Experiences in Hybrid Chicken Scaling up in East and Central Shewa

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Experiences
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Scaling up
in
East and Central Shewa

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Introduction

Poultry is an important source of food and income. In Ethiopia, poultry production appears to be the most suitable and practical intervention to improve the livelihood of the poor. However, poultry production system is characterized by the production of a small number of low yielding local chickens (yielding 30 to 80 eggs hen\(^{-1}\) year\(^{-1}\)), a flock size of 5 to 6 per family, and little or no additional inputs except shelter in the house at night (Mebratu, 1997; Taddele, 1996). A recent study on adoption of poultry breeds in the highlands of Ethiopia also indicates 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 (Hailemariam et al., 2006). Still, there is a big gap between demand and supply of poultry products.

There were attempts made by MoA and several institutions and NGOs to improve village production systems through introduction of limited number of, usually 5 to 7, exotic breeds (Alemu and Taddele, 1997).

Of the 38.3 million chickens of Ethiopia, more than 90% is made up of local, low producing chickens. Local chickens are known for their low productivity due to
Hybrid chicken scaling up poor genetic makeup. It is believed by many professionals that there is a need for intervention, through management, to increase the productivity of local chickens. However, the urgency to produce cheap animal protein in a very short period of time needs a focus on hybrid technologies. Previous evaluations of the poultry extension system indicate that packages involving crossbreeding of locals with RIR, which was developed by MoA, is not yet developed and adopted by farmers (EEA:EEPRI, 2006)

In general, the study indicates that much progress has not been made in promoting the poultry development packages in most regions since the numbers of animals included in the package and the types of breeds are few. Therefore, it is necessary to reconsider intervention approaches with different poultry technology packages that are impact-oriented, gender-sensitive, and that would not repeat previous mistakes.

The objectives of this study were:

- to evaluate performance of 100 hybrid layer (Lohmann silver) and dual purpose (Koekoek) chickens;
- to establish a new approach of cooperation with wereda agricultural offices for large scaling up; and
- to create awareness of poultry production as a means of alternative business.
Methodology

Overall approach

In the past, Poultry Research National Case Team of the Ethiopian Institute of Agricultural Research used to disseminate the final hybrids to the final producers through direct contact. In this regard, previous attempts resulted in promising results (Negussie et al., 2006). This includes very good performance of hybrid chickens, higher economic return, and above all, creation of interest towards small-scale commercial poultry production technologies based on 100 hybrid chickens.

Based on previous results, in 2002, it was planned to promote the technology with new layer and dual breeds in many more weredas in collaboration with agricultural offices and extension sections.

Planning

The activity was planned with prior and thorough discussion with the Livestock Development, Health and Marketing Agency of the Oromia Region. The Region was selected for the first phase activities based on its proximity to the Research Center. Other regions were
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communicated as consecutive intervention areas. Common understanding was reached among stakeholders on the idea that EIAR supplies the genotypes, gives training, and Livestock Development, Health and Marketing Agency covers travelling costs for the training that would be held at Debre Zeit Agricultural Research Center.

Awareness Creation

An awareness creation workshop was held at EIAR headquarters, in which different stakeholders from various weredas attended. The major objective of the workshop was to create common understanding among the stakeholders on the form, idea and procedures of the planned partnership, and instigate attitudinal change towards small-scale commercial poultry business. During the workshop, common understanding was created on the sensitive nature of the poultry production, the need for timely and regular monitoring activities by wereda experts and proper record keeping. It was also agreed upon by the stakeholders that the Oromiya Livestock Development, Health and Marketing Agency, respective wereda experts, development agents and wereda veterinarians should give out most attention for the success of this activity as they were close to the participants. Finally, all parties, i.e. the Ethiopian
Sites and farmers selection

The Livestock Development, Health and Marketing Offices selected 25 participants from Lumme, Adama, Tiyo, sululta, Sebeta and Welmera Weredas (Figure 1; Table 2).
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Figure 1: The study area
Table 1. Participating weredas

<table>
<thead>
<tr>
<th>Wereda</th>
<th>Breeds</th>
<th>No. of participants</th>
<th>No. of chickens/package</th>
<th>Total no. of chickens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lume</td>
<td>Lohmann Silver</td>
<td>13</td>
<td>100</td>
<td>1300</td>
</tr>
<tr>
<td>Adama</td>
<td>Lohmann Silver</td>
<td>14</td>
<td>100</td>
<td>1400</td>
</tr>
<tr>
<td></td>
<td>Koekoek</td>
<td>8</td>
<td>50</td>
<td>400</td>
</tr>
<tr>
<td>Tiyo</td>
<td>Lohmann Silver</td>
<td>12</td>
<td>100</td>
<td>1200</td>
</tr>
<tr>
<td></td>
<td>Koekoek</td>
<td>5</td>
<td>50</td>
<td>250</td>
</tr>
<tr>
<td>Sululta</td>
<td>Lohmann Silver</td>
<td>5</td>
<td>100</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>Koekoek</td>
<td>9</td>
<td>50</td>
<td>450</td>
</tr>
<tr>
<td>Sebeta</td>
<td>Lohmann Silver</td>
<td>2</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td>Koekoek</td>
<td>4</td>
<td>50</td>
<td>200</td>
</tr>
<tr>
<td>Welmera</td>
<td>Lohmann Silver</td>
<td>7</td>
<td>100</td>
<td>700</td>
</tr>
<tr>
<td></td>
<td>Koekoek</td>
<td>8</td>
<td>50</td>
<td>400</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>87</td>
<td>850</td>
<td>7000</td>
</tr>
</tbody>
</table>

The criteria for the selection of the package participants were set considering the demand of the package. The criteria for the package were as follows: The participant should (1) have great interest towards poultry production (2) not be rich who have other priority farming activities and giving less attention to small poultry package (3) be capable of constructing poultry houses (4) not be too poor to cover costs associated with poultry feeding, medication, till the chickens start production (5) be literate as it is required to record the amount of feed offered, feed refused, egg collected and other data.
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Training

A multidisciplinary team from the Poultry Research and Research Extension and Socio-Economics Department gave a 5-day intensive training on feeding and health management of hybrid chickens to farmers. Participant farmers, development agents and experts from respective weredas were trained on small-scale commercial poultry production. Development agents and experts were also trained to enable them to give immediate technical support to farmers during implementation. During the practical training session, participants were intensively engaged in selecting, grinding, and mixing feeds for their chickens. They were given options of feed formulae based on available feed ingredients in their area.

Selecting and packaging technologies

The technologies presented include breed (Hubbard classic: broiler, Dual: Koekoek and Layer: Lohmann Silver) [broiler breeds from the Hubbard Classic family, Koekoek breeds from Dual purpose family, and Lohmann Silver form the Layer Family;] compounded feed which can be made locally by farmers themselves, housing and equipment such as deep litter filled with hay straw; feeders and drinkers made or bought locally,
improved management and health care practices, and standard recommendation.

**Breeds**
The packages were based on two breeds imported and being evaluated at Debre Zeit Agricultural Research Center. Lohmann Silver (commercial layer) and Potchefstroom Koekoek (dual purpose) chickens based packages. Lohmann Silver is a layer breed which has been tested in some countries in Africa. Lohmann management guide indicates that Lohmann Silver is a predominately white feathering layer for the production of uniform brown eggs with reduced egg weight. The breed lays smaller eggs, more than 230 year⁻¹, with small feed requirement for a unit of product. As the system of egg sell in Ethiopia is on number bases unlike on a weight basis as in Europe, the breed was a good candidate. The Potchefstroom Koekoek breed is a dual purpose chicken. According to Fourie and Grobbelaar, 2003, the Potchefstroom Koekoek was bred at the Potchefstroom Agricultural College in South Africa during the 1950s. Potchefstroom Koekoek was developed for the following specific production traits: brown shelled egg (200 year⁻¹) with an average weight of 55.7 g and attractive carcass (more than 2.5 kg mature weight) with a deep yellow colored skin. The Potchefstroom Koekoek cocks and culled hens are used
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for meat production. This breed is very popular among rural farmers in South Africa and neighboring countries for egg and meat production as well as for their ability to hatch their own offspring (Grobbelaar, 2008).

Feed

The feeding regime was designed based on requirement per class (layer or dual) and age (chick, grower, or layer stage) of chickens. Feed ration formulae were prepared to be used by the producers to make their own feed at home. The formulae were carefully made to contain the amount of nutrients required by the chickens. Available ingredients were selected to produce feeds. The ingredients were yellow maize grain, noug cake, Soybean meal, salt, limestone, what middling, DL-methionine, L-lysine, fish offal, and vitamin premix.

Housing

The house was designed to accommodate the chickens to lay egg, eat, and to exercise. Keeping the standard of 5 to 6 medium sized chickens per house was followed. The material for the house construction was wood and mud wall, corrugated iron sheets. The floor of the house was filled with tef straw after properly disinfected with Malathion and formalin. The ceilings and the walls of the houses were then cleaned, disinfected and fitted with feeders, drinkers and laying nests. It was also advised to

Comment [AS]: Could we use "system" instead?
farmers to use lighting, especially incandescent bulb, if electricity is available.

**Health**

Before the chickens were distributed, vaccination against Marek’s disease was given at the farm. The farmers were then given vaccination program for the wereda veterinarians to follow and administer accordingly. Vaccines included in the packages available at the Ministry of Agriculture, Debre Zeit National Veterinary Institute, and were for Marek’s and Newcastle disease (HB1 and Lasota), for Fowl Pox, and Fowl Thyphoid. Bio-security measures included cleaning the poultry house before the chicken brought in, avoiding entrance of birds, dogs and vermin into the house, restricting visitors and using a cloth only to be worn in the poultry house and putting a disinfectant bath at the entrance of the house to disinfect shoe while entering the house.

**Inspection prior to distribution**

Before chickens were distributed, a team of researchers and wereda experts made a tour in selected weredas to monitor and evaluate preparations for the reception of the chickens and start up the scaling up work. Every wereda was visited at least once and technical advices
Hybrid chicken scaling up were forwarded. Finally, chickens were distributed by wereda experts.

**Distribution of chickens**

Day-old chickens were vaccinated against Marek’s disease at the hatchery before they were distributed to individual farmers. The farmers were given data recording sheet to record feed intake, mortality, vaccination dates and time. They were also given a vaccination program to be hanged in their poultry house for easy reference by wereda experts. Farmers were given the breed and package they liked. Farmers who wanted to receive dual purpose chickens were given 50 layers and 4 cocks as they are dual breeds, which later on multiply. Those who wanted commercial layers took 100 Lohmann Silver layers.

**Record keeping, monitoring, and evaluation**

Record keeping was believed to help evaluate the profitability of the activity. Farmers were given recording sheet to record feed offered, feed refused, mortality, vaccination dates, etc. Monitoring and evaluation was also planned at the start of the activity.
The aim was to identify any type of errors that may occur in due course and give appropriate corrective measures. It is important to objectively measure the success of the activity. Bi-weekly visit of the farms was planned by wereda development agents and experts. Researchers visit and give technical support as the need arise once in a month.

Outcomes

Performance of breeds

The performance of the breeds was not properly recorded. Farmers failed to keep records except mortality, though they were repeatedly told by researchers during training and supervision to do so. The livability of Lohmann Silver and Potchefstroom Koekoek was not good. Only less than 12% chicken mortality was expected for less than 20 weeks of age under commercial production systems. Even if complete commercial system and management were not applied, more than 50% mortality is too much. Livability of the breeds under research condition was lower than the average of the six weredas. Under research conditions, the mortality of Potchefstroom Koekoek was even lower than the standard. Wereda experts did not visit farmers to
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correct their problems and did not join researchers in visiting the participants. It was, therefore, not possible to clearly show the amount of feed the animals consumed and the weight gain as a result of food consumed.

According to Table 2, mean mortality of chicken’s ranges from 0 to 58.5%, implying that more than half of the chickens distributed to farmers died before they start laying eggs. The breeds were evaluated at Debre Zeit, a location that has closer environmental condition to Lumme, Adama, and Sebeta. The recommendations on feeding, vaccination, and general management were strictly applied. Analysis of variance of mortality level by breed and by wereda was conducted. Mortality of Lohmann across all locations was significantly higher than Koekoek (P<0.05). Similarly, mortality level of breeds was significantly lower in research sites in Debre Zeit than in other locations. Welmera and Sululta had significantly higher mortality than any other areas (P<0.05). This might be due to the cold weather conditions in the two places. Similarly, the management condition in the two places was poorer than others.
Table 2. Percentage of mortality by wereda and breed till week 12

<table>
<thead>
<tr>
<th>Wereda</th>
<th>Breeds</th>
<th>Mortality</th>
<th>Mean mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Min.</td>
<td>Max.</td>
</tr>
<tr>
<td>Lumme</td>
<td>Lohmann Silver</td>
<td>8</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>Koekoek</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Adama</td>
<td>Lohmann Silver</td>
<td>1</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td>Koekoek</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Tiyo</td>
<td>Lohmann Silver</td>
<td>20</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>Koekoek</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Sululta</td>
<td>Lohmann Silver</td>
<td>25</td>
<td>55</td>
</tr>
<tr>
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<td>Koekoek</td>
<td>8</td>
<td>30</td>
</tr>
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<td>Lohmann Silver</td>
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<td>30</td>
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<td></td>
<td>Koekoek</td>
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<td>0</td>
</tr>
<tr>
<td>Welmera</td>
<td>Lohmann Silver</td>
<td>35</td>
<td>82</td>
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<td>Koekoek</td>
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<td>14</td>
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<tr>
<td>DZ-Research</td>
<td>Lohmann Silver</td>
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<td>11</td>
</tr>
<tr>
<td></td>
<td>Koekoek</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

**Health management and bio-security**

The outcome of the monitoring activity in the five weredas shows that chickens distributed to farmers exhibited, in general, poor performance and ill condition. The bio-security situation of individual poultry house was also very poor. Farmers move in and out of the house without using foot bath. They did not keep records properly. Vaccination was not also given for chickens after they left Debre Zeit Research Center farm. None of
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The chickens were vaccinated for Newcastle (HB1 and Lasota), and Gumbro diseases, which are known to kill most chickens in poultry production. They were not also provided with any type of vitamin supplementation as per the recommendations. Some of the symptoms were even ignored.

Regular visit once in two weeks was supposed to be paid. It was primarily agreed that the respective wereda experts had to give vaccinations, corrections and advice on management of the hybrid chickens once in two weeks. However, only participants in Welmera Wereda received technical support and visit from wereda experts. As a result, activities, like bio-security and vaccination, were not accomplished on time and according to the recommendation.

**Feeding**

Poor feeding management was observed during field visit at individual farmer’s farms. Proper feeding and drinking equipment were not provided to chickens. Most of the feeds given were scattered on the floor. Chickens were also fed ingredients which were not supposed to be given raw. Raw soybean grain was just ground and put into the mix. This grain has an anti-nutritional factor and should not have been given unless roasted or prepared in
a meal form. Some farmers even gave a single ingredient, like wheat or maize that does not fulfill the nutritional requirement of chickens.

**Housing**

Housing was the only package component that was constructed as per the recommendation. Some farmers constructed proper houses and others did not. However, even those who constructed good houses had poor performance since they failed to follow the recommendations on other package components.

**Conclusion and Recommendations**

When the two breeds are compared, Koekoek, being dual purpose, was more resistant to diseases even with low vaccination and management inputs than the other breeds.

Being a specialized hybrid layer, Lohmann faced the highest mortality in this study. For the success of future scaling up activities, an alternative breed could be considered.
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Lohmann Silver should only be used in a system where standard managements are applied. Koekoek should be multiplied and used massively.

References


