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Introduction of the Water-bed Incubation Technology to Rural Poultry Farmers in Bauchi State, Nigeria

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Abstract: The need to enhance the capacity of the rural poultry keepers is paramount to the improvement of the level of protein intake of the Nigeria populace. This would invariably have an impact on the health status of the citizenry. An obvious and effective strategy of enhancing the capacity of the rural poultry keepers is the introduction of improved techniques that are simple, appropriate, affordable and reliable. The water-bed incubator is one of such technologies hereby discussed and recommended for adoption.

Key words: Bauchi, incubation, Nigeria, poultry, rural, water-bed

INTRODUCTION

It has been projected that the human population of Sub-Saharan Africa (SSA) will increase rapidly between now and 2025 (Smith *et al.*, 1997). These changes will lead to rapidly increasing demands for food. Crop and livestock production must expand by more than 30% annually to keep pace with food demands (Winrock, 1992). Further, a major reason in the rural livestock and poultry keeping is to enhance generation of income for solving emerging financial problems. Despite this fact, the quality of protein food intake becomes more critical. Olayide *et al.* (1972) estimated a list of available energy in Nigeria to be 2,083 kw, while total protein was put at 54 g and animal protein, including fish game animal at 8 g per person per day. However, in order to accomplish the above mentioned requirements, emphasis should be geared towards increased food production, increased rural income generation and improved protein intake. A pragmatic effort towards building the capacity of the rural populace should be put into action. One sure way of actualizing this is to introduce simple, available and affordable technology that would solve problems along the line of production process. The traditional incubation method, solely relied upon by the rural poultry keepers has been observed to be less efficient. It is obvious that the modern alternative which is more efficient is not affordable. Therefore, the need to strike balance between affordability and efficiency must be made. Thus, the water-bed incubation technology was introduced.

Objective: The focus of the paper is to introduce the technology of water-bed incubator to be adopted by the rural poultry keepers in Bauchi State. Specifically, the paper is aimed at achieving the following objectives:

- Identifying the materials used for the construction of the water bed incubator,
- Explaining step by step the construction of the water-bed incubator and
- Examining the use of the water-bed incubator for subsequent adoption.

Feasibility of adopting the water-bed incubator by farmers in the state

Incubation and incubator: Incubation is the process of hatching poultry eggs. This may be accomplished through the natural method i.e. the use of brooding hens or the artificial means using machines (NEARLS, 1979). The incubator is either a table type (known as flat and natural draught) or a forced or cabinet type. Both types are essentially insulated chambers in which temperature and relative humidity are controlled. The heated system may be electricity, water (heated by electricity), oil, coal or gas (Olayide and Robert, 1979). The flat or still air incubators usually combine a setter with hatchers and are mostly used in reserved establishment and schools. The forced draught or cabinet may be available as a separate setter and combined hatchers and setter, mammoth or walk-in.

Water-bed incubator: The water-bed incubator was introduced to the technical staff of Bauchi State Agricultural Development Programme (BSADP) by Chinese personnel-courtesy of the south-south cooperation. With little modification to match culture of Nigeria, the technology is being passed to the rural populace considering all technical aspects of the modern system. In essence, all principles of incubation are considered in the design and use of the water-bed incubator. The materials needed for the construction are

locally available, affordable and durable. It is capable of hatching over 1000 eggs per sequence. Once the water-bed has been prepared, a farmer can single handedly manage the incubation. The incubator does not require electricity. Thus, it is appropriate for the rural folks who do not have easy access to electricity.

Materials required:

- A space within a room (hatchery, thatched house or concrete house) well disinfected.
- Bricks (mud bricks)
- Iron sheet
- Kerosene stove
- Polyethylene bag
- Wood ash
- Blanket (quilt)
- Thermometer
- Rice straw

Preparation of the water-bed:

- Select a suitable corner of the room as hatchery. Build two walls with the bricks (mud or cement) to make a rectangular shape with the chosen corner of room. The height of the new wall should be 0.8m while the length should be 1.7 m. Another wall should be built inside the other side, to make them double walled. The height of the new walls should be 0.9 m while the length should be 1.7 m. At the height of 0.60 m, very strong plywood of 0.45 m should be placed on the brick on either end of the building before you continue the laying of blocks. The width is determined by the polyethylene bag used. An opening through which the kerosene stove will be passed into middle of the incubator should be provided.
- Lay the iron sheet at the same place with the 0.45 m plywood (wooden board) to cover the remaining space at the middle; the wooden board should be higher than the iron sheet.
- Pour the well prepared wood ash on the iron sheet up to 3 cm thickness and then spread the rice straw on top of the wooden board. This should be thicker than the wood ash.
- Lay the polyethylene bag on top of the ash and straw. Fill the polyethylene bag with water such that it looks like a pad.
- Use blanket to cover the polyethylene bag to conserve heat.
- Prepare a kerosene stove and be sure it is working perfectly.
- Put the stove under the iron sheet at the middle of the bed with gap of 22-24 cm between the iron sheet and the top of the stove. Heat is provided by the stove, when you light it. Ensure that the stove produces a steady blue flame that does not necessarily fluctuate.

- Observe and test the temperature for 2 days before setting eggs on the bed. When the temperature is suitable for incubation (about 39°C), you can then lay the eggs on the bed and cover with blanket.

Using the incubator:

- Select fertile eggs for incubation with the aid of egg Candler
- Sterilize the eggs selected. It could be fumigated in the container on arrival at the hatchery and prior to setting.
- Heat the eggs to about 35°C or under sunlight for about 1-2 h before incubation. This will increase the incubation efficiency.
- Set the eggs at the middle of the polyethylene bag and regulate the temperature of the bed as follows:
 - 1st-3rd day = 39°C
 - 4th-12th day = 38°C
 - 13th-16th day = 37.6°C
 - 17th-21th day = 37°C

The regulation of the temperature is done through:

- Controlling the heat of the stove (lowering or rising the flame)
- Opening or closing air inlet to the hatchery.
- Eggs should be appropriately turned about four times daily.
- Provision of a support from 19th day of incubation to raise the blanket above the eggs just at the middle such that the eggs would not have direct contact with the blanket. This is because the eggs might have begun hatching from that date
- On 20th to 21th day, remove the hatched chicks to a different room for brooding.

Conclusion and recommendation: The water-bed incubator is a great improvement on the traditional system. The construction is simple and it uses locally available materials that are affordable to the rural farmer. It is therefore, appropriate for the rural poultry keepers as it will enhance their capacity to increase poultry production. It can incubate and hatch over 1000 eggs at an operation. Hence, it is an opportunity to improve the level of protein intake and income of the citizenry. In essence, the promotion of the incubator among the rural poultry keepers would actualize the accomplishment of the above benefits. In view of the above, the water-bed incubator technology should be extended to the rural farmers to facilitate increased poultry products.

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