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Research Article

Poultry Waste Management Techniques, the Implication on Environment and Agricultural Productivity in Afijo Local Government Area, Oyo State, Nigeria

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ABSTRACT

This study assessed the poultry management techniques and its implications on environment and agricultural productivity in Afijio Local Government Area, Oyo State, Nigeria. The specific objectives were to identify the socio-economic differentials of poultry waste users on the management pattern of poultry waste in the study area, examining poultry waste management and utilization techniques and their determinants in Afijio Local Government Area of Oyo State, Nigeria, Analyzed the impact of poultry waste utilization on yield and revenue of the respondents in the study area. A random sampling technique was used in selection of respondents. A total number of 104 respondents were randomly selected for this study through the use of structured questionnaire. Description statistics, Gross Margin analysis and cobb-Douglas production function were used as analytical techniques. The socio-economic characteristics of the respondents revealed that an average poultry farmer in the enterprises were between 41-50 years which means most of the farmers were in their active age and majority of the poultry farmers were male (52.90%). Majority of the poultry farmers had formal education (96.2%) while few had non-formal education (3.8%) this implies that majority of the respondents were literate 62.50% claimed they remove waste between 2-3 days interval. The variable that have significant relationship with poultry waste impact of respondents include: waste removal day interval significant at 5% level but had a negative relationship with poultry waste impact which implies that as the period for waste removal extends, there was a negative impact on the environment and performance on the poultry birds thus resulting to low output, purpose of rearing birds, years of experience and ingredient that increase/decrease waste smell are all significant at 1% level of significance respectively. The enterprise in the study area is not a bias one because ratio of male to female is 1:1. The following are recommended: farmers should be encourage to increase hygiene by doing frequent sanitation so as to reduce the chances of diseases infestation, the farmers should be advised to attend waste management and health programme to support year of experience.

Keywords: Poultry waste; Management techniques; Environment; Agriculture; Productivity

INTRODUCTION

Poultry by-products are potential pollutants to water and air quality concerns, and in some cases on soil quality [1] Poultry production adversely affects the environment in numerous ways-through poor management of manure and litter, waste streams from processing plants (blood, bones, feathers, etc), birds' carcasses, dust, insects, odour, etc. Furthermore, intensive poultry production is held responsible for the emission of greenhouse gasses, acidification, and eutrophication. The environmental impact of poultry production depends on numerous factors, among which are farm size, production system, diet composition, type of bedding used [2]. It is well known that, if properly managed, waste generated in the poultry can be source of soil fertility. According to [3] Organic fertilizers including farmyard manure and sheep manure may be used for the crop production as a substitute of the chemical fertilizers because the importance of the organic manures cannot be overlooked Worldwide, there is growing interest in the use of organic manures due to depletion in the soil fertility. Economic

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premiums for certified organic grains have been driving many transition decisions related to the organic farming. Continuous use of fertilizers creates potential polluting effect in the environment. Synthesis of chemical fertilizers consumes a large amount of energy and money. However, an organic farming with or without chemical fertilizers seems to be possible solution for these situations [4] organic sources and synthetic sources of nutrients not only supply essential nutrients but also have some positive interaction with chemical fertilizers to increase their efficiency and thereby reduce environmental hazards.

STATEMENT OF THE PROBLEM

Despite an increase intensive chicken keeping in early 1980's, the withdrawal of subsidy by government on the prices of day-old chicks and feed ingredients led to a general decline in the number of poultry birds particularly under commercial production in the country [5]. The ever-increasing cost of feeds and management forced many commercial poultry establishments to fold-up. Most poultry manure and litter are applied to land near poultry production farms. With few exceptions, this is the preferred practice in developing countries and elsewhere. Such land management of poultry by-products brings the risk of surface and groundwater contamination from potential pollutants contained in the manure and litter. Air quality can be affected by aerial emissions of pollutants from poultry production facilities. Ammonia emitted into the atmosphere is arguably the most environmentally significant aerial pollutant associated with poultry production [6] sport and fate of ammonia once it is emitted into the atmosphere are not well understood, but its presence in high concentration can trigger environmental effects that have impacts on local ecosystems and human health. Based on the previous discussions on waste management, this study intends to answer the following questions:What are the socio-economic differentials of poultry waste users on the managementpattern of poultry waste in the study area?What are the poultry waste management and utilization techniques and their determinants in Afijio Local government area of Oyo State, Nigeria?What is the impact of poultry waste utilization on yield and revenue of the respondents in the study area? Specifically, this study assessed the economic impact of poultry waste on the environmental and agricultural productivity [7].

RESEARCH METHODOLOGY

This study was conducted in Afijio local government Area of Oyo State, Nigeria. Its headquarters is Jobele. It has an area of 722km^2 and a population of 134,173 at the 2006 census. The postal code area is 21, which comprises of eleven (11) wards such as Ilora1, Ilora 11, Ilora 111, Fiditi 1, Fidity 11, Fiditi 111, Awe 1, Awe 11, Akinmori Jobele, Iware, and Imini. The local government is governed by an elected chairman and 10 councilors elected from each ward. Town under Afijio Local Government are (Awe, Akinmoorin, Fiditi, Ilora, Jobele, Iware, Imini, Ore lope).

Methods of data collection

Both primary and secondary data were collected using structured questionnaires. Random sampling technique was used to select 104 respondents for the purpose of this study.

Measurement of variables

The variable consists of both dependent and independent variables.The dependent variable is environment and agricultural productivity measured withCobb–Douglas production function. While independent variables were the socio-economic characteristic of the respondents. In its most standard form for production of a single good with two factors, the function is:

where:

- Y = total production (the real value of all goods produced in a year or 365.25 days)
- L = Labour input (the total number of person-hours worked in a year or 365.25 days)
- K = Capital input (a measure of all machinery, equipment, and buildings; the value of capital input divided by the price of capital)
- A = A total factor productivity.
- α and β are the output elasticities of capital and labor, respectively. These values are constants determined by available technology.

Output elasticity measures the responsiveness of output to a change in levels of either labor or capital used in production, ceteris paribus. For example, if α = 0.45, a 1% increase in capital usage would lead to approximately a 0.45% increase in output.

Sometimes the term has a more restricted meaning, requiring that the function display constant return to scale, meaning that doubling the usage of capital K and labor L will also double output Y. This holds if

$\alpha + \beta = 1$, ...(1)

If

$\alpha + \beta < 1$,.....(2)

returns to scale are decreasing, and if

$\alpha + \beta > 1$,.....(3)

returns to scale are increasing. Assuming perfect competition and $\alpha + \beta = 1$, α andβ can be shown to be capital's and labor's shares of output.

In its generalized form, the Cobb–Douglas function models more than two goods. The Cobb–Douglas Production function may be written as:

where:

- A is an efficiency parameter
- L is the total number of goods
- x_1, ..., x_L is the (non-negative) quantities of good consumed, produced, etc.
- is an elasticity parameter for good i

Cobb-Douglas production function was employed to determine the productivity of the farm. While Gross margin analysis and profitability ratio were used to examine the costs and returns of poultry farming in the study area.

Gross margin analysis is given by equation:

GM = TR-TVC .....(4)

Where

GM = Gross Margin (N)

TR = Total Revenue (N)

TVC = Total Variable Cost (N)

The performance and economic worth of the respondents can be determined by the use of the following Profitability ratios:

1. Benefit Cost Ratio BCR = TR/TC
2. Expense Structure Ratio ESR = FC/VC
3. Rate of Return ROR = NR/TC
4. Gross ratio GR = TC/TR

The Cobb-Douglas production function analysis explanation postulated for poultry farmers in the study area is implicitly presented as:

$Q = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, X_{11}, X_{12}, ei)$.....(5)

Where

Q = Total Revenue (N)

X_1 = Distance of poultry farm to residential households (Meters)

X_2 = Number of poultry birds (Units)

X_3 = Frequency of visit of poultry sanitation officials (per month)

X_4 = Age of poultry farm manager (Years)

X_5 = Quantities of water used (Litres)

X_6 = Number of farms labour (Family and Hired) (Man- day)

X_7 = Poultry farming experience of the farm manager (Years)

X_8 = System of operation of the farm (Deep Liter = 1, others = 0)

X_9 = Quantity of faecal materials generated (Kg)

X_{10} = Number of dead chicks/chicken (Numbers)

X_{11} = Frequency of waste clearance (per month)

X_{12} = Number of cracked/stale eggs (Number)

ei = Random (stochastic) factor external to the model.

The Semilog, Antilog and Cobb-Douglas production functions were evaluated using ordinary least square method.

RESULTS AND DISCUSSION

Socio-economic Characteristics of Respondents

Sex of Respondents

Table 1 showed that 52.9% of the respondents were male, while 47.1% were female. This implies that the percentage of male household head was slightly more than the female household heads.

Age of Respondents

Table 2 shows that the respondents within the age range of 20-30 years were 9.6% while those within the age range of 41-50 years were 25.0%. About 34.6% of the respondents were in the age group of 31-40 years and only 5.8% were above 60 years of age. This implies that 69.2% of the respondents were within the age range of 20 – 50 years, majority of the respondents were actively involved in farming. This finding tells that the higher the age of the household head, the more unstable the economy of the farm household.

Table 1: Distribution of Respondents by Sex.

Sex	Frequency	Percentage
Male	55	52.9
Female	49	47.1
Total	104	100

Source: *Field Survey, 2017.*

Marital status of Respondents

Table 3 showed that 9.6% of the respondents were single, 53.8% were married; 3.8% were divorced; while 32.7% were widow. From this result, it can be deduced that the highest fraction of the respondents were married, a clue that they are likely to have a number of dependents, which can affect their food security status.

Educational level of the respondents

Table 4 revealed that 3.8% of the respondents have no formaleducation, 10.6% had primary education, 21.2% had secondary education while 64.4%attended an adult learning program. The table showed that the lowest percentageof the respondents were non-literates.

Religion of the respondent

Table 5 showed that 57.7% of the respondents are Christians, 41.3% were Muslims while the rest 1.0% were traditional worshippers. This implies that most of the respondents were Christians.

Table 2: Distribution of Respondents by Age.

Age range (years)	Frequency	Percentage
20-30	10	9.6
30-40	36	34.6
41-50	26	25
51-60	26	25
Above 60	6	5.8
Total	104	100

Source: *Field Survey, 2017.*

Table 3: Distribution of Respondents by Marital status.

Marital status	Frequency	Percentage
Single	10	9.6
Married	56	53.8
Divorced	4	3.8
Widow	34	32.7
Total	104	100

Source: *Field Survey, 2017.*

Table 4: Distribution of Respondents by educational level.

Educational level	Frequency	Percentage
Non-formal	4	3.8
Primary	11	10.6
Secondary	22	21.2
Adult learning	67	64.4
Total	104	100

Source: *Field Survey, 2017.*

Year of experience of respondents

Table 6 showed the years of experience of the respondents, 73.2% of the respondents had range of 1-5 years of experience, 23.1% had 6-10 years of experience, while the rest 3.9% had 11-15 years of experience. This implies that most of the respondents had little good years of experience.

Type of birds

Table 7 shows that, 40.4% of the respondent's rears layers, broilers were being reared by only 32.7% of the respondents while only 26.9% of the respondents were rearing cockerels.

Waste disposal method

Table 8 showed that out of all the respondents 21.2% dispose poultry waste by pouring them into the river, 45.2% of the respondents disposal method is by burying them while the other 33.7% respondents runs their waste into a soak away.

Ingredients that increase or decrease waste smell

Table 9 below showed that 75% of the respondents agreed that some ingredients increases or decreases the smell of waste, 23.1% of the respondents says that no ingredients contribute to waste smell while 1.9% of the respondents says they were not sure.

Table 5: Distribution of Respondents by Religion.

Religion	Frequency	Percentage
Christianity	60	57.7
Islam	43	41.3
Traditional	1	1
Total	104	100

Source: *Field Survey, 2017.*

Table 6: Distribution of Respondents years of experience.

Year of experience	Frequency	Percentage
01-May	76	73.2
06-Oct	24	23.1
Nov-15	4	3.9
Total	104	100

Source: *Field Survey, 2017.*

Table 7: Distribution of Respondents based on kind of birds reared.

Type of birds	Frequency	Percentage
Broiler	34	32.7
Layers	42	40.4
Cockerels	28	26.9
Total	104	100

Source: *Field Survey, 2017.*

Table 8: Distribution of Respondents based on waste disposal method.

Waste disposal method	Frequency	Percentage
Into river	22	21.2
Burying	47	45.2
Into soak away	35	33.7
Total	104	100

Source: *Field Survey, 2017.*

Waste removal day interval

Table 10 shows that 62.5% of the respondents remove their waste between 2-3 days, while 37.5% of the respondents remove the waste in the interval of 5-7 days.

Complain from people due to smell

Table 11 showed that 21.2% of the respondents got complaints from people about the smell of their poultry waste while the rest 78.8% respondents don't receive any complaint from people around. This means greater percentage of the respondents manages their poultry well or the poultry farm is situated in a non-residential area

Number of production cycle

Table 12 showed the production cycle of the respondents yearly, 51.0% of the respondents said they undergo 1 production cycle per year, 31.7% undergo 2 production cycle per year, 9.6% said they

Table 9: Distribution of Respondents based on Ingredients that affect smell.

Ingredient / increase/ decreases waste smell	Frequency	Percentage
Yes	78	75
No	24	23.1
Not sure	2	1.9
Total	104	100

Source: *Field Survey, 2017.*

Table 10: Distribution of Respondents based on waste removal day interval.

Waste interval day	Frequency	Percentage
02-Mar	65	62.5
05-Jul	39	37.5
Total	104	100
Total	104	100

Source: *Field Survey, 2017.*

Table 11: Distribution of Respondents based complains on smell.

Complaints from people	Frequency	Percentage
Yes	22	21.2
No	82	78.8
Total	104	100

Source: *Field Survey, 2017.*

Table 12: Distribution of Respondents based Ingredients that affect smell.

Number of production cycle	Frequency	Percentage
1	53	51
2	33	31.7
4	10	9.6
Above 4	8	7.7
Total	104	100

Source: *Field Survey, 2017.*

undergo 4 production cycle per year while 7.7% of the respondents undergo above 4 production cycle per year.

Numbers of birds reared per cycle

Table 13 showed that 47.1% of the respondents had range of 500 to 100.000 birds in a single cycle, 39.4% reared 4000 birds in a cycle, 1.9% of the respondents reared 3000 birds per cycle while 11.5% of the respondent reared 4000 birds per cycle.

Purpose of rearing them

Table 14 showed that out of all the respondents, 7.7% of them rears for the purpose of feeding themselves and their families (subsistence), while 92.3% of the respondents' rears for commercial purposes.

Formulate feed yourself

Table 15 showed that 78.8% of the respondents formulate their feed for the birds themselves, while the rest 21.1% do not formulate the feed by themselves.

Ratio of feed/ overall maintenance

Table 16 showed the ratio of feed used by the respondents, 76.0% of the respondents have 70/30 feed overall maintenance while 24.0% have $^{x}0$ 20 feed overall maintenance

Table 13: Distribution of Respondents based on number of birds reared per cycle.

Waste disposal method	Frequency	Percentage
500-100.00	49	47.1
2000	41	39.4
3000	2	1.9
4000	12	11.5
Total	104	100

Source: *Field Survey, 2017.*

Table 14: Distribution of Respondents based on purpose for rearing.

Purpose of rearing	Frequency	Percentage
Subsistence	8	7.7
Commercial	96	92.3
Total	104	100

Source: *Field Survey, 2017.*

Table 15: Distribution of Respondents based on self feed formulation.

Formulate feed	Frequency	Percentage
Yes	82	78.8
No	22	21.2
Total	104	100

Source: *Field Survey, 2017.*

Table 16: Distribution of Respondents based on overall maintenance.

Overall maintenance	Frequency	Percentage
70/30	79	76
80/20	25	24
Total	104	100

Source: *Field Survey, 2017.*

Kg of starter/finisher (2-3 kg per each bird)

Table 17 showed that all questioned respondents had a kg of starter or finisher that weighs 2 - 3 kg per each bird.

If yes what is it?

The information on the Table 18 below showed that 1.0% of the respondents' kg starter/finisher have l-2kg per bird, while 99.0% of the respondent's kg of starter/ finisher have 4-5 kg per bird.

Do you use local finisher feeds?

Table 19 showed that 83.7% of the respondents uses local finishers to feed their birds while 16.3% of the respondents do not use local finisher feed for feeding their birds.

Amount used to rear each bird

Table 20 shows that 80.8% of the respondents' uses 868 to rear each bird, that is the feed, drugs and maintenance, 11.5% of the respondent used 760 to rear each bird, while 7.7% of the respondents used 782 amounts to rear each bird.

Price sale of each birds.

Table 21 showed the different price of each bird, 41.3% of the respondents put a price of 1200 on each bird, 15.4% of the respondents puts a price range of 1300-1500 on each bird, 20.2%

Table 17: Distribution of Respondents based on feed weight.

Kg of starter/finisher 2-3kg	Frequency	Percentage
2-3 kg per bird	104	100
Total	104	100

Source: *Field Survey, 2017.*

Table 18: Distribution of Respondents based on if yes.

If yes what is it	Frequency	Percentage
1-2 kg per bird	1	1
4-5 kg per bird	103	99
Total	104	100

Source: *Field Survey, 2017.*

Table 19: Distribution of Respondents based on kind of feed used.

Use local finisher feed	Frequency	Percentage
Yes	87	83.7
No	17	16.3
Total	104	100

Source: *Field Survey, 2017.*

Table 20: Distribution of Respondents based on amount to rear each bird.

Amount used to rear each bird	Frequency	Percentage
868	84	80.8
760	12	11.5
782	8	7.7
Total	104	100

Source: *Field Survey, 2017.*

of the respondent put a price range of 1600-2000 on each bird, while 23.1% puts a price range of 2100.00-2500 on each bird.

Do you sell waste

Table 22 shows that 83.7% of the respondents sell their poultry wastes, 10.6% of the respondent do not sell their poultry waste, while 5.8% of respondents sometimes sell and sometimes do not sell.

Other waste apart from poultry litter

Table 23 shows that out of all the respondents only 58.7% of them have other wastes apart from poultry litter while 41.3% do not have any other waste apart from poultry litters.

Who buys them?

Table 24 showed that 45.2% of the respondents says poultry farmers buys the waste from them, 6.7% of the respondents says the waste were bought by pig farmers, 6.7% of the respondents sells the waste to other industries, 35.6% of the respondents says the wastes were bought by crop farmers.

Costs and Returns

Table 25 shows that 6.7% of the respondents had 70,000 as their annual returns, 24% of the respondents make 200,000 as their annual returns, 1% of the respondents made 360,000 as their annual returns, 7.7% makes 400,000 as their annual return, 2.9% of the respondents made 500,000 as their annual returns, 1.9% of the respondents had an annual returns of 750,000. 20.2% made 800,000 as their annual returns, 24% of the respondents made 100,000,000 annual returns, 1.9% made an annual return of 200,000,000 while 9.6% of the respondents made 440,000,000 as theirannual returns.

Does wastes substitute fertilizer?

Table 26 showed that all the respondents substitute poultry waste for fertilizer.

If yes what?

Table 27 shows that 27.9% of the respondents uses poultry waste to substitute NPK, 8.7% of the respondent's substitute poultry waste with urea while 63.5% of the respondents' substitute poultry waste with both NPK and urea.

Which crop is the poultry waste best used for?

Table 28 shows that poultry wastes are used for planting cassava by 18.3% of the respondents. 68.3% used poultry waste for planting maize, while the rest 13.5% of the respondents used poultry waste for cultivating vegetables

Table 21: Distribution of Respondents based on price sale of ach bird.

Price of each birds	Frequency	Percentage
1200	43	41.3
1300-1500	16	15.4
1600-2000	21	20.2
2100-2500	24	23.1
Total	104	100

Source: *Field Survey, 2017.*

Table 22: Distribution of Respondents based on do you sell waste.

Do you sell waste	Frequency	Percentage
Yes	87	83.7
No	11	10.6
Sometimes sell & not sell	6	5.8
Total	104	100

Source: *Field Survey, 2017.*

Table 23: Distribution of Respondents based on other waste.

Other wastes	Frequency	Percentage
Yes	61	58.7
No	43	41.3
Total	104	100

Source: *Field Survey, 2017.*

Table 24: Distribution of Respondents based on Who buys them?

Who buys them	Frequency	Percentage
Poultry	47	45.2
Pig farmers	7	6.7
Other industries	37	35.6
Crop farmer	13	12.5
Total	104	100

Source: *Field Survey, 2017.*

Table 25: Distribution of Respondents based on annual return.

Annual returns	Frequency	Percentage
70000	7	6.7
200000	25	24
360000	1	1
400000	8	7.7
500000	3	2.9
750000	2	1.9
800000	21	20.2
100000000#	25	24
2000000000	2	1.9
440000000	10	9.6
Total	104	100

Source: *Field Survey, 2017.*

Table 26: Distribution of Respondents based on Does wastes substitute fertilizer?

Waste substitute fertilizer	Frequency	Percentage
Yes	104	100
Total	104	100

Source: *Field Survey, 2017.*

Table 27: Distribution of Respondents that substituted wastes for fertilizer.

If yes what	Frequency	Percentage
NPK	29	27.9
Urea	9	8.7
Both	66	63.5
Total	104	100

Source: *Field Survey, 2017.*

Price of fertilizer manure substitute

Table 29 showed that 45.2% of the respondents buys it at the rate of 5500 while 54.8% of the respondents buys it at the rate of 6000

How effective is it

Table 30 showed that 86.5% of all the respondents experienced the same effectiveness when using poultry wastes, while only 13.5% of the respondents says poultry wastes has more effectiveness on crops.

Does it serve the same purpose with fertilizer?

Table 31 revealed that 90.4% of the respondents agreed that it serves the same purpose with fertilizer substitute while 9.6% of the respondents disagreed that it does not serves the same purpose with fertilizer.

Regression Analysis Result

The result of multiple regression analysis is presented as follows, from the result, an adjusted R-squared value of 0.8154 revealed that 81.54 percent of the explained Variation poultry waste impact of respondents were captured by the estimated independent variables specified in the model, while the rest 18.46 percent of the unexplained variation in poultry waste impact of respondents may be due to certain variables of interest not specified in the model butresident in the error term.F-value is 5.74 and significant at 1%.The variables that have significant relationship with poultry waste impact of respondents include;

Waste remover day interval, significant at 5% level, but had a negative relationship with poultry waste impact, this implies that as the period for waste remover extends, there was a negative impact on the environment and performance of the poultry birds thus, resulting to low output. Purpose of rearing birds, years of experience and ingredient that increases/decrease waste smell were all significant at 1% level of significance respectively. Purpose of rearing birds had a negative and inverse relationship with poultry waste impact. Years of experience and ingredient that increases/decrease waste had a positive and direct relationship with the impact of poultry waste on the environment and productivity of the farmer by implication, increase in the years of experience and ingredient that increases/decrease waste, brings about positive increase in agricultural productivity (Table 32).

Table 28: Distribution of Respondents based on best crop used for?

Crop best used for	Frequency	Percentage
Cassava	19	18.3
Maize	71	68.3
Vegetables	14	13.5
Total	104	100

Source: *Field Survey, 2017.*

Table 29: Distribution of Respondents based on manure fertilizer price?

Price	Frequency	Percentage
5500	47	45.2
6000	57	54.8
Total	104	100
Total	104	100

Source: *Field Survey, 2017.*

Table 30: Distribution of Respondents based on how effective is poultry wastes on crop.

How effective	Frequency	Percentage
More	14	13.5
Same	90	86.5
Total	104	100

Source: *Field Survey, 2017.*

Table 31: Distribution of Respondents based on did poultry waste serve the same purpose with fertilizer?

Same purpose with fertilizer substitute	Frequency	Percentage
Yes	94	90.4
No	10	9.6
Total	104	100

Source: *Field Survey, 2017.*

Table 32: Results Multiple Regression.

Variable	Co-efficient	T	p>t
Waste removal day interval	-0.142	-1.09	0.018**
Purpose of rearing birds	-1.03	-0.6	0.000*
Years of experience	0.402	3.97	0.000*
Ingredient that incre/decre.	0.665	8.71	0.000*
Waste			
Annual return	3.67	0.69	0.493
Constant	3.714	6.83	0

Source: Field Survey, 2017.

*, **, *** Significant at 1%, 5% and 10% respectively.

CONCLUSION AND RECOMMENDATION

Based on the result of the findings, the study showed that respondents in the study area were above their active and economic age, and were married. Average household size was 8members. The enterprise in the study area is not a bias one because the ratio the male to female is 1:1. The following was recommended: Farmers should be encouraged to increase hygiene by doing frequent sanitation so as to reduce the chances of disease infestation. Community-based surveillance of pathogens on poultry products should be intensified to ensure the success of programs undertaken. The farmers should be advised to attend waste management and health program to support year of experience. The government should assist through research institute, make available feed ingredient that will reduce waste without causing a detrimental effect on the poultry animal.

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