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Keywords: *potchefstroom koekoek, mortality, farmers management.*

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Demonstration and Evaluation of Dual Purpose Chicken “Potchefstroom Koekoek” Packages at Areka areas, SNNPR, Ethiopia

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& Endrias Dako ^χ

Abstract- The demonstration was conducted in Wolaita zone, Boloso Sore district at Areka and around Areka areas. Participants (farmers) were selected purposively on the basis of willingness to construct poultry house; to cover all the associated package costs and record the required was selected. Survival of chicks during the first 8 weeks of brooding using hay-box at the farmers management condition was 79.8% (359 were survived out 450). On average about 93.1% of the chicken were survived to the laying age while mortality reduced from 20.2% to 6.9% . The average age at first egg laying recorded at each farmers was 142 days and average weight of eggs at first laying was 40.2g. The average weight of male and female chicken at 20 weeks of age was 1.5kg and 1.1kg respectively. Field day was arranged when they were at the age of 20 weeks and 135 (120 male and 15 female) farmers and 65 (60 male and 5 female) researchers, experts and government officials from regional to woredas levels were participated on field day and awareness creation was created as a result all participants got a conviction to consider the technology as a viable agricultural venture.

Keywords: potchefstroom koekoek, mortality, farmers management.

I. BACKGROUND AND JUSTIFICATION

Animal production in general and chickens in particular play important socioeconomic roles many poor rural households in developing countries (Alders, 2004; Salam, 2005). Chicken are the most important avian species for the resource challenged families of the developing world, because they are sources of income, animal protein and have cultural values, and can be raised in varying agro climates with limited resources, feed and housing (Kondombo, 2005). As reported by Van Eekeren (2006), people rear chickens under widely varying circumstances, while their main objective is generally the same: maximum production from minimum costs and with minimum risks.

In sub Saharan Africa, 85% of all households keep chicken under free range system, with women owning 70% of it; providing cheap/affordable animal protein in the form of meat and eggs as well as being a reliable source of cash income (Aklilu *et al.*, 2007).

Besides the sector significantly constitutes to human livelihood and food security of poor households and can be considered an initiative enterprise owing to its low cost (Abdelqader *et. al.*, 2007).

In spite of their great importance to the lives of most rural people, the contribution of village chicken is not proportion to the huge number. According to Singh (1990), low productivity of local breeds; prevalence of diseases; less availability and poor quality of feeds; limited research and poor extension service; and lack of organized marketing and processing facilities are some of the most important constraints affecting the village chicken production system.

In Ethiopia chickens are the most widespread and almost every rural family owns chickens, which provide a valuable source of family protein and income (Tadelle, 2003). The total chicken population in the country is estimated to be 56.87 million (CSA, 2014). About 95.87% of the total population is consists of indigenous chickens characterized by the production of low yielding local chicken, a flock size of 5-6 per family and offering little or no additional inputs for housing, feeding and health care (Mebratu, 1997).

In Ethiopia, like other African countries, attempts have been made at various times by the Ministry of Agriculture and Rural Development (MOARD) and several other institutions including research, higher learning institutions and NGOs to improve village poultry production systems through introduction of exotic breeds and fertile eggs (Alemu and Tadelle 1997). Distribution of a day-old and 3 months old improved chicken breeds, mainly RIR & WLH, has been some of the livestock extension packages implemented by the ministry of agriculture. The package is being implemented in many ways like; 5 pullets & 1 cockerel, 1 cock only, 15 pullets & 2 cocks and 50 day-old chicks. Despite such a large number of improved breeds distribution into the village system, the majority of the chicken population is still comprised of the local stock managed under the traditional production system. The contribution of improved chicken in the current production system is less than two percent (Mebratu, 1997).

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A recent study on adoption of poultry breeds in the highlands of Ethiopia indicated that adoption has been limited by a set of factors such as, lack of strong extension follow up and complimentary inputs, diseases, unavailability of credit services and market problems. Besides, the numbers of breeds and birds included in the package were few (Hailemariam et al. 2006). This results to a huge gap between demand and supply of poultry products. According to Alemu and Tadelle (1997), the per capita egg and chicken meat consumption was estimated to be 57 eggs and 2.85 kgs respectively. But in the current time it is less than one egg and a kilogram of chicken meat, which is very much less than a global average (153 eggs) (Smith and Wiseman, 2007).

A recent study by Nigussie et al, (2010), witnessed that the significance of enhancing institutional links and the need to transform the traditional piece meal approach of poultry technology transfer into promotion of carefully selected and packaged technologies. Therefore, to tackle the ever existing problem, different approaches of improved poultry technology packages dissemination should be followed on the basis of certain socio-economic and physical environments.

a) Objectives of the study

i. General Objective

- ❖ To enhance a small scale commercial poultry production packages into potential areas so as to improve rural livelihood and nutrition quality of the people

ii. Specific Objectives

- ❖ To promote and disseminate suitable full-fledged poultry packages
- ❖ To build the skill of participant farmers thereby to increase farmer to farmer technology dissemination
- ❖ To aware the contribution of poultry technologies to household income and food security
- ❖ To increase the national per capita egg and poultry meat consumption

II. METHODOLOGY

The demonstration was conducted around Areka areas. Participants farmers was selected purposely on the basis of willingness construct poultry house; to cover all the associated package costs and record the required will be selected. Training was given poultry house and housing, health, feeding and data recording. Data was collected on mortality (as occurred due to either disease, predator, mechanical or others); age at first egg; cost of feed/feed ingredients and medicaments; income from sale of cocks, nonproductive/spent hens. Intensive follow up during the brooding phase, then on monthly base afterwards by the respective research centers. Monitoring and evaluation was undertaken by the team of experts from DZARC and respective research centers. Field day was arranged, so that stockholders and farmers in the respective areas will be included and participant farmers was presented their success and/or experience on the field day.

Accordingly, nine farmers around Areka areas were selected and 50 day-old koekoek chicken was given.

III. RESULT AND DISCUSSION

a) Mortality

Survival of chicks during the first 8 weeks of brooding using this modified hay-box at the farmers management condition was 79.8%. On average about 93.1% of the chicken survived to the laying age while mortality reduced from 20.2% to 6.9% (Table 1) . The survival rate and mortality varied between farmer could be duet difference in management from farmers to farmers. Even though difference in management observed mortality was due poor management (especially for high mortality in some farmers), inappropriate housing, watering and feeding condition. In addition to this the chicks were provided in cold season "keremet" so that the susceptibility of chicks was increased. These all showed, in future there need intense training and follow-up of poultry keepers.

Table 1 : Mortality Recorded at the age of their 4 months

Participants	No. of chicken given	Mortality recorded during first 8 weeks	Mortality recorded during 2 nd 8 weeks
1	50	14	6
2	50	20	9
3	50	10	6
4	50	10	2
5	50	5	0
6	50	6	2
7	50	8	2
8	50	10	2
9	50	8	2

b) Age at first laying and average weight of eggs

The average age of first laying recorded at each farmers was 142 days and average weight of eggs at first laying was 40.2 g. Age at first laying and egg weight of Koekoek chicken was 153.3±6 days and 48.84± 6.77

g respectively in Ada**a and Lume districts (Desalew, 2012). The Koekoek breeds attain the first oviposition at 130 days with an average egg weight of 55.7 g (Nithimo, 2004) in South Africa which is slightly early matured to first egg laying.

Table 1 : Age at first egg laying and weigh of eggs

Participants	No. of female chicken at first egg laying	Age at first egg laying (days)	Wt. of egg at first age (gm)
1	10	141	43.2
2	8	154	42.4
3	2	135	41.8
4	9	146	39
5	16	131	38.3
6	14	138	41
7	12	140	34.2
8	6	139	37.8
9	6	151	40
10	5	141	41.4
11	1	141	43.2

c) Weight of chicken recorded at the age of 20 weeks

The average weight at 20 weeks of age under farmers management condition was 1.5k and 1.1kg for male and females respectively (Table 3). Nthimo (2004) reported a body weight of 1.7kg for Koekoek breed at 26th week of age. Argaw and Mengistu (2011) also reported 1.39 kg of body weight at 19th weeks of age for Koekoek breeds at on station feeding trial at Haramaya University which is slightly consistent with the current

evaluation at 20 weeks of age at farmers management condition. Benerjee et al. (2013) and Aberra et al. (2013) also reported 1.04kg and 1.01kg of body weight at 15 weeks of age respectively at Hawassa University intensive feeding. In general the body weight of koekoek breed achieved at 20 weeks of age evaluated under farmers management condition was showed good potential.

Table 3 : Body weight record of chicken (at 20 weeks of age)

Participants	No. of chicken sample taken		Average body weight (kg)	
	Male	Female	Male	Female
1	5	5	1.6	1.06
2	5	5	1.66	1.18
3	5	5	1.18	1.04
4	5	5	1.25	0.93
5	5	5	1.52	1.26
6	5	5	1.56	1.18
7	5	5	1.62	1.3
8	5	5	1.28	0.8
9	5	5	1.36	0.86
Average			1.5	1.1

d) Profit earned by farmers

Even though, most of the farmers sold both male and female before all data were collected (such as egg production) cost of feed/feed ingredients; income from sale of cocks, nonproductive/spent hens were recorded, rough profit was estimated as indicated table (Table 4). All the costs was recorded based on the current price.

Accordingly the average net income from sales of chicken was 1048.90 (ET. Birr). This income was only from sales of males and females at the age of 4 months excluding egg production.

The change in net income (ΔNI) was calculated as the difference between the change in total return (ΔTR) and the change in total variable costs (TVC)

$$\Delta NI = \Delta TR - \Delta TVC$$

Table 4 : Estimated profit from sale of cocks, nonproductive/spent hens

Participa nts	List of costs				Income items			Total net income	Profit
	Unit	House construction	Chick purchase	Feed costs	Total Variable Cost	Sale of cock	Sale of hen		
1	birr	300	300	700	1300	1080	800	1880	580
2	"	1500	300	300	2100	990	1300	2290	190
3	"	695	300	1900	2895	1700	2040	3740	845
4	"	905	300	1550	2755	2000	1200	3200	445
5	"	2000	300	1500	3800	3240	1980	5220	1420
6	"	320	300	1060	1680	2400	1100	3500	1820
7	"	300	300	2500	3100	2000	1500	3500	400
8	"	0	300	150	450	1800	1560	3360	2910
9	"	500	300	200	1000	1020	810	1830	830
									1048.90

e) Field day arrangement

Field day was arranged when the chicken were at the age of 16 weeks so as to create awareness as time passes by and benefits realized, all participants got a conviction to consider the technology as a viable agricultural venture. Accordingly 135 (120 male and 15 female) farmers and 65 (60 male and 5 female)

researchers, experts and government officials from regional to woredas levels were participated on field day. Farmers perception: generally farmers showed high interest to conduct poultry farming with some adjustments like: other highly productive breed and in-depth training on chicken management, house preparation and feed formation at home.



Fig. 1 : Photos taken during field day

IV. CHALLENGES

There was a problem on farmers selection and data recording . As a result most of the farmers sold chicken (both male and female) before data on egg production, weight at 52 and 72 weeks of age were not organized.

V. CONCLUSION AND RECOMMENDATIONS

The result of the current demonstration showed a good performance of "*Potchefstroom Koekoek*" under farmers management condition; indicating productivity could be increased through improved housing, feeding and health management. Farmers are aware that this breed can produce more if they are fed and looked after carefully, but majority of the farmers did not provide the recommended management practices. However, the overall productivity of the birds under farmers management condition was lower in comparison with those reared under intensive management system, but still the current demonstration suggested the importance of keeping such dual purpose chicken for farmers in the study areas. According to farmers perceptions and observations there was no doubt on breed adaptation.

In outlook of the above, training for farmers and extension staffs focusing on diseases control, improved housing and feeding should be arranged to be successful in such dual purpose chicken under farmer management production system.

Hence there were some indicating results (Mortality, Weight at 20 weeks of age, age at first egg laying) as compared to local chicken breeds scaling-up should be done in other areas with proper selection of farmers so that the missed data will also be included.

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