180	180	180	180	180
Town Hall	Pearson correlation	0.066	0.365**	0.338**	1	0.409**	0.071	0.192**	0.263**	0.306**	0.107
	Sig. (two tailed)	0.630	0.000	0.000		0.000	0.347	0.010	0.000	0.000	0.154
	N	56	180	180	180	180	180	180	180	180	180
School building	Pearson correlation	-0.011	0.023	-0.060	0.409**	1	-0.102	-0.060	-0.041	-0.086	0.433**
	Sig. (two tailed)	0.935	0.755	0.421	0.000		0.173	0.423	0.585	0.252	0.000
	N	56	180	180	180	180	180	180	180	180	180
Market	Pearson correlation	0.021	-0.006	0.133	0.071	-0.102	-0.182*	0.678**	0.303**	0.370**	-0.245**
	Sig. (two tailed)	0.876	0.936	0.075	0.347	0.173	0.014	0.000	0.000	0.000	0.001
	N	56	180	180	180	180	180	180	180	180	180
Hospital	Pearson correlation	0.006	-0.231**	-0.284**	0.402**	0.402**	1	-0.155*	0.157*	-0.114	0.491**
	Sig. (two tailed)	0.962	0.002	0.000	0.000	0.000		0.037	0.036	0.126	0.000
	N	56	180	180	180	180	180	180	180	180	180
Road Network	Pearson correlation	-0.024	0.111	0.214**	0.192**	-0.060	0.678**	1	0.483**	0.516**	-0.125
	Sig. (two tailed)	0.862	0.138	0.004	0.010	0.423	0.000		0.000	0.000	0.096
	N	56	180	180	180	180	180	180	180	180	180
Hotels	Pearson correlation	0.111	0.195**	0.281**	0.263**	-0.041	0.303**	0.483**	1	0.643**	0.006
	Sig. (two tailed)	0.417	0.009	0.000	0.000	0.585	0.000	0.036		0.000	0.941
	N	56	180	180	180	180	180	180	180	180	180
Banks	Pearson correlation	0.107	0.259**	0.322**	0.306**	-0.086	0.370**	0.516**	0.643**	1	0.042
	Sig. (two tailed)	0.434	0.000	0.000	0.000	0.252	0.000	0.126	0.000		0.580
	N	56	180	180	180	180	180	180	180	180	180
Church	Pearson correlation	-0.094	-0.223**	-0.259**	0.107	0.433**	-0.245**	-0.125	0.006	0.042	1
	Sig. (two tailed)	0.492	0.003	0.000	0.154	0.000	0.001	0.096	0.941	0.580	
	N	56	180	180	180	180	180	180	180	180	180

**Correlation is significant at the 0.01 level (two tailed).

*Correlation is significant at the 0.05 level (two tailed).

Table 6: Respondents' relationship between goat sector and rural development

Correlations												
	Goat	Water project	Power supply	Town hall	School building	Market	Hospital	Road network	Hotels	Banks	Church	
Goat	Pearson correlation	1	0.191	0.232*	0.108	-0.073	-0.020	-0.153	-0.012	0.204	0.175	-0.141
	Sig. (two tailed)		0.108	0.050	0.368	0.541	0.869	0.199	0.918	0.085	0.141	0.238
	N		72	72	72	72	72	72	72	72	72	72
Water project	Pearson correlation	0.191	1	0.785**	0.365**	0.023	-0.006	-0.231**	0.111	0.195**	0.259**	-0.223**
	Sig. (two tailed)	0.108		0.000	0.000	0.755	0.936	0.002	0.138	0.009	0.000	0.003
	N	72	180	180	180	180	180	180	180	180	180	180
Power supply	Pearson correlation	0.232	0.785**	1	0.338**	-0.060	0.133	-0.284**	0.214**	0.281**	0.322**	-0.259**
	Sig. (two tailed)	0.50	0.000		0.000	0.421	0.075	0.000	0.004	0.000	0.000	0.000
	N	72	180	180	180	180	180	180	180	180	180	180
Town Hall	Pearson correlation	0.108	0.365**	0.338**	1	0.409**	0.071	0.105	0.192**	0.263**	0.306**	0.107
	Sig. (two tailed)	0.368	0.000	0.000		0.000	0.347	0.159	0.010	0.000	0.000	0.154
	N	72	180	180	180	180	180	180	180	180	180	180
School building	Pearson correlation	-0.073	0.023	-0.060	0.409**	1	-0.102	0.402**	-0.060	-0.041	-0.086	0.433**
	Sig. (two tailed)	0.541	0.755	0.421	0.000		0.173	0.000	0.423	0.585	0.252	0.000
	N	72	180	180	180	180	180	180	180	180	180	180
Market	Pearson correlation	-0.020	-0.006	0.133	0.071	-0.102	1	-0.182*	0.678**	0.303**	0.370**	-0.245**
	Sig. (two tailed)	0.869	0.936	0.075	0.347	0.173		0.014	0.000	0.000	0.000	0.001
	N	72	180	180	180	180	180	180	180	180	180	180
Hospital	Pearson correlation	-0.153	-0.231**	-0.284**	0.105	0.402**	-0.182*	1	-0.155*	0.157*	-0.114	0.491**
	Sig. (two tailed)	0.199	0.002	0.000	0.159	0.000	0.014		0.037	0.036	0.126	0.000
	N	72	180	180	180	180	180	180	180	180	180	180
Road Network	Pearson correlation	-0.012	0.111	0.214**	0.192**	-0.060	0.678**	-0.155*	1	0.483**	0.516**	-0.125
	Sig. (two tailed)	0.918	0.138	0.004	0.010	0.423	0.000	0.037		0.000	0.000	0.096
	N	72	180	180	180	180	180	180	180	180	180	180
Hotels	Pearson correlation	0.204	0.195**	0.281**	0.263**	-0.041	0.303**	0.157*	0.483**	1	0.643**	0.006
	Sig. (two tailed)	0.085	0.009	0.000	0.000	0.585	0.000	0.036	0.000		0.000	0.941
	N	72	180	180	180	180	180	180	180	180	180	180
Banks	Pearson correlation	0.175	0.259**	0.322**	0.306**	-0.086	0.370**	-0.114	0.516**	0.643**	1	0.042
	Sig. (two tailed)	0.141	0.000	0.000	0.000	0.252	0.000	0.126	0.000	0.000		0.580
	N	72	180	180	180	180	180	180	180	180	180	180
Church	Pearson correlation	-0.141	-0.223**	-0.259**	0.107	0.433**	-0.245**	0.491**	-0.125	0.006	0.042	1
	Sig. (two tailed)	0.238	0.003	0.000	0.154	0.000	0.001	0.000	0.096	0.941	0.580	
	N	72	180	180	180	180	180	180	180	180	180	180

**Correlation is significant at the 0.05 level (two tailed).

*Correlation is significant at the 0.01 level (two tailed).

existing relationships with positive correlation here are in consonance with the FADAMA III survey embarked upon by Ovharhe *et al.* (2016), it was reported that rural areas with FADAMA III infrastructural support and intervention tend to advance in agricultural development than other communities without such assistance. Again, Ofuoku *et al.* (2016) reaffirmed that more poultry farmers drifted from rural to urban areas because of poor infrastructural development and low input support given to livestock farmers.

2.1.4 Relationship between the piggery sector and rural development

The correlation coefficient for the piggery sector is shown in Table 4 which indicated that all indicators of piggery show a positive correlation among variable, an indication that they are a good measure of piggery.

Regarding piggery, variable correlated positively with water project ($r = 0.371, 0.01$), power supply ($r = 0.385, 0.01$), town hall ($r = 0.167, 0.05$), market ($r = 0.236, 0.05$), road network ($r = 0.264, 0.01$), hotels ($r = 0.179, 0.05$) and banks ($r = 0.318, 0.01$).

Piggery correlated negatively with school building ($r = -0.056, 0.05$), hospital ($r = -0.144, 0.05$) and church ($r = -0.053, 0.05$). Ovharhe and Ovwigho (2016) asserted that rural development encourages the agricultural development as in the piggery sectors among others. Government provided investment and development opportunities in the rural areas for the development of the piggery sector and other agricultural enterprises (Arokoyo and Kato 2008; Sharma and Vanlalmalsawma 2015).

2.1.5 Relationship between the rabbitry sector and rural development

The correlation coefficient for rabbitry is shown in Table 5. It indicated that all the indicators of rabbitry show a positive correlation among variable, an indication that they are a good measure of rabbitry.

Specifically rabbitry, variable correlated positively with water project ($r = 0.076, 0.05$), power supply ($r = 0.111, 0.05$), town hall ($r = 0.066, 0.05$), market ($r = 0.021, 0.05$), hospital ($r = 0.006, 0.05$), hotels ($r = 0.111, 0.05$) and banks ($r = 0.107, 0.05$). Rabbitry correlated negatively with school building ($r = -0.011, 0.05$), road network ($r = -0.024, 0.05$) and church ($r = -0.094, 0.05$).

Ovharhe *et al.* (2020) discovered that rabbit backyard farming contributed to food security in Delta State, Nigeria. In addition, the infrastructural contribution of stakeholders to the housing of rabbitry sector in livestock production increased the livelihood of rural farmers in northern Nigeria (Mailafia *et al.* 2011).

2.1.6 Relationship between goat sector and rural development

The correlation coefficient for goat is shown in Table 6. It indicated that most indicators of the goat sector showed positive correlation among some variables, an indication that they are a good measure of fitness.

With regard to the goat sector, variable correlated positively with water project ($r = 0.191, 0.05$), power supply ($r = 0.232, 0.05$), town hall ($r = 0.108, 0.05$), hotels ($r = 0.204, 0.05$) and banks ($r = 0.175, 0.05$).

The goat sector correlated negatively with school building ($r = -0.073, 0.05$), market ($r = -0.020, 0.05$), hospital ($r = -0.153, 0.05$), road network ($r = -0.012, 0.05$) and church ($r = -0.141, 0.05$). Jabir (2007) opined that the goat sector in livestock development contributes to poverty alleviation. Thus, infrastructural development is a key factor for livestock development. Fan and Zhang (2004) also maintained that economic development cannot be holistic until rural and urban areas are synergized into development.

2.2 Identify the challenges faced by livestock development practitioners

Results in Table 7 show the challenges faced by livestock farmers, and most of these challenges includes high cost of feed (mean = 3.69), insufficient power supply (mean = 3.49), inadequate veterinary facilities (mean = 3.47), poor road network (mean = 3.44), distant market location, (mean = 3.26), absence of young farmers club (mean = 3.25), non-modern livestock housing (mean = 3.22), cost of building (mean = 3.20) and non-functional government water project (mean = 3.16). These findings confirmed Adeoye *et al.* (2014) and Ovharhe and Ovwigho (2016) in different rural development surveys, where they acclaimed that poor infrastructural development not only impedes agricultural advancement in communities but reduces income generation and farming enterprise expansion.

Table 7: Respondents' perceptions of the challenges faced by livestock development practitioners

Parameters	Strongly agreed %	Agreed %	Disagreed %	Strongly disagreed %	Mean score	Standard deviation	Rank
High cost of feed	125 (69.4)	55 (30.6)			3.69	0.46	1st
Insufficient power supply	89 (49.4)	90 (50.0)	1 (0.6)		3.49	0.51	2nd
Inadequate veterinary facilities	86 (47.8)	93 (51.7)	1 (0.6)		3.47	0.51	3rd
Poor road network	81 (45.0)	97 (53.9)	2 (1.1)		3.44	0.51	4th
Distant market location	48 (26.7)	131 (72.8)	1 (0.6)		3.26	0.45	5th
Absence of young farmers' club	50 (27.8)	126 (70.0)	4 (2.2)		3.25	0.48	6th
Non-modern livestock housing	42 (23.3)	136 (75.6)	2 (1.1)		3.22	0.44	7th
Cost of building	46 (25.6)	125 (69.4)	9 (5.0)		3.20	0.51	8th
Non-functional government water project	42 (23.3)	126 (70.0)	11 (6.1)	1 (0.6)	3.16	0.54	9th

Source: field survey responses.

3 Conclusion

It was noticed that majority of the livestock farmers were males and had considerable of experience in farming. Based on the finding of this research, it is believed that stakeholders' intervention through rural infrastructural development has positive contributory roles and impacts on the livestock development in Delta State. The study revealed the livestock development status by external stakeholders' programmes (such as STEP, YAGEP and job creation entrepreneurs) recorded good support to livestock development.

It was observed that a positive correlation existed among various enterprises of the livestock industry and rural development. Thus, the more the availability of water project, power supply, town hall, school building, market, hospital, road network, hotels, banks and church, the more the livestock development in the study area, which includes increase in population and practices of livestock farming in poultry, piggery, rabbitry and goat production.

Among the challenges facing the livestock development, the serious issues are high cost of feed, non-functional government water project, insufficient power supply and non-modern livestock housing among others.

3.1 Recommendations

The findings of this study led to the following recommendations, that

- (i) Stakeholders should make their extension organs more available to livestock farmers since it was discovered that there was a limitation in livestock extension activities.

- (ii) Project donors and stakeholders should have a functional policy of monitoring and evaluating empowerment programmes (livestock) as in YAGEP. This will ensure project sustainability.
- (iii) High cost of feed facilities, insufficient power supply and inadequate veterinary facilities were serious challenges that needed to be dealt with. Thus, external stakeholders should intervene appropriately as it will help farmers to have good productivity.

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