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Village chicken production performances assessment under scavenging management system in Amaro district, SNNPRS of Ethiopia

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ABSTRACT :*This research was conducted in Amaro District. District is one of the special district in the Southern Nations, Nationalities and Peoples Regional State (SNNPRS). Two representative peasant associations namely Kereda and Jijola were selected purposively. Also Dilla University poultry farm station was used for on-station trials. The qualitative and quantitative data-sets were analyzed using SPSS software, version 16 (SPSS, 2002). About 77.8 and 60.7% of respondents from Kereda and Jijola, respectively, offer supplementary feeds to their chicken on top of scavenging feed resources. Majority of the respondent's indicated that cholera, kisen and Wararshe (Fengel). All of the respondents practice natural incubation system with the help of broody hens. Predation is the major constraints of the study area. The study was revealed that about 89.9 and 75.9% of the respondent's practices select relatively high producing/superior chicken's individual from the household flock in Kereda and Jijola, respectively. Majority (85.1%) of the producers have not got any improved management practices together with exotic breed distribution such as improved feeding, housing and diseases control. Improvement of local poultry breeds would be beneficial, it is essential to evaluate breeds and their crosses and then undertaking a breeding strategy. Cross-breeding with improved breeds is recommended, followed by selection in the composite population.*

Key words: *Village Chicken, practices, scavenging and Amaro District*

Introduction

Ethiopian chickens are the most widespread and almost every rural family owns chickens, which provide a valuable source of family protein and income [1]. The most dominant chicken types reared in Ethiopia are local ecotypes, which show a large variation in body position, plumage color, comb type and productivity [2].

The production performance of indigenous or local scavenging chickens of Ethiopia is low because of their low egg production potential, high chick mortality and longer reproductive cycle or the low genetic potential (slow growth rate, late sexual maturity and broodiness for an extended period). About 40-60% of the chicks hatched die during the first 8 weeks of age mainly due to disease and predators attack. About half of the eggs produced

have to be hatched to replace chicken that have died, and the brooding time of the laying hens is longer, with many brooding cycles required to compensate for its unsuccessful brooding [3].

Indigenous chickens provide major opportunities for increased protein production and income for smallholders [4]. Chickens have a short generation interval and a high rate of productivity. They can also be transported with ease to different areas and are relatively affordable and consumed by the rural people as compared with other farm animals such as cattle and small ruminants. Chickens also play a complementary role in relation to other crop livestock activities.

Indigenous chickens are good scavengers as well as foragers and have high levels of disease tolerance, possess good maternal qualities and are adapted to harsh conditions and poor quality feeds as compared to the exotic breeds. In Ethiopia, however, lack of knowledge about poultry production, limitation of feed resources, prevalence of diseases (Newcastle, Coccidiosis, etc) as well as institutional and socio-economic constraints [5] remains to be the major challenges in village based chicken productions.

According to [6], the primary problem cited by the village poultry farmers was high mortality of chicks. The major causes of this problem as perceived by the community and in their order of importance were disease (63.8 %), predation (21.8 %), lack of feed (9.5 %) and lack of information (4.9%), as per the reports of [7]. Insufficient water was also one of the causes of mortality in chicks and older birds and a contributing factor to low productivity. The major constraints of village indigenous chicken production were partly due to poor management of the chicken (prevailing diseases and predators, lack of proper health care, poor feeding and poor marketing information). Considering the above mentioned View this research was conducted with the following objectives.

To carry out a survey on management practices, and production performance of indigenous household chicken kept in selected District.

To identify and analyze the constraints that limiting the poultry production development.

MATERIALS AND METHODS

Description of the Study Area

This study was conducted in Amaro District . The District is one of the special district s in the Southern Nations, Nationalities and Peoples Regional State (SNNPRS). The land area of this Special District is estimated at 1,597.20 square kilometres, and bordered with Arbaminch Zuria district to the Northwest, Derashe Special District to the Southwest, Konso and Burji Special district to the south, and Oromia National and Regional State to the East. Agro-ecologically, Amaro Special District can be divided into Dega (30%), Woina Dega (38%) and Kola (32 %). Geographically, it is found between 370 32"10': 380 East, longitude and 50 3" 55': 60 North, latitude. The elevation of the district varies from 501 - 3,000 metres above sea level. The rainfall varies from 801 - 1,000 millimetres while the average temperature ranges from 12 °C – 25 °C.

Sampling Techniques

Two representative peasant associations namely Kereda and Jijola were selected purposively to get appropriate experienced respondents poultry production. From these peasant associations forty seven households were selected by using pervasive sampling techniques in collaborating with the district agricultural office which have a potential in rearing village chickens. Mostly male farmers were sampled to fill the prepared semi structured questionnaires.

Data Collection

The Primary quantitative and qualitative data was collected by using semi structured questionnaires and prepared checklist for on-station and on-farm trial. The data was collected through personal and house to house interviews and participatory rural appraisal, mainly through transect walks. A transact walk in each households from each peasant association was made for field observation and seen the farmers managements practices. The experimental data were collected on age at first egg, rate of egg production for two weeks laying period and live body weight at point of laying through frequent visit at farm site. Secondary data which were assumed to supplement the primary data were obtained from the district agricultural office and peasant associations' development agent's office report and documents.

Data Analysis The qualitative and quantitative data-sets were analyzed using SPSS software, version 16 (SPSS, 2002). The Duncan multiple range tests were used to locate treatment means that are significantly different.

RESULT AND DISCUSSION

Chicken flock size and structure

Chicken production is a predominant farming practice in both of the study peasant association and most of the households kept local chicken ecotypes. All chicken, irrespective of age and sex, move freely forming subgroups in and around the compound of households, allowing cocks and hens to mate indiscriminately. Aggressive and dominant cocks in the neighborhood tend to be sires. Respondents indicated that the chicken population in all the study areas is increasing largely due to growth in demand and higher prices of chicken and eggs.

The average chicken flock size per household and flock structure is presented in Table 3. Out of the total flocks, hens account for 34.4%. Similarly out of the total flocks counted, young chicks accounted for 25.1%. In agreement to the result of this study [8] reported that an average of 35.57% hens composition of flock structure in three district s of Amhara regional state of Ethiopia. Same finding is reported conversely with the result of this study in chick's composition of the flock structure which indicated about 48% of chicks in average.

The average chicken flock size/household for hens, young chicks, cocks, pullets and cockerels was 2.94, 2.38, 2.11, and 0.74 respectively; with a total flock size of 10 birds and ranged from a minimum of zero to a maximum 40 chickens/household. The mean flock size calculated for the current study is comparable to the report of [9] and [10], who reported mean flock size of 7-10 and 5-10 chickens/household from the central high lands of Ethiopia and Africa, respectively. This result is also comparable to the mean flock size of 8.8, 9.2 and 7.37 chickens/ household reported by [11] from Awassa Zuria southern, by [12] from Dale Wereda northern and by [13] from Nole kabba district western Ethiopia, respectively. On the other side, the mean flock size recorded in this study is higher than the national (4.1) and Oromia Regional State (3.6) averages as reported by [14]; but comparable to that of Tigray (7.2), Gambella (7.5) and Benshangul-Gumuz (7.6) Regional States [14].

The result of this study revealed that the average male to female ratio are 1:1.6. Which is due to the fact that Amaro cock has high consumer preferences on the market because of more fattened and heavy body conformation. However, the recommended cock to hen ratio in modern light and

heavy breeds are 1:10 and 1:8, respectively. However, a cock to hen ratio of 1:4.4 was reported in Sudan by [15] and 1:3.7 was reported by [16] in Amhara region of Ethiopia.

As presented in Table 3, the chicken population of the study area is dominated by local ecotypes, despite the fact that the Agricultural Office of the Wereda was said to be involved in the distribution of exotic breeds of chickens (mainly WLH and RIR) through the national poultry extension package. The results of this study showed that indigenous chickens make up about 88.96% of the total chicken population of the overall study areas. The remaining 3.61 and 7.43% of the total chicken population of the study areas are assumed to be exotic (WLH and RIR) and their crosses with local chickens, respectively. Which indicates that the proportion of exotic chicks recorded from the study area is slightly higher than the national average (2.84%). The remaining 97.82% consists of indigenous chickens of none descriptive breeds, closely related to the jungle fowl [17]. The results of this study clearly showed that there has been intensive distribution of exotic breeds of chickens (WLH and RIR) in the study area through the national poultry extension package without consideration of other production factors.

Table 1. The average chicken flock size per household and flock structure/Household

Flock structure	Kereda			Jijola			Total
	mean ± St. Error	Min.	Max	mean ± St. Error	Min.	Max	mean ± St. Error
Local chicken							
Chick	5.28±2.25	0	30	0.59±0.25	0	4	2.38±0.92
Pullet	2.39±1.12	0	15	0.41±0.18	0	4	1.17±0.46
Cockerels	1.82±1.204	0	15	0.10±.076	0	2	0.74±.456
Hens	2.89±.749	0	12	2.97±1.36	0	40	2.94±.878
Cocks	1.61±.421	0	6	2.41±1.366	0	40	2.11±.854
Exotic Chicken							
Chick	0.33±0.33	0	6	0.0			0.13±0.13
Pullet	0.0			0.0			0.0
Cockerels	0.0			0.0			0.0
Hens				0.83±0.44	0	12	0.51±0.28
Cocks				0.11±0.11	0	3	0.064±0.064

Village chicken husbandry/management

There are a number of requirements by which animals should be managed so that the best performance is achieved in a way acceptable to those responsible for the care of the animals and to the community generally. These requirements are the keys to good management and may be used to test the management of a poultry in relation to the standard of its management.

Feed and Feeding System

Scavenging for feed is a major characteristic poultry-keeping of study area. Birds are free to forage and they usually manage to get a reasonably balanced diet. Nevertheless, their diet is restricted in quality and quantity to what they manage to find. The locally available feed is called the 'scavenging feed resource base' (SFRB). The SFRB is limited and has to be shared by all birds in the area. Similarly the report of [18] indicated that in Ethiopia, village chicken production systems are usually kept under free range system and the major proportion of the feed is obtained through scavenging. About 77.8 and 60.7% of respondents from Kereda and Jijola, respectively, offer supplementary feeds to their chicken on top of scavenging feed resources. When the shortage of feed for scavenging chickens, particularly the lack of high quality protein, is considered, there is a tendency to invoke the prospects for unconventional or nontraditional feeds. Almost all of the farmers produced their own feed supplementation. The supplementary feeds used were combinations of maize and small grain (67.6% of the households), maize (17.6%), cassava (5.9%), Household wests and food leftover had the highest contribution (8.8%). At the time of offering supplementation young chicks given a priority because they could not scavenge. [20] also reported that cereal grains like maize, small grains and household wests is the major supplementary feed used on top of scavenging in Zimbabwe.

Chicken Health and Disease Control Measures

The economic losses due to diseases in smallholder poultry cannot be accurately calculated. In qualitative terms the value of village chickens is well known, but few have attempted to derive monetary values for smallholder poultry flocks. Disease is not commonly associated with the high mortality, the steady rate of attrition being unlike that of an infectious or parasitic disease.

Farmers responded more or less similarly in symptom and name of disease occurrence in the area. Majority of the respondent's indicated that cholera (Symptoms: bloody, wa-

tery and yellowish diarrhea and birds look sleepy), kisen Wararshe (Fengel) (Symptoms: Head and wing dropping and look sleeping and sometimes diarrhea). This result indicated the disease might probably be Newcastle (Wararshe/Fengel), fowl cholera (cholera) and salmonella (kisen). In agreement to the result of this study [18] compiled that mortality of village chicken due to disease outbreak is higher during the short rainy season, mainly in April (66.8%) and May (31.4%). [19] also reported that NCD is one of the major infectious diseases affecting productivity and survival of village chicken in the central highlands of Ethiopia. Season of disease severity, Provisions of medicine, vaccinating and age mostly affected for specific disease were showed in Table 3. About 85.1% of the respondents experienced with springtime severity of diseases. This time is the time just before the main rainy season. Whereas, 10.6% of the respondents indicated the disease occurred any time of the year. The majority 59.6% did nothing, 19.2% gave traditional medicine like feeding of ground leaf of eucalyptus and lemon juice mixed with injera, and 19.1% used human related medicine like tetracycline prescribed for human medicine. Lack of response by the farmers was attributed to lack of cash to purchase veterinary medicine and shortage of veterinary and extension services. The wide use of traditional medicine was due to its low cost, local availability and easiness of application. Large flock sizes were obtained with those farmers that gave traditional medicine to their chickens. This indicates that traditional medicines do work and have the potential to improve the health status of village flocks. Hence, there is a need for research to determine their chemical properties, concentrations and mode of application.

Even though, vaccination is available for Newcastle and fowl cholera diseases that produced at national veterinary institute majority of the farmers (95.6%) were not vaccinated their bird against diseases. Protection against Newcastle Disease requires three vaccinations during the six-month growing phase of pullets and cockerels. Depending on local conditions, between two and three vaccinations per year are needed for adult birds. Because of the limited resources of government veterinary services, veterinary assistants and vaccinators to provide preventive veterinary care in remote rural areas, and to ensure a reliable supply of vaccines (with a cold chain for the storage and distribution of conventional vaccines). In Bangladesh, the Department of Livestock Services established such a cold chain from the vaccine production laboratory to the village level in 1984. Within three years, 4 500 poultry farmers (especially women) were trained as village poultry vaccinators. The full cost of vaccination was charged to poultry producers in order to sustain the full cost of vaccine production and distribution. When it (Symptoms: sudden death without showing any disease sign) is possible to extend this fee to partly cover an extension service, it can result in the creation of a partly privatised poultry extension service. Such a system, financed by vaccination fees and the sale of exotic birds to farmers, was established in Sao Tome and Principe.

About 5.4% of the farmer offer vaccinate after report of the disease outbreak, this case increases the severity of the disease instead of curing. The finding of [16] also indicated that the level of awareness about availability of vaccines for local chicken is low and the farmers do not have any experience of getting their chicken vaccinated against diseases which is agreed with the result of this study. This is due to the fact that the farmers have no information about disease control and vaccination because of poor extension package of poultry production. Since every chicken farmer aims to keep their chickens healthy and productive, to benefit from the flock in terms of meat and egg production. One major step towards increased productivity is to vaccinate against these diseases, the most devastating disease of chickens in the regions. However, once vaccination is implemented economically important diseases are controlled, more chickens will survive. Consequently, the following possibilities emerge: 1. the breeder flock size can be allowed to increase; 2. Surplus chickens surviving can be marketed or consumed prior to maturity; 3. fewer eggs can be set under the hens, allowing more eggs to be consumed or sold.

Majority of the farmers responded that all age group (67.4%) were equally affected by diseases. In contrast to the result of this study [21] revealed that Chicks and growers which die, also tend to be those with lighter feather colors, that is, those which are more conspicuous.

Table. 2. Feed supplementation and types of supplementary feeding in study area (%)

Feed and water provision	Kereda	Jijola	Total
Feed Supplement	77.8	60.7	67.4
Water provision at d/t season	94.4	93.1	93.6
Types of supplementary feeding			
Cassava	0.0	13.3	5.9
Household wests and food leftover	10.5	6.7	8.8
Maize	5.3	33.3	17.6
Mixture of maize and small grain	84.2	46.7	67.6

Table 3. Season of disease severity, Provisions of medicine, vaccinating and Age mostly affected in the study area (%)

Parameters	Kereda	Jijola	Total
Season of disease severity			
Summer (Dry season)	5.6	0.0	2.1
Winter (Rainy season)	0.0	3.4	2.1
Springtime	72.2	93.1	85.1
All season	22.2	3.4	10.6
Provision medicine			
Chillies (mitimitta)	0.0	10.3	6.4
Leaf of eucalyptus	5.6	0.0	2.1
Lemon mixed with injera	16.7	0.0	6.4
No suggested traditional medicine	55.6	62.1	59.6
Root of papaya chiiling	0.0	6.9	4.3
Tetracycline	16.7	20.7	19.1
Provision of Vaccination			
Provided	11.8	0.0	4.4
Not provided	88.2	100.0	95.6
Age mostly affected for specific diseases			
Young chicks	23.5	3.4	10.9
Adult	17.6	24.1	21.7
All age group	58.8	72.4	67.4

Housing system of chicken

Commonly indigenous chickens are kept in the family house (42.6%) in this case birds are set free on free range whereby they move freely during the day and spend the night in the main house. About 40.4% of the respondents use separate shelter entirely constructed for poultry which is located very near the main house for security purposes. Sometimes the chickens are housed overnight on have a different shelter for night enclosure in the same roof (12.8%) and perch on trees (4.3%). In all cases, chickens are housed during the night only. Lack of housing is one of the constraints of the chicken under extensive production system. In some African countries, a large proportion of village poultry mortality accounted due to nocturnal predators because of lack of proper housing [22]. In the Gambia livestock improvement program, which included improved poultry housing resulted in lower chick mortality (19%) relative to that observed in Ethiopia (66%) and Tanzania (33%), where no housing improvements were made [23].

Table 4. Chicken housing system, need of ventilation, number bird and Material used for housing study area (%)

Housing system	Kereda (%)	Jijola (%)	Total (%)
• **Share the same room with family (in the main house)**	38.9	44.8	42.6
• **Different shelter for night enclosure in the same roof**	11.1	13.8	12.8
• **Separate house constructed entirely for poultry**	44.4	37.9	40.4
• **Perch on tree**	5.6	3.4	4.3
Frequency of cleaning			
• **Daily**	100.0	76.5	85.7
• **Weekly**	0.0	23.5	14.3
Considering need of Ventilation	90.9	77.8	82.8
No number bird consideration	90.9	82.4	85.7
Construction material			
• **Bamboo**	35.3	45.5	39.3
• **Timber**	11.8	27.3	17.9
• **Wood and mud**	52.9	27.3	42.9

The majority of the respondents clean their chicken house/shelter daily (85.7%), while the remaining (14.3%) clean weekly. The situation in the other study areas is similar. Lack of frequent cleaning of poultry shelter can easily cause diseases and increase morbidity and mortality rates of chicken. Thus, raising awareness of farmers on the need for cleaning shelters is important that all development practitioners should take seriously. While chicken house construction majority of the respondents consider need of ventilation (82.8%) but not number of birds (85.7%). While separate housing is provided, the walls is made of wood and mud (42.9%), Bamboo (39.9%) and Timber (17.9%).

Bamboo (39.9%) and Timber (17.9%). The roofing material mostly used for chicken housing grass. Some more advanced ones have corrugated iron sheets for the roofs.

Housing is essential to protect the bird against incremental weather (rain, sun, very cold winds, dropping night temperatures), predators, and theft, and also to provide shelter for hens laying eggs and broody hens. And most important: housing is necessary in order to maintain a high level of biosecurity in the flock. Furthermore, a suitable or comfortable poultry house is extremely important to maintain an efficient production and for the convenience of the poultry farmer.

Incubation and Hatchability practices

In Amaro District 97.9% of the farmer practice incubation and hatchability (Table 5). All of the respondents practice natural incubation system with the help of broody hens. About 78.7% preferred Dry season period of incubation because of chick mortality is very high at the wet/rainy season. Similarly [16] revealed that all respondents reported that they use broody hens for hatching eggs and growing chicks. Most farmers incubate eggs using their brooder hens during the dry seasons when there is good feed resource, less disease risk and favourable environment for growing chicks. Of the incubated eggs 98.6% of eggs hatched out to healthy chicks. The result of this study showed that egg hatchability at household level is more economical. But the total number of grown chick in to pullet/cockerels at age 3 months is limited to 50.36%. [24] report from estern Gojem northern Ethiopia also reported that mortality from hatching to maturity is higher mostly due to disease (45%) and predators (33.33%). The result of this study revealed that almost half of hatched chicks has been died due to different reasons. The major reason of chick mortality is predator attack (61.7%) followed by seasonal disease (25.5%) occurrence. According to [6], the primary problem cited by the village poultry farmers was high mortality of chicks. The major causes of this problem as perceived by the community and in their order of importance were disease (63.8 %), predation (21.8 %), lack of feed (9.5 %) and lack of information (4.9%), as per the reports of [7]. According to previous research findings the major causes of poultry losses in village chicken production was mortality due to disease, predator and nutritional stress [25]; [26]; [27]**;** **[**28].

Predation is the most important problem of the study area. About 41.8% of the respondents indicated that wild cat is a dangerous predator. In addition, wild Egyptian Vulture (locally called 'chilfit') (32.6%), Honey badger (23.4%) and snake (2.1%). Even though, all age group attacked by predators, young chicks is the most vulnerable age group (48.1%) (Table 6). About 18.4% of the respondents do nothing whereas protecting in the house and under shade (46.1%), house construction (17.0%) and killing (14.9%) predators using toxins and traps are the preferred predator control systems by farmers. Construction of 'predator proof' chicken houses could help to reduce losses, especially at night. [2] also reported that predation is one of the major constraints in village chicken production in northwest Ethiopia.

Table 5. Egg laying interval, hatching practice and preferred season of hatching of rural chicken in the study area (%)

Rate of Egg laying	Kereda	Jijola	Total
• **Daily**	38.9	27.6	31.9
• **Two successive lay and one day rest**	16.7	37.9	29.8
• **every other day**	38.9	34.5	36.2
• **Two day rest and One day laying**	5.6	0.0	2.1
Hatching practice			
• **Yes**	100.0	96.6	97.9
• **No**	0.0	3.4	2.1
Season of Hatching			
• **Wet**	0.0	13.8	8.5
• **Dry**	88.9	72.4	78.7
• **Both**	11.1	13.8	12.8
Reason of Chick death			
• **Predators**	61.1	62.1	61.7
• **Disease**	16.7	31.0	25.5
• **Both predator and disease**	22.2	6.9	12.8

Table 6. Types of predators, severity of attack, means of control and mostly attacked age group in the study area (%)

Types of predator	Kereda (%)	Jijola (%)	Total (%)
• **Honey badger**	27.8	20.7	23.4
• **wild Egyptian Vulture**	31.5	33.3	32.6
• **wild cat**	35.1	46	41.8

• **Snake**	5.6	0.0	2.1
Severity of attack			
• **Very High**	64.8	42.5	51.1
• **High**	5.6	42.5	28.4
• **Medium**	29.6	12.6	19.1
• **Low**	0.0	2.3	1.4
Means of control			
• **protecting in the house and under shade**	42.6	48.3	46.1
• **house construction**	16.7	17.2	17.0
• **Killing by different means**	18.5	12.6	14.9
• **No suggested control**	14.8	20.7	18.4
• **Surround cleaning**	7.4	1.1	3.5
Attacked age group			
• **Chicks**	55.6	42.9	48.1
• **Adult Local**	4.4	6.3	5.6
• **Adult Exotic**	4.4	0.0	1.9
• **All age Group**	35.6	50.8	44.4

Chicken Selection and Breeding

When the farmer has taken on improving the productivity and survival of local free-range poultry through improved management, housing, feeding, chick protection etc., she/he may embark on better selection and breeding the best indigenous chickens from her/his own flock. These will be chickens which produce a large number of eggs, hens having good mothering ability, have big bodies and large eggs. The farmer may wish to add other criteria such as plumage etc. The advantage of the indigenous chickens is that they are well adapted to the local and usually harsh environment. In this view result of this study was revealed that about 89.9 and 75.9% of the respondent's practices select relatively high producing/superior chicken's individual from the household flock in Kereda and Jijola, respectively. This indicates that majority of the overall respondents practice selection to improve production and productivity of their village chicken.

Table 7. Selection practices and interest of the household to raise exotic breed of chicken (%)

Parameters	Kereda	Jijola	Total
Selection (%)			
• **Practicing selection**	88.9	75.9	80.9
• **Not practice selection**	11.1	24.1	19.1
Selection of fattening chicken (%)			
• **Body Conformation (Height, length and appearance)**	72.7	100.0	89.7
• **Breed (Known Local Ecotype)**	9.1	0.0	3.4
• **Physical Characteristics (Color, Comb, Beak)**	9.1	0.0	3.4
• **Body Conformation, Breed and Physical Characteristics**	9.1	0.0	3.4
Selected sex type for Egg yield (%)			
• **Male**	12.5	0.0	5.1
• **Female**	12.5	13.0	12.8
• **Both**	75.0	87.0	82.1
Selection characters (%)			
• **color**	18.8	0.0	7.7
• **Egg production**	43.8	65.2	56.4
• **Body weight**	37.5	8.7	20.5
• **All combination**	0.0	26.1	15.4
Interest on Exotic breed (%)			
• **Interested to raise**	100.0	96.6	97.9
• **Not interested to raise**	0.0	3.4	2.1
Average number to mage (Mean ± St. Error)	18.83±4.13	14.57±2.105	16.24±2.058

Selections for higher meat production means for fattening chicken is common in the study area (Table 7). Majority (89.7%) of the respondent prefer body conformation (Height, length and appearance) traits for fattening purposes. Whereas Breed (Known Local Ecotype) (3.4%) and Physical Characteristics (Color, Comb, Beak) (3.4%) were given least position for selection by producing households. The farmers selection criteria might be misled the farmer's improvement objectives since scientifically selection parameters justified as laying hens are "boat-shaped" with a long straight back and a big bottom. Meat producers (broilers) are long-legged, have a more upright position and wings placed in high position on the body. Dual-purpose breeds have body forms in-between layers and broilers. Local breeds often have the

form of a dual-purpose breed, though much less heavy in body form and size [29]. According to the farmer's group discussion, the household clearly confirmed that male individual is the preferred sex type than female for fattening practices by the producers.

Since the farmers indicated the purpose of selection is different according to the sex. About 12.8% of farmers select only hens for the purpose of egg production. This is due to the fact that the producers have lack of information about selection of both sexes for egg production parameters. About 82.1% of the respondents select both male and female for the purpose of egg production improvement. Whereas about 12.8% of the producer prefer female sex only for the purpose of egg productivity improvement.

Regarding to the selection character about 56.4% were select for egg production. Whereas 15.4% prefer the combination of feather color and body weight. Which means the farmers consider both white feather color and heavily body weight in equal treatment as a major parameters. Body weight (20.5%) consideration also applied by some farmers. It is important to note that improved growth (for meat production) and high egg production are genetically incompatible in the same bird. The genetic traits are negatively correlated, which means that selection for one trait will reduce the other. With this reality farmers body weight selection for egg production improvement disappoint the producers by reduce egg yield instead of increment objective. This indicated that lack of producer's knowledge in selection and breeding of chickens made this gap. The gap would have be filled through training and educational supports of poultry producers, the extension program ministry of agriculture and rural development must support the farmer's profitability.

Table 8. Institutional support of village poultry productivity improvement I study area (%)

Parameters	Kereda	Jijola	Total
Received			
• **Yes**	16.7	13.8	14.9
• **No**	83.3	86.2	85.1
From Who you obtained			
• **Development Agent (DA)**	100.0	100.0	100.0
Obtained the training			
• **Yes**	5.9	6.9	6.5
• **No**	94.1	93.1	93.5
getting any improvement from training			
• **Yes**	0.0	50.0	14.3
• **No**	100.0	50.0	85.7
Receive credit in the in recent year			
• **Received**	29.4	14.3	20.0
• **Not received**	70.6	85.7	80.0
Source of credit			
• **Safety net program**	60.0	100.0	75.0
• **Micro-finance**	40.0	0.0	25.0
Purpose of that credit			
• **cattle and small ruminant fattening**	50.0	100.0	71.4
• **Family package**	50.0	0.0	28.6

The farmers of the study area want to further increase chicken productivity by introducing better breeds. The most common method of improving the local gene pool is crossing indigenous and exotic birds, and then leaving the hybrid offspring to natural selection. Pure-bred or hybrid cockerels (or pullets) selected for greater meat or egg production are introduced into local flocks, usually in order to increase egg production. In this fact almost all of the village chicken producers interested in raising exotic breed of chicken, this due to the fact that exotic breed of chicken lay many eggs than indigenous. In this fact farmers exotic breed preferences linked to their egg production. About 3.4% of the respondents were not willing to raise exotic breed of chicken because of their susceptibility diseases and easily attacked by predators. The capacity of the farmers to raise exotic breed of chicken in the household is average of 19 and 15 numbers exotic chicken in Kereda and Jijola, respectively, with the minimum of 2 and maximum of 80 birds/household. The factors that hard up village poultry farmers to limit their exotic bird interests are inappropriate poultry house, feeds, predators and diseases. When the bird released for scavenging in the backyard due to lack of housing they attacked by predators and exposed economically important diseases. Nutritional deficiency is common in village poultry especially for protein, since supplementation on top of scavenging is mainly focused on energy source feedstuff such as cereal grain crops and inset. Therefore, the poultry productivity improvement package of Ministry of Agriculture should be full improvement package. At the time of exotic bird distribution farmer should be enforced to buy balanced least cost poultry feed to utilize their full production potential.

Institutional support and source of information for chicken production

Majority (85.1%) of the producers have not got any improved management practices together with exotic breed distribution such as improved feeding, housing and diseases control. Technical skills need to be considered at both farmer and extension officer levels. Only 6.5% of the respondents trained on poultry production improvement. Training is essential in the areas of disease control, housing, equipment, feeding, genetic improvement and marketing. A basic knowledge of specific features of poultry anatomy and physiology is also important, to provide a basis for understanding. Housing and management could be improved through appropriate farmer training, preferably conducted on-farm. Local craftsmen could be trained to manufacture small equipment, such as feeders and drinkers. In this fact, more than 93% of the producer has not received training. Of the trained household producers about 14.3% of them is improved chicken productivity through application of advisee given by trainers (Development Agents). This indicated that institutional support in management improvement together exotic pullet and cockerels looked very poor. Crop productivity improvement package of Ministry of Agriculture mainly focused on productivity improvement input supplies and enforcing farmers to use agrochemical input to increase production and productivity. Likewise poultry productivity improvement package must be focused on input supply together exotic bird distribution such as balanced commercial feeds, improved housing and health control (Medicine and Vaccine).

About 80% of the respondents were not received credit, which means only 20% of them received credit. Of which 75% of them received from safety net program whereas about 25% of the respondents received from micro finance. In its purpose this credit is mainly focused cattle and small ruminant fattening (71.4%) while about 28.6% of the credit is offered as a family package to minimize poverty.

CONCLUSION

It is difficult to imagine birds better adapted for survival under scavenger free-range conditions than the breeds that have already evolved under those very same conditions, and are still surviving as proof of their ability to do so. However, there does remain a considerable and largely unexploited potential for increased production from local breeds through improved management.

The problem with local ecotypes are inherently low egg production and low meat production, also high mortality. Breed improvement to increase meat or egg production would not solve the health and nutrition management problems. However, increased egg production (by breed improvement) would create a new problem - lack of broodiness in the flock - which would force the smallholder to buy stock rather than have the hen brood and rear her own.

Mortality can be significantly reduced through increasing farmer awareness of health needs, through the provision of vaccine (especially for Fowl Cholera and Newcastle Disease) and through improving the nutrition of growing stock (for example, by providing commercial feeding systems). These are the most important improvements to management activities that will enable to the farmer to best exploit the existing potential of local breeds under scavenging free-range conditions.

If management resources available to the smallholder or landless farmer increase to the extent of a local supply of balanced poultry feed, the options open to farmer income-generating ability are increased. However, the answer is not to confine local breeds in intensive management systems.
If balanced feed, good health-care supplies and day-old chicks of exotic varieties are locally available, then distribution of improved poultry breeds is an option.

The vast potential for increasing income generation from scavenger free-range family poultry clearly lies in the management area of reducing mortality in growing chickens. This alone is sufficient challenge for the already over-stretched resources of government and NGO field extension staff in study areas.

The potential for breed improvement is a factor to be considered in the future, but only when the more immediate objective of reducing mortality is attained. Meanwhile efforts should be continued to preserve germplasm as a resource for the future.

Improvement of local poultry breeds would be beneficial, it is essential to evaluate breeds and their crosses and then undertaking a breeding strategy. Cross-breeding with improved breeds is recommended, followed by selection in the composite population.

RECOMMENDATIONS

The achievement of village poultry development objectives requires a concerted effort, incorporating research, development and training. A coherent strategy should emphasize, but should be focused on the following:

- Identification of research requirements and programmes, at both the strategic and adaptive levels;
- Identification of development efforts for the two target groups: rural and small scale;
- Delivery of technological assistance to producers with regard to input supply and product marketing;

- Continuous training and retraining of technical staff involved in smallholder Village poultry production at all levels.

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