

Full Length Research Paper

Use of economical jobs ideas in advancing biosecurity in free roaming poultry in provincial Nigeria

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Poultry production is very significant to the livelihoods of Nigerian rural populace which constitute 70%. Free range scavenging poultry constitutes up to 90% of the total stock. Disease such as Newcastle and recent past the highly pathogenic avian influenza (HPAI) or bird flu H5N1 among other constitutes serious threat to poultry production in the country. Interventions targeted at preventing diseases at low cost and on sustainable manner particularly the HPAI seen as central in the fight against the plight and vulnerability of the rural dwellers. A series of field assessment focusing on vulnerability, assets base, and capabilities was conducted in 18 communities using participatory tools and questionnaire, six each from the North West (Katsina State), South East (Anambra State) and South West (Ondo State) of Nigeria. The results revealed abundance of natural resources, such as land, water, forest and indigenous knowledge, skill and experiences that can be used to achieve cost effective biosecurity amongst the rural households, hence increased poultry production and well-being of the communities at large.

Key words: Free range, poultry, biosecurity, sustainable livelihood, rural Nigeria.

INTRODUCTION

Majority of the Nigerian population (70%) live on less than US\$1.25 a day (Nwajiuba, 2010). In 2010, West Africa Insight put the estimated number of hungry people in Nigeria at over 53 million, which is about 30% of the country's total population of roughly 150 million then, 52% live under the poverty line. Poverty is especially severe in rural areas where majority of the population live

below the poverty line, social services and infrastructure are limited (IFAD, 2012). The country's poor rural women and men depend on agriculture for food and income.

Among the agricultural activities, scavenging poultry play a significant role in enhancing food security of the poorest household and reducing livelihoods vulnerability and promotion of gender as evident in literature

Table 1. Communities selected for the study.

S/No	State	LGAs	Communities
1	Anambra	Aguata	Ekwulobia (Okpo), Uga (Umoulu)
		Anambra East	Aguleri, Nando
		Awka North	Achalla(Udeazu), Amansea(Okukwu)
2	Katsina	Charanchi	Banye, Ganuwa
		Daura	Kampawa, Sukwanawa
		Funtua	Dukke, Maigamji
3	Ondo	Akure South	Aponmu, Ipinsa
		Odigbo	Odigbo, Osoro
		Owo	Ipenemen, Isuada

(Dolberg, 2004; Otte, 2006; Ahuja et al., 2008). The local poultry stocks constitute 90% of the total poultry population in Nigeria (Kperegbeyi et al., 2009). Poultry production is vital to the Nigerian rural economy and serves as important productive assets source of protein and income to several households.

Today, poultry keeping is a necessary practice in Nigerian rural households particularly among women. It makes up an estimated 51 to 67% of rural flocks (Evans School of Public Affairs-ESPA, 2010). However, in the midst of these benefits, these people are often threatened by some vulnerability factors due to poultry diseases, climatic and environmental issues to which they have little or no control over them (ESPA, 2010).

The emergence of highly pathogenic avian influenza (HPAI) H5N1 in Nigeria, in February 2006, presents a clear scenario of the vulnerability situation of poor rural farmers. With the devastating tendencies associated with H5N1, its pronouncement attracted full attention of the government of Nigeria and international development agencies which hitherto was not the case (FAO, 2008). The Emergency Centre for Transboundary Animal Disease (ECTAD) unit of the FAO developed some approaches to mitigate the menace of H5N1 across the world particularly in affected countries. The approaches were aimed at improving local capacity for early detection, containment, adoption and practice of biosecurity, amelioration of the socioeconomic impact and communication for behavior change towards safer poultry production. According to FAO (2006) owners of scavenging poultry that hold the larger population of poultry in the developing countries under what is often classified as sector 4 of production, are limited in their ability to practice biosecurity. Even though in many countries, including Nigeria, the approach towards biosecurity emphasized more on providing inputs such as disinfectants, disinfection of markets and other inputs

dependent measures which may not be sustainable.

Against this backdrop, the study seeks to identify source of vulnerability particularly the ones that affect poultry production and to identify community asset base, capability and the activities they can engaged to attain cost effective biosecurity and sustainable poultry production using the concept of sustainable livelihood approach. It is generally accepted that socioeconomic and livelihood assessment are essential for instituting cost effective and locally sustainable biosecurity measures particularly when dealing with resource limited settings such as exist in rural Nigeria.

MATERIALS AND METHODS

The study was designed to practically test the application of Sustainable Livelihood Approach (SLA) in biosecurity. It was conducted using a questionnaire survey and Participatory Rapid Appraisal (PRA) to assess sources of vulnerability and facilities with biosecurity implications in the communities, husbandry and occurrence of poultry diseases and other livelihood issues such as Assets, Governance and service delivery.

The Livelihood study was among the components of the projects designed to achieve cost effective biosecurity among the three pilot states in Nigeria. Katsina state from the North West, Ondo state from the South West and Anambra state from the South East geopolitical zones (Table 1). The criteria designed for village selection include; small villages and small peri-urban communities, some level of poultry production activity, accessibility through a secondary road and limited commercial poultry activity. 256 structured questionnaires were administered to generate information on socio-economic, assets, poultry number and species, diseases and livelihood strategies. Additionally, PRA was conducted to generate information on each community's livelihood situation using mapping, seasonal calendar, Venn diagram, historical profile and quantification technique. Data obtained was analyzed using simple descriptive statistics ranking and other quantification techniques using Statistical Package for Social Sciences (SPSS).

Table 2. Socio-economic characteristics of the respondents.

Socio-economic characteristics		
Age (Years)	Frequency	Percentage
Below 20	3	1.2
21-40	88	34.4
41-60	111	43.4
61-above	54	21.1
Total	256	100
Level of Education		
Primary School	81	31.6
Secondary School.	50	19.5
Tertiary School	30	11.7
Adult/Non-formal education	16	6.3
Non	79	30.9
Total	256	100
Household size		
1-5	97	37.9
6-10	155	60.5
11-15	4	1.6
Total	256	100
Primary occupation		
Crop Production	169	66
Livestock/Poultry production	3	1.2
Entrepreneurship	55	21.5
Civil Servant	29	11.3
Total	256	100

Source: Field Survey 2009.

RESULTS

Socio-economic characteristic of the respondents

The findings revealed that 43.4% of the respondents were between the age range of 41 to 60, while 34.4% were 21 to 40 years old, 21.1% were 61 years old and above. Of the respondents, 31.6% had only primary education, 30.9% had no formal education. Majority (60.5%) of the respondents had a household size of 6 to 10, while 37.9% of them had a household size of 1 to 5 and just 1.6% with a household size of 11 to 15. Majority of the respondents (66%) are engaged in farming (crop production) as primary occupation, though other activities such as entrepreneurship, livestock and civil service also form part of primary occupations in the communities (Table 2)

Husbandry occurrence of poultry diseases and effect on rural economy

The poultry mapping (using PRA) conducted in the study areas reveals that simple and local houses for poultry are

constructed using zinc sheets, mud, wooden, and thatched materials. However, in some cases, chickens are kept overnight in the kitchen or even inside rooms of the owners, other members are putting efforts to improvise housing for scavenging poultry, yet a good number of people do not see the need for that as they still allow these birds to sleep on the fence or on trees' top.

This exposes the birds to risks of environmental hazards, predators and theft in some cases.

The study similarly found that scavenging poultry production in the rural areas is really hampered by diseases, with devastating effects on their economy. The PRA findings revealed that diseases account for 43.8% annual death of poultry in the study areas. Newcastle is the most prominent disease constituting 50.8% of the disease burden in the communities. Other important diseases are unclassified respiratory infection (12.5%), Fowl pox (6.5%) and coccidiosis (5.0%) (Figure 1).

Community facilities/amenities and implication for biosecurity

The communities surveyed, being rural, lacked basic

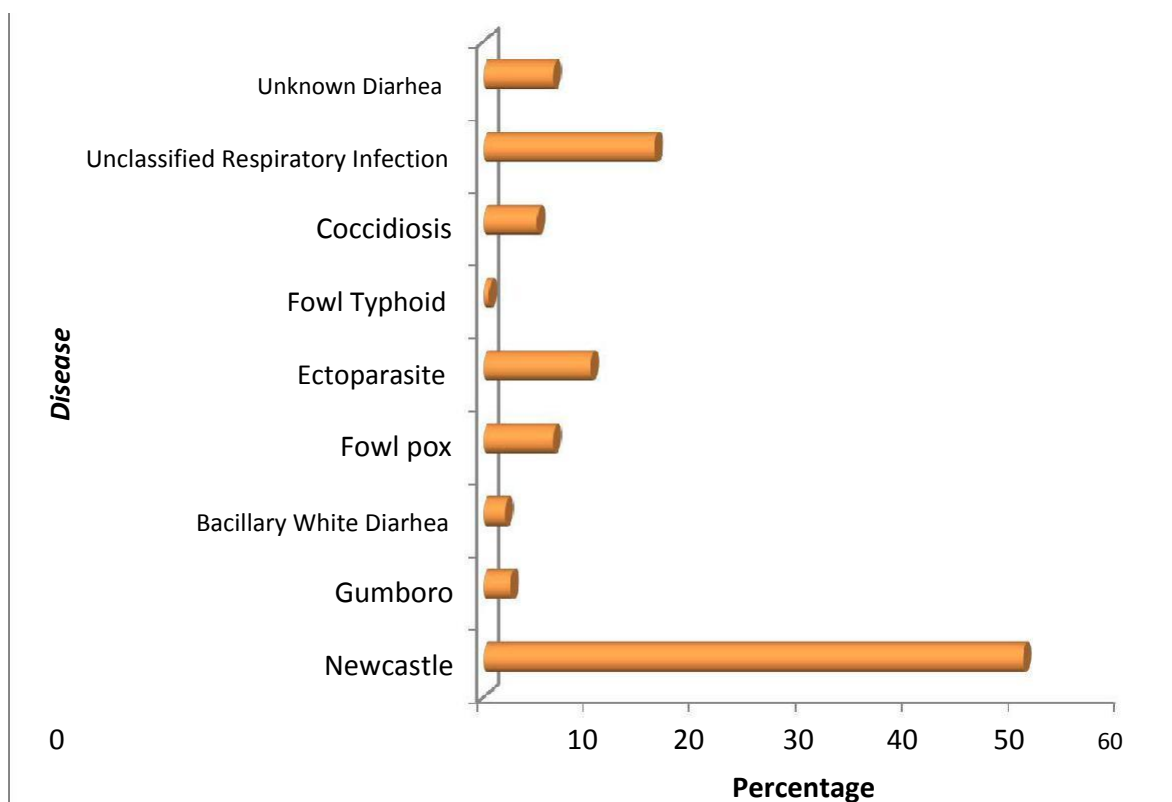


Figure 1. Frequency of some poultry diseases in the study areas.

facilities particularly at household level. This result to use of common or centralized resources. The PRA community mapping in this study found that half of the communities surveyed (50%) rely on centralized water supply system ranging from borehole, well and tap. Similarly, 83.3% of the communities have either river or stream nearby which are used for domestic purposes and at the same time livestock and wild animals and birds drink and play around it.

For instance in Banye community of Charanchi LGA in Katsina State, the only source of water which is open along a river is used for domestic purposes including livestock and even wild animals and birds. The same water body serves its neighboring communities. Similarly, in 44.4% of the communities, centralized grain and foodstuff processing units do exist. In some 16.7% of the communities, burrows, ponds or reservoirs are found.

Vulnerability factors

The historical profile conducted in the communities revealed that community members are vulnerable to certain shocks such as disease outbreaks which include measles, cholera, etc in humans; Newcastle, *Peste des petits ruminants*, etc in animals. Trends: including ecological and environmental, which keep reoccurring at

intervals such as famine, drought, flood, hails and plant infestation, etc and seasonality are all part of constant reality in the community's life.

Community assets (resources) and biosecurity implications

Resource assessment following the transect work around the communities indicates availability of several natural materials for construction of poultry houses. These resources are accessible to almost all members of the communities at minimum cost and at times for free (cost effective). They include palm leaves (*Kaba*), bark of *Bauhinia reticulata* (*Kalgo tree*), Gamba grass, corn stalk and shrubs cane, in Katsina state northern region; Rappia palm, palm trees, mahogany, Iroko trees, willow cane etc in Anambra and Ondo states, eastern and western regions respectively.

Governance, Institutions, service delivery and biosecurity implications

The findings revealed that most of the communities surveyed are without extension agents (61.9%), though 50% of them have cooperative societies, mostly in Ondo

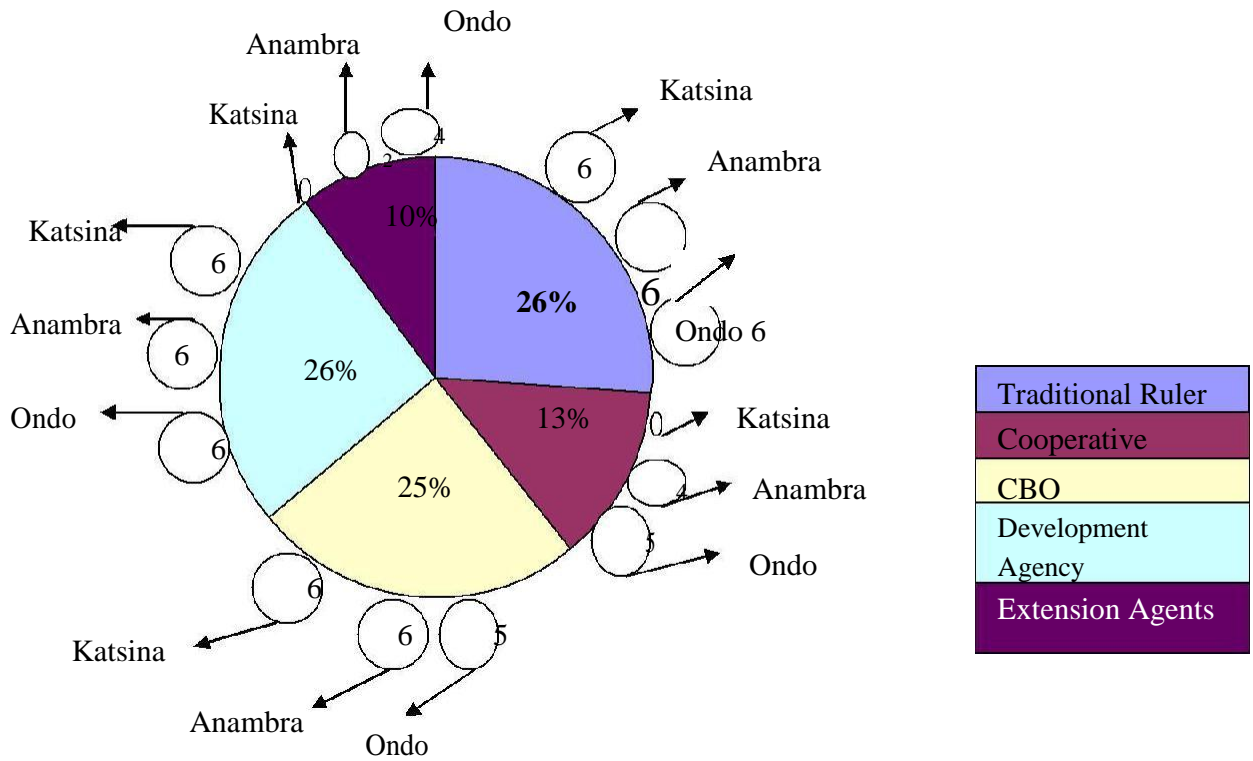


Figure 2. Existence of community development institutions.

and Anambra states (Figure 2). All communities in the study areas (100%) have benefited from one development project or the other; however, the impact is still not profound.

Practical application of the sustainable livelihood framework

The FAO-ECTAD livelihood study used the sustainable livelihood framework and other PRA tools for the survey. The approach attempted to look at the most important risk factors that can cause poultry diseases in the communities. These factors are both of internal and external sources ranging from poor management (feeding, watering and housing), inappropriate use of common facilities, infectious agents and other environmental factors.

These factors have some linkages between themselves and their combinations can cause diseases of different magnitudes. Once disease has occurred, it will lead to two important issues: low productivity and reduction in the owners' income because of high mortality of the poultry, reduction in asset base and inability to diversify into other livelihoods activities. The combination of these effects will eventually subject the rural poor (scavenging poultry owners) into poor socio-economic well-being and increase their vulnerability (Figure 3).

However, going by the provision of the framework, irrespective of people's conditions and locations either at individual, household or community level, they have these five capital assets: natural, such as forest, water, land; human: populations, health, skills and knowledge; Physical: roads, schools and machinery; financial: local contribution and animals that can easily be converted into money; and social: such as linkages of the people to other bodies in partnership or collaboration, etc. These assets if properly put into use can improve biosecurity hence address the issue of diseases and improved poultry production. Once this is achieved, the income of the scavenging poultry owners is expected to increase so also their nutrition status will be improved. It is expected that they will be more resilient and be able to diversify into other income generating activities.

DISCUSSION

Information derived by this study was largely obtained from individuals that have lived for a long time in the community and conversant with the affairs of their households and the community at large. Low level of education presents an impediment to risk perception and adoption of technology and ideas such as biosecurity measures, as level of education is a great determinant of technology adoption.

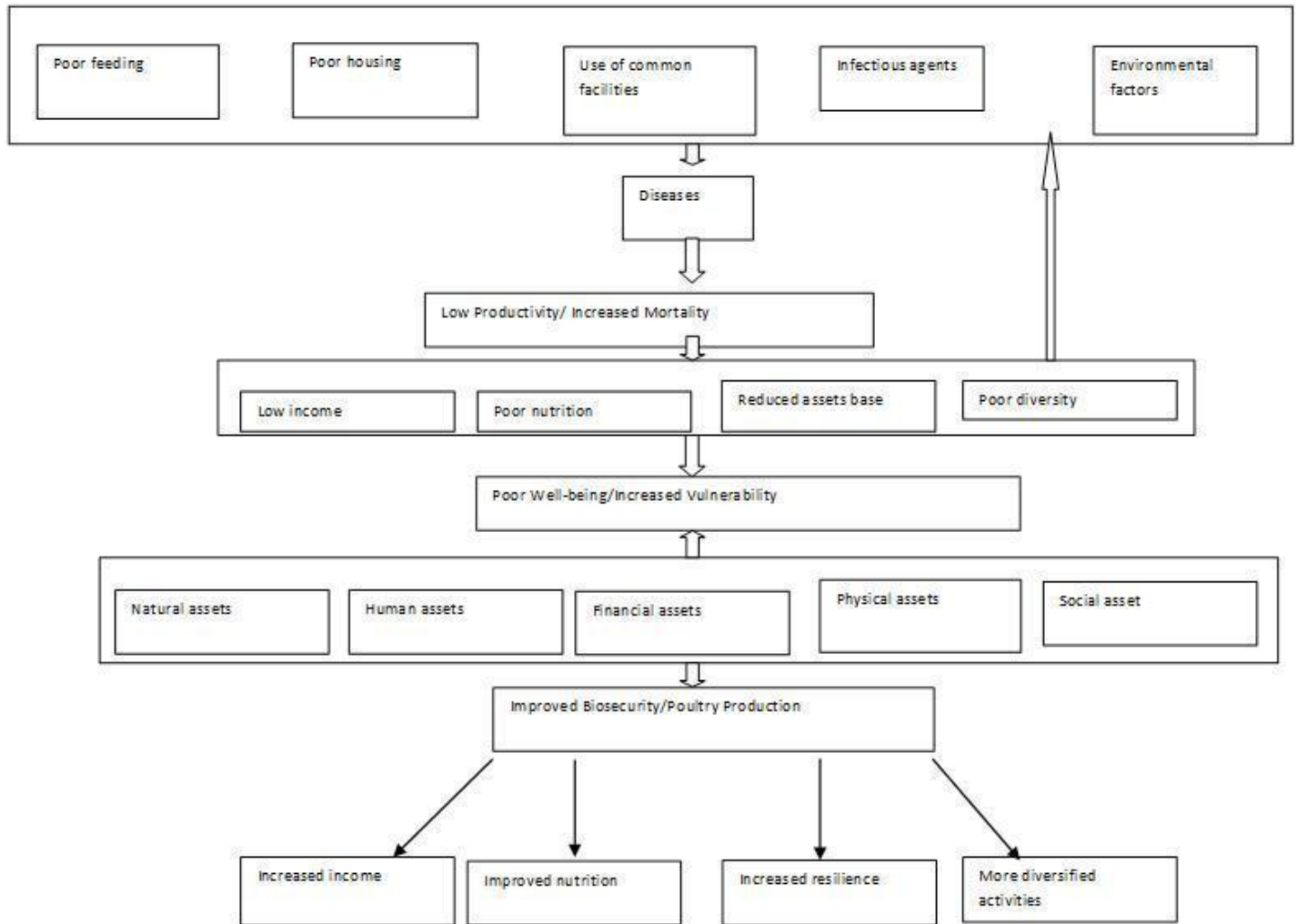


Figure 3. Practical application of SL framework.

According to Billah et al. (2013), 78% of the smallholders had poor knowledge of breeding, feeding, housing and prevention and control of poultry diseases. Hence, this calls for a simplified and multi level approach in disseminating biosecurity ideas to the communities. Although, household size is an important factor in terms of labour supply in rural communities, if not properly utilized, this advantage may have negative implications for biosecurity. This is particularly important where outbreaks of HPAI occur (increasing the possible number of contact persons to the disease). Recent literature related the level of adoption of improved technology such as biosecurity to socio-economic characteristics such as age, level of education, social and marital status, location and other factors (Olaniyi et al., 2008).

In promoting biosecurity measure in these rural communities, it would be essential to ensure that attentions are paid to the variation of ages, the level education and other related variables particularly while

developing messages aimed at behavior change towards safer poultry production.

Apart from housing problems, in most of the communities little concern is given to feeding and watering of the local poultry. Apparently, most of them survive by scavenging around the compound in the neighborhood and streets etc. With high concentration in places where grains or other food stuffs are being processed or food waste is being dumped or near water source such as well, borehole and tap etc.

This corroborates to study by FAO (2010) where they reported that village poultry is kept with minimal input of resources and is considered by most smallholders as supplementary to their main livelihood activity. Their coming together in close contacts provide opportunity for transmission of diseases such as HPAI and Newcastle among others, this is owing to the fact that healthy and unhealthy birds from different sources mix together. This agrees with FAO report of 2010 where they said that

poultry keepers lose many birds as a result of diseases and exposure to predators.

In order to address the issue of poultry feeding, it is reported that leaves from shrubs (such as *Leucaena* sp., *Calliandra* sp., *Sesbania* sp., etc); aquatic plants (*Azolla* sp., water hyacinths, etc); insects (termites); fruits (palm oil, fruits, papaya and guava); small animals (snails, earthworms etc) can all be used for poultry feeding (Branckaert and Gueye, 2008).

In addition to losses due to mortality, poultry diseases also cause some negative effects with multiple effects on the owners; these include low consumption of the product, low market price, with attendant low income and generally poor well-being of households and community members. Studies in Nigeria estimate that the overall flock mortality may be as high as 90% in some areas (Branckaert and Gueye, 2008). Use of common facilities within the communities brings together, human beings, livestock, wild animals and birds including poultry in close contact creating suitable conditions for disease transmission. Vulnerabilities always have some negative and diverse effects on rural activities, which in turn affect their livelihoods overall.

However, it is evident from the PRA that in each event, the local people adopt some coping strategies using their locally available resources, skills and experiences to mitigate the shocks. These comprise of using herbs, intensifying efforts in other activities, selling of other household assets to forestall the economic impact of the disease. This implies that community members are fully aware of dangers associated with epidemics and have some lessons learnt over the years, and with their local skills and knowledge of addressing poultry problems therefore, the communities may be amenable to adopt feasible biosecurity measures as a noble strategy for responding to the threats of poultry disease.

These plant materials or their by products can be used in constructing cheap and effective local poultry houses and barriers for segregation. Interestingly, most of the communities have people with weaving and craft skills including children that have been doing other things similar to poultry cage. Using these resources for construction can guarantee sustainable rural poultry housing with minimum cost, hence protecting the birds against predators and improving biosecurity and by implication enhance poultry production and well-being of the rural people.

Generally, the communities are endowed with natural and human resources, which could permit adoption of biosecurity measures and further construction of multiple livelihoods portfolios in the long support local poultry production.

Extension services and cooperatives provide important structures and support for adoption of technology such as improved biosecurity. The presence of these institutions, with the exception of traditional rulers and development agencies, differ from one state to the other. For instance

while in Ondo and Anambra states cooperatives are well advanced, in Katsina state, it has just started gaining grounds.

Traditional rulers have great influence in terms of decision making on issues that relate to the livelihoods of their kinsmen. They equally influence the process of service delivery, hence listened to by majority of their subjects. Interestingly, this institution, which comprises of village heads, ward heads, and at times clergies, appears to be coherent. Apparently, they could serve as a good entry point for biosecurity interventions in rural poultry production.

Institutional arrangements and governance in any community play a great role in terms of service delivery and facilitation for adoption of technology or ideas such as biosecurity that would enhance poultry production. The study examines some grass root institutions, which are relevant in governing and enhancing rural productivity, these include existence of traditional rulers, cooperative societies, and community based organizations (CBOs), presence of development agencies and extension agents.

Conclusion

Low level of education presents an impediment to risk perception and adoption of technology and ideas such as biosecurity measures. Birds of different species and ages, other animals and human beings all coming together in close contact. (Possibility for disease transmission). Mortality affects rural income and economy with multiplier effects on the household nutrition, health and general well-being. Improperly disposed carcasses can endanger the health of man and other animals. Women and children potentially benefit more from poultry, at the same time they could be more vulnerable to diseases from poultry. Communities are very familiar with poultry diseases and other vulnerability factors and their occurrences. Poor organization affects service delivery and dissemination of technology and ideas such as biosecurity for curtailing poultry diseases and increasing their productivity.

This also reduces the influence of peer adoption of technology. Different species of domestic and wild birds, livestock and human beings from different locations coming together in close contact (risk of disease transmission). Communities have access to resources to improve poultry production including improving segregation and restriction of poultry movement and in the process enhance their livelihoods. Communities stand a chance of being resilient over shocks from poultry diseases including HPAI.

Conflict of Interest

The authors have not declared any conflict of interest.

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