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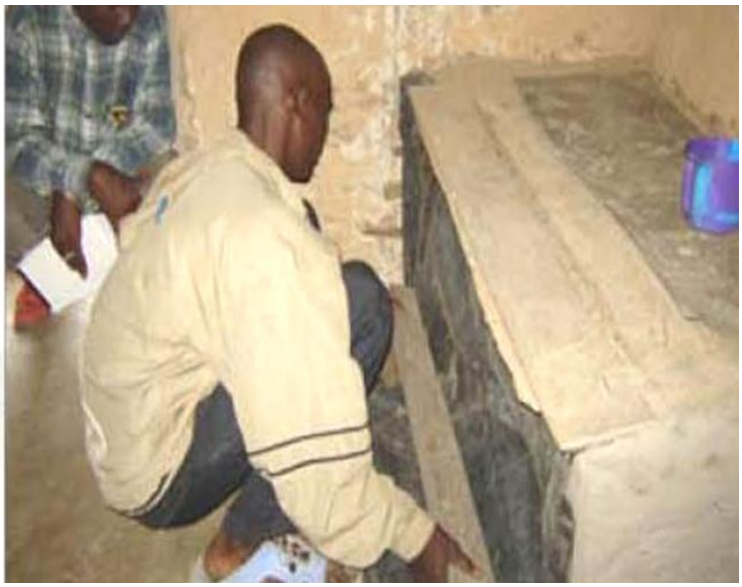
Good Practices for Family Poultry Production



Clay incubator: A Pro Poor Initiative to incubate eggs for inclusive Guinea Fowl farming

by

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The purpose of the International Network for Family Poultry Development (INFPD) is to share information about poultry production among scientists, researchers, policy makers, educationists, students and development workers and to promote the cause of family poultry production.

Good Practices of Family Poultry Production (GPFPP) are "practices that address environmental, economic and social sustainability for on-farm processes, and result in safe and quality food and non-food agricultural products" (FAO COAG 2003 GAP paper). Sharing information about “Good Practices for Family Poultry Production” that are successfully implemented in countries, regions or development projects is an important objective of the INFPD so that these practices can be replicated in different region based on the farmers’ demand.

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1. INTRODUCTION

Mali, a Sahelian country characterized by agriculture, livestock/pastoralism and fishery is located in Sub-Saharan Africa (SSA). The economy is based on agriculture which contributes with 45 percent to the Gross Domestic Product (GDP), including livestock with 8.1 percent. Mali, as well as many other countries in Sub-Saharan Africa is subject to repeated droughts, which have made its agriculture very unpredictable. Productions from agriculture, livestock and fisheries are insufficient, causing low revenues for the rural population. Consequently, there is an unprecedented increase in food insecurity, such as was the case during 2010-2011 when more than a million people faced a vulnerable situation. For a long time, poultry farming has been one of the most important activities in rural areas. It provides revenues that help rural populations to satisfy their basic needs in Mali and in most of the Sahelian countries such as Burkina Faso or Niger. Among the poultry species, guinea fowls are widespread in rural areas of the region.

Guinea fowls are important birds for resource-poor farmers. To reduce food insecurity, especially during the rainy season, rural populations have intensified guinea fowl production. In the past, meals made with guinea fowl meat was only used by high personalities and elders, for home consumption. Now-a-days, it is eaten because of its good taste by many people who can afford it. Guinea fowls are also used frequently for socio-cultural purposes. It was and continues to be used in specific cultural activities (such as sacrifices), that explains the relevance of this poultry species.

Besides the socio-cultural aspects, the economic aspect of guinea fowl production is today very important. This favorable situation has led producers to organize their production for more birds and eggs. The rural populations are supplying products from guinea fowl, both live birds and eggs to urban populations. In the market, guinea fowl meat and eggs are the most preferred poultry products being more expensive than those from chickens In December 2011, the price per bird in Bamako was between 3000 and 3500 FCFA (6-7US$) (this price usually increases and almost doubles on New Year's Eve), while chicken cost between 1500 and 2000 FCFA (3-4US$). In December 2012, the price for one guinea fowl in Bamako was in the range of 3000 -5000 FCFA (6-10US$). There is a high demand for guinea fowls and a strong business has been developed around its trade. A value chain exists from producers to consumers involving many middle men and women. Since production of the birds on-farm is possible with low expenses concerning food, housing and health high demand has created a large increase of their production.

Generally, the beginning of the rainy season is the period of food insecurity in many rural areas. The development of farmers' guinea fowl activity is linked to the fact that egg production begins with the first rains and lasts all raining season. Guinea fowls in the region lay eggs from April–May to October–November, depending upon the length of the rainy season. During that period, guinea fowls lay eggs almost daily. In 2003, the national

production of guinea fowl eggs in Segou areas of Mali was estimated at about 14,561,000 (PDAM, 2003). Eggs are sold by producers at 30 FCFA (0.06US$) each and resold at 50 FCFA (0.11US$) fresh or boiled along the roads or in towns, mostly by women. From 2003 until today, the price of guinea fowl eggs has remained at that level.

Guinea fowl is therefore a quick and sustainable source of income for resource-poor farmers. It contributes significantly to food security of rural populations through eggs and meat consumption. These revenues help most of the rural populations to satisfy their basic needs during the period of food scarcity (May, June, and July). A case study from 2009 revealed that a farmer from Saye village in the Ségou region earned more than 800 000 FCFA (1 777US$) from guinea fowl and egg sales during the 3-4 months of the rainy season.

2. WHY THE NECESSITY OF GOOD PRACTICE EMERGED?

For more than three decades, the diversification of products has been promoted by the government of Mali as a way to reduce food insecurity. One of the components has been promoting poultry production as a way to diversify agricultural production.

Farmers are often experiencing the following:

- High demand of guinea fowl eggs and birds in the local market
- Need to increase household's income and satisfy the basic needs of the family (food, shelter, clothes, children schooling, etc.) that are not covered by other agriculture activities.

Many projects and programs have been implemented to encourage people to develop poultry in urban and rural areas. Some support has been provided to promote incubator technologies, proper housing and health. During the last 10 years urban poultry production has taken off, but leaving the rural zones practicing traditional poultry management. To address this situation some NGOs introduced modern incubation techniques

The modern incubator technologies that are available are very expensive for resource poor farmers and not appropriate for rural areas (no electricity). The price ranges from 800,000 to 1,000,000 FCFA (US$1,800-US$2,200). The cheapest technology introduced by the NGO World Neighbors, was a wooden incubator with the cost of 45,000 FCFA or US$100 and they were introduced with a subsidized rate. The wooden incubators were efficient but had a low capacity and could not

cover the high demands for incubating sufficient numbers of guinea fowl eggs

3. OVERVIEW OF THE GOOD PRACTICE

The practice is describing the preparation and use of a clay incubator made by a resource-poor farmer. This farmer got the idea when he noted the high demand for guinea fowl, its high price and the small capacity of his incubator. The materials used to build the incubator are clay bricks, sand, a thermometer, a kerosene lamp, black plastic, iron roof, and a grid rack with wooden edges.

The person who invented the incubator is Mr. Nouhoum Traoré, a 31 years old farmer from a village called Djéla (rural commune of Gouendo, cercle of Baraouéli). The clay incubator was made for a higher capacity which can, depending on one's capacity, hatch up to 400 eggs. If all the eggs are fertile the hatching rate is under optimum condition 80-90 percent (A. Kanoute *et al.,* 2008, 2009, 2010)

4. KEY COMPONENTS OF THE GP

- The clay incubator is easy to build, to use and more solid than the wooden incubators used in the country.
- It is accessible for any poor resource farmer.
- It is more adapted to local conditions and easy to change according to specific needs.
- The cost is 17,500 FCFA (US$38) compared to 45,000 FCFA (US$100) for a wooden incubator.
- The estimated hatching rate is 80-90 percent when all eggs are fertile.
- The capacity is up to 400-450 eggs and thus higher than the 140-150 eggs capacity of the wooden incubators. The actual capacity depends upon the choice of the farmer; it can be small, medium and large size.
- It has been accepted by the local population which is shown by the high demand to build clay incubators.
- It is a quick, consistent and sustainable source of income for poor resource farmers.

5. METHODOLOGY

The materials for building the clay incubator include: clay bricks (6-8), wet mixed mud clay, sand, a kerosene lamp (Luciole brand), an egg tray, a thermometer, 1m of black plastic, a piece of sheet metal, a piece of wood plank or board, some nails, four piece of pipe (small diameter) and four wooden sticks.

The steps to build the clay incubator are the following:

- First, build a wooden egg tray with a size according to the planned number of eggs (150, 200, 300, 400 eggs). The dimensions of the egg

tray depend upon the quantity of eggs for hatching. For 150 eggs, the dimensions are 50 cm of length, 60 cm width and a frame of 12 cm height. For other capacities only the length should be adjusted, 1m for 200 egg, 1.5m for 300 eggs and 2m for 400 eggs.

- Put the egg tray on the floor to measure the size of the incubator. Build the first row of clay bricks on three sides around the egg tray and leave one side open for the door.
- Place two big nails on each of the two lateral sides of the wall to support the egg tray.
- Then build the second row of bricks in which four pieces of pipe are put for ventilation of the incubator. Finally level the top of the three walls with a layer of clay or mud.
- To build the roof, measure the dimensions of the upper part of the incubator and prepare a piece of metal sheet according to these dimensions that will cover the top of the three walls of the incubator.
- Fix the metal sheet with a wooden bar and nails. This top cover will keep the heat inside of the incubator.
- The front cover of the incubator is made from a piece of black plastic which is fixed at the upper side by a piece of wood to hold it in place. Another piece of wood is fixed at the bottom of the plastic cover to ensure that the cover remains closed.
- Cover the bottom of the incubator with sand that will be moistened during operation to control humidity within the incubator. Put a small row of mud (2-3cm) in front of the sand to keep it in place.
- The distances between the sand and the egg tray should be 20 cm and from the sand to the top cover 55 cm. The lamp which will be put onto the tray should not touch the top cover.

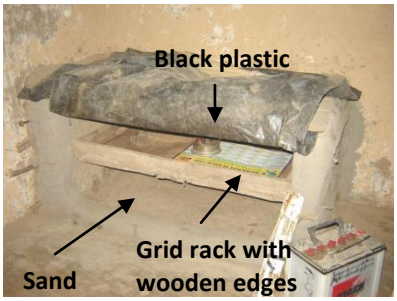
The following procedures should be observed during the operation of the clay incubator:

- The eggs must be cleaned and carefully put into the tray.
- The kerosene lamp for heating of the incubator must be put into the middle of the egg tray and kerosene only refilled outside the incubator.
- The thermometer should be put into the center to control that the temperature remains in the range of 37-39°C.
- The black plastic cover should be closed to keep the inside of the incubator at the desired temperature which should be controlled by adjusting the lamp.
- To control the humidity water should be regularly sprinkled on the sand inside the incubator; the frequency will depend on the climate of the location.
- The eggs need to be turned manually one by one at least twice per day. To turn the eggs quickly, the farmer should remove two to three rows of eggs and move the remaining eggs toward the empty space. The eggs removed are replaced in the free space.
- Marks should be put on the different sides of the eggs for controlling if the egg has been turned.

Prerequisites for success:

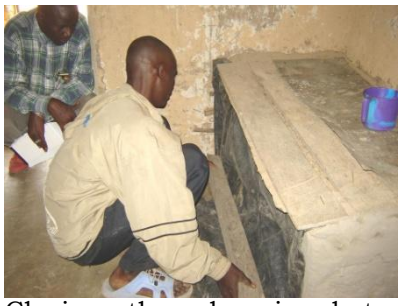
- The clay incubator must be built in a place protected from rain, wind and other climatic factors.
- The eggs must be fertile
- The temperature must always be kept between 37-39°C
- A good quality kerosene lamp (Luciole brand) should be used as well as good quality of kerosene to avoid smoke inside of the incubator.

The design of the clay incubator is shown on the photos below.



Presentation of the clay incubator

Preparation of the hatching process



Closing the clay incubator door

Eggs in the clay incubator

Eggs marked for checking of turning

6. HOW HAS THIS GP WORKED?

Traditionally, guinea fowls lay many eggs during the rainy season. One guinea fowl female lays one egg per day and can provide 90-100 eggs depending upon the length of the rainy season. When the bird has laid 30-35 eggs, it starts the incubation. But to have enough eggs from one guinea fowl female, farmers remove one egg daily after three days. The principle is that at least one or two eggs must be left so that the bird does not change its laying place. There are two reasons why farmers do not like the guinea fowls to hatch their eggs:

- They do not want the guinea fowl to hatch its eggs in order to avoid the keets to become wild;
- They like to get more eggs.

In fact, if the guinea fowl is allowed to sit on the eggs it will reduce the number of eggs that are laid from as many as 60-90, depending upon the length of the raining season to only 28-35 eggs at maximum. Farmers prefer to get as many eggs as possible. Those eggs that are removed are hatched by hens or turkeys. Each hen can incubate 28-30 eggs and several hens can be used. Turkeys can also be used to hatch guinea eggs. They can hatch 50-60 eggs at once but farmers then have to remove the keets as hatching is going on and take care of them.

Welcome, keets!

7. SCOPE OF REPLICATION AND SUSTAINABILITY

The clay incubator is easy to replicate because it is made with the locally available materials and it can be build by any farmer with a minimum of skills. In 2008 for example, other farmers adopted the good practice based on a single visit to the farmer who first developed the clay incubator. Therefore, “hands on” training would be an effective way to train farmers and further scale-up the technology. The training to build clay incubators combined with modern poultry training would allow a better understanding how to handle this good practice. Establishing revolving funds to allow farmers to buy kerosene lamps and kerosene will also increase not only the adoption but also the sustainability of the good practice. A market for guinea fowls already exists, but a better organization of producers will

increase access to the poultry markets and possibly encourage creation of special guinea fowl market in respective production zones.

In three years, 50 farmers from 30 villages have built the clay incubator only by learning farmer to farmer. More than 89 students (technicians and undergraduate students in animal science) have been trained.

8. CONCLUSION

Good practice such as the clay incubator is a viable technology for resource-poor farmers. Conceived and designed by a resource-poor farmer, the clay incubator is easy to adopt and to replicate by any farmer in the rural area in the sub-region. Guinea fowl is the poultry for resource-poor farmers in the sense that it tremendously helps them to go through harsh times. The worst period of food insecurity in Sahel is the beginning of the rainy season and it is precisely during that period that guinea fowls begin their egg production. Guinea fowls are good not only for the meat that is tasty and eggs for home consumption but also as a viable and accessible source of income for smallholder producers, contributing tremendously to the food security in the rural area. Following a workshop, partners agreed to call this practice **"one egg, one guinea fowl keet for all and anywhere"**

However, although the practice has been adopted by many farmers, there is still a need to improve the clay incubator in partnership with agricultural research institutes.

9. KEY LEARNINGS

- Poor resource farmer have knowledge that need to be identified, characterized and should be shared with other farmers.
- A local innovation such as the clay incubator has been shared freely among farmers. "Knowledge is like fire which someone may get free from the neighbors" (Chesha, Mariana and Waters-Bayer, 2006)
- The local knowledge from farmers should be supported to stimulate their creativity. Farmer led experimentation is a way for mutual learning (Diop, 2008).
- Participatory Innovation Development (PID) an approach that combines local and outside knowledge has been used to identify local innovation (Geye, 2009).
- Once being put at the center of the process is giving the farmer innovator a certain confidence.
- To be easily adopted among the resource poor farmers any technology must be simple with low investment costs.
- Local innovation must be built around a multi partnership. Building partnerships is simply making the best use of available financial as well as human resources (Critchley, Verburg and vanVeldhuizen, 2006).
- The informal research of resource-poor farmer and formal research must converge through a multi stakeholder partnership platform where

agricultural research institutes, extension services and NGOs get together to develop appropriate technologies to improve the production and the productivity of small farmers.
- Local knowledge developed by resource-poor farmers should be at the center for positive exchange, mutual experiences and learning processes to become dynamic.

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and a training video is available at:
http://www.cop-ppld.net/cop_knowledge_base/detail/?uid=3030