Archives of Business Research – Vol.2, No.5
Publication Date: October 15, 2014
DOI:10.14738/abr.25.557
Tracey, K. (2014). Brooding Broilers: The Experience of the Nazareth Agro- Pastoral Training and Production Centre (NAPTPC) in the North West Region of Cameroon. *Archives of Business Research, 2*(5), 69-83

Brooding Broilers: The Experience of the Nazareth Agro-Pastoral Training and Production Centre (NAPTPC) in the North West Region of Cameroon.

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ABSTRACT

The paper observes that the brooding stage in poultry production is often neglected by both poultry farmers and researchers. It then investigates into the brooding techniques, challenges, measures adopted to solve challenges at the brooding stage and the prospects of brooding broilers in the Nazareth Agro Pastoral Training and Production Centre (NAPTAPC) .Data was obtained from the centre through interviews, questioners, and discussions with all stakeholders involved in the brooding stage of production. Participant observation was equally used to obtain some of the data. The data was analyzed using descriptive statistics. The results showed that the brooding techniques used by this centre do not significantly deviate from the expected standard. It was also found that the centre suffered from the problem of loss of chicks, inadequate space, and inadequate capital for expansion and low demand for three weeks old chicks. To reduce this problem, the centre makes provision for a foot bath containing disinfectant to limit the spread of diseases, automatic generator to ensure a continuous supply of electric heat and correct administration of vaccines. Also, the surroundings as well as equipment were also kept clean. Above all, workers work in shifts so as to give adequate attention to the chicks. This center is optimistic to expand its activities in the near future. These findings are important and should not be ignored when examining issues of poultry production in the region. Finally, the paper recommends that the centre should ensure to always receive good quality day old chicks and to carry out brooding of broilers when climatic conditions are conducive to their growth. The center should also respect the standard stocking capacity of chicks to avoid the negative consequences of overcrowding.

JEL Classification: E23, F2, F21, F43
Keywords: Brooding broilers, Nazareth Agro- Pastoral Training and Production Centre-Cameroon.

INTRODUCTION

The poultry industry has come to be considered as a means to fight poverty in Cameroon. It is important as a source of employment and income to many families. Unlike other ventures, it provides faster turn over on capital investment. This has led to the setting up of formal businesses and training institutions specializing in poultry in Cameroon.

Elsewhere, Brannius (1997), reports that the interest of operators in the industry is gradually being killed, due to prevalence of diseases and other challenges or constraints in the industry.

National production of poultry products over the years could increase if these challenges are investigated and addressed. The benefits which the country gets from the poultry industry are very important to the country's growth. It provides food security and protein intake for poor countries (Lathan, 1997). Unfortunately, this sector in the North West Region of Cameroon faces some challenges which tend to reduce the profitability of the sector. Despite the challenges confronting the poultry business, Nazareth Agro Pastoral Training and Production Center (NAPTAPC) remains focused, as it trains youths in poultry production techniques.

Production is always in stages and every stage is very important to ensure overall efficiency in the production chain. In the poultry industry, production ranges from hatchery, brooding of broilers or layers, fattening and marketing. The brooding of broilers is one of the foundation stages in the production chain which needs the close attention of operators in the sector and that of researchers. Unfortunately, this stage of production in this industry has not been considered seriously by most operators in the sector and by researchers. Really, more attention is focused on the fattening of birds, production of eggs and marketing. This is erroneous since this stage determines the quality and quantity of the products of the other stages in the industry. The Nazareth Agro Pastoral Training and Production Center (NAPTAPC) is involved in all stages of production which are faced with a variety of challenges. This leads us to seek to know the unique brooding techniques used by the above center and to question the major brooding constraints and challenges it faces in its effort to be a production leader in the North West Region. How can this center overcome its brooding constraints and challenges to maintain or even build upon its production share and become a market leader in the region? What are the future prospects of the Center if it is able to address its production problems especially brooding challenges and problems?

It is therefore the objective of this study is to examine the challenges and prospects of brooding in the Nazareth Agro Pastoral Training and Production Center (NAPTAPC). More specifically, this study seeks to describe the unique brooding techniques used, identify the main brooding challenges faced, find out how the center addresses its brooding challenges, and determines the brooding prospects of the Center. The rest of the study is organized as follows: Section two situates the study in its proper perspective by reviewing both conceptual and empirical works in the domain. Section three is devoted to the method of analysis. Section four presents the results of the study. Section five provides a summary and conclusion to the study.

LITERATURE REVIEW

Conceptual Literature

Definition of key l concepts

Parkhurst and Mountney (1988) consider poultry to collectively designate species of birds which are domesticated to reproduce and grow in captivity so as to render the products of economic value. Chickens, turkeys, ducks, geese, some quail and pheasants, guineas and pigeons generally meet the above criteria. They provide meat, eggs, feathers, fertilizer, animal food and other by – products such as pharmaceuticals. They also serve as laboratory animals for scientific research. Birds kept only for companionship or beauty, are not considered poultry. In this study poultry is limited to the domestication of chickens.

Broilers are chickens (*Gallus gallusdomesticus*) bred and raised specifically for meat production. Chickens are one of the most common and widespread domestic animals, and with a population of 19 billion in 2011, there are more chickens in the world than any other species of bird. Typical broilers have white feathers and yellowish skin. Most commercial broilers bred for meat reach slaughter weight at between 5 to 7 weeks of age, although slower growing

strains reach slaughter weight at approximately 14 weeks of age. Because of this young age, much of their behavior and physiology is that of an immature bird.

In zoology brooding is a pattern of behavior of certain egg-laying animals, especially birds, marked by cessation of egg laying and readiness to sit on and incubate eggs. Incubation itself is the process of maintaining uniform heat and humidity of the developing eggs, usually accomplished by one or both parents sitting on the eggs at all times. Many birds develop a brood patch—an area of bare, featherless skin on the underbody—in preparation for incubation and brooding. A network of blood vessels in the skin of the brood patch raises the temperature locally. After the hatch, the parent bird's brood their young, keeping them warm by spreading the feathers out, umbrella-like, so the young can maintain contact with the skin of the adult. In domestic fowl the term "broody hen" refers both to a sitting (incubating) bird and, later, to the same hen brooding her chicks. In this study brooding is simply understood as the process of breeding or taking care of chicks from day old to three weeks.

Related Literature

Brooding Of Broilers

Small poultry flock owners often experience problems of one sort or another with their young birds. In the majority of cases, the problems are related to either management or nutrition. To prevent or reduce these problems a number of management or brooding techniques are suggested by Chernos and Schneider (2004).

Management

A lot of preparation is done in advance such as cleaning and disinfection of all housing facilities and equipment. Given that some disease causing agents can stay in the soil for several months and years, detergent s and appropriate disinfectants should be used in washing all dust, dirt and organic matter from all housing facilities and equipment. A high pressure washer is ideal for washing .All these is done as soon as the old flock leaves. The Agricultural Operation Practices Act (AOPA) regulates how manure is handled. AOPA does not register small poultry farmers having less than 2000 birds but these farmers are still expected to meet up with the requirements of the act. AOPA states that manure, composting materials and compost can only be incorporated within 48 hours to arable land about 150m away from living residence. This is done to avoid re-infection from insects, wild birds, and even humans. After removal of litter, the house should be washed and disinfected with disinfectants .Disinfectants should never be mixed but rather it is very important to follow the exact prescription on the label. All other movable equipment such as the feeders, drinkers and other equipment should be properly washed and sunned because ultraviolet rays are a good germicide. In case of portable brooding houses, all outdoor runs should be rotated and all manure scraped off in other to expose soil underneath to sunlight.

Barn, Yard and Equipment Set-up

A: LITTER

Coarse wood shavings are the best litter to use. Sawdust and fine shavings should be avoided to prevent litter picking by chicks which can cause gizzard impaction. Also, ordinary garden sphagnum peat moss should be avoided to prevent the growth of mould which can cause pneumonia as the chicks breathe in. Rather only peat moss which has been labeled and sterilized for poultry should be used. Other commonly used litter includes chopped wheat straw and chopped paper etc. Bedding material should be spread two weeks before chick's arrival to a thickness of 10cm. It is done this early to enable the saw dust to dry up well hence preventing mould.

B: *FENCING*

Fencing of about 2m high using wire, digging 60cm into the ground and angling outward from the pen should be done outside the brooding house to prevent predators such as rat moles, foxes, skanks e.t.c. To prevent hawks, Life size replicas of plastic made owls should be placed on top of poultry houses.

C: BARN HEATING and TEMPERATURE

Electric brooder lamps, charcoal pots and electric bulbs are the main sources of heat commonly used in poultry flocks. In order to ensure proper functioning of lighting equipment as well as preventing cold beddings, the brooding house should be heated a couple of days before chicks arrive. This activity is very important as cold floors weaken the chick's immune system and can increase water belly incidence.

A temperature of 32 degrees centigrade at chick's height is most appropriate when placing broiler chicks. This temperature is reduced weekly until a temperature of 21 degrees centigrade is reached. In the case of turkey poults, 35 degrees centigrade is most appropriate and also gradually reduced weekly until 21 degrees centigrade is reached.

Finally, observation is the best thermometer. During observation, huddled chicks will mean there is cold, while crowded birds at the corners of the brooder guard will signify too much heat. Therefore evenly distributed birds will mean that the ideal temperature has been met.

D: *EQUIPMENT*

In the brooding house, the brooder guard is a multi -purpose equipment. It keeps the chicks confined. It brings the chicks closer to their feed, water and warmth. The circular guard is most appropriate because it eliminates crowding corners. Fig 1 shows a suitable equipment layout for chicks and poults.

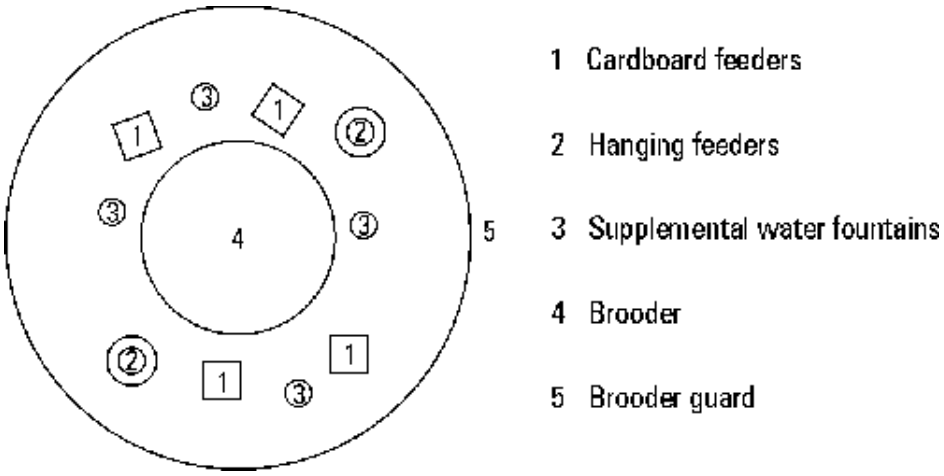

Figure 1. Brooding diagram

Source: Chernos and Schneider (2004).

Nipple and fountain drinkers are the most commonly used drinkers. Nipple drinkers are the best to provide clean water for poultry. Nipple drinkers require high light intensity to attract young birds to the nipple. One nipple can serve up to 20 birds. Fig 2 shows a nipple drinker.

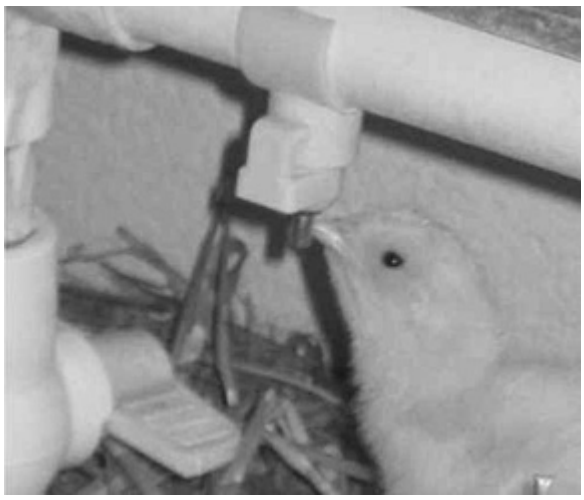

Figure 2. Nipple drinkers
Source: Chernos and Schneider (2004).

Fountain drinkers (Fig 3) are often used to start flocks and are later supplemented with nipple drinkers.

Figure 3. Supplementary fountain drinker
Source: Chernos and Schneider (2004).

The standard 3 foot through feeders (Fig 4) are suitable for chicks and can be gradually replaced with hanging feeders once the chicks reach 3 weeks of age.

Figure 4.Hanging feeder
Source: Chernos and Schneider (2004).

Light intensity of 20 lux is most suitable within the first three days of life. High light intensity will trigger aggressive behaviours like feather picking and cannibalism.

E: *FLOOR SPACE REQUIREMENT*

0.19m square per chick is most appropriate for broiler and layer chicks in small flocks. However this area could be increased for heavier breeds of turkey and could also be reduced in case of large flocks for commercial purposes.

NUTRITION

Poultry owners often receive their chicks at the same time. To ensure a good skeletal system and healthy musculature, broiler chicks should be fed with a medicated chick starter with at least 24% protein content. In case of turkey poults, feed with 28% protein content is ideal. When protein content is low, it can result to some diseases such as leg weakness. Outdoor runs should be avoided or better still moved in cycles to avoid some diseases such as black head for turkey poults which is spread by earthworms and can cause 100% mortality. In case of home- made feed, vital minerals, vitamins and other elements like granite grit should be included in the feed.

Empirical Literature

Temperature and brooding

Oviedo-Rondón.E. et al (2009) hold that the brooding phase is a critical phase in the life of chickens. During this early period the ability to self-regulate body temperature (TEM) is not completely functional. House TEMs have been managed based on historical general recommendations that have demonstrated adequate broiler performance. They hold that the best house TEM conditions that guarantee physiological comfort for chickens of strains that have increased growth rates and muscle mass growing up to 7 and 9 weeks are unknown. Preliminary data from our trials showed that optimal house TEM for brooding might not be the same for every flock. Therefore, a study to optimize brooding TEM utilizing rectal TEM as a tool to adjust ambient TEM was proposed. Chick body TEM data can be easily collected with pediatric thermometers at very low cost. Rectal TEM are indicators of effective TEM which is dependent upon environmental TEM (dry bulb), relative humidity and air speed. Our objective was to compare, under commercial conditions flock live performance, meat yield, and gas propane use of the integrators traditional brooding TEM management systems to one that is managed by direct measurement of hatchling rectal TEM. Their findings showed that rectal TEMs can be used as a tool to micromanage brooding TEMs.

in power ventilated houses. The results also suggested that profiles of house TEMs for each farm or house can be slightly different depending on weather, type of housing, brooding equipment and age of litter. Additionally, every flock may need slightly different optimum TEMs to obtain the best performance possible depending on growth rates associated with broiler strain, chick quality and feed traits. House TEMs during the first week of age obtained with our methodology and the traditional recommendations of brooding were very similar. Main differences in house TEMs were observed during the second and third week, when the chickens showed a need to lower house.

TEMs. Obtaining the best brooding TEMs can improve final body weight, feed conversion, and flock uniformity of 9 weeks-old broiler flocks. Additionally, it was possible to reduce gas usage between 8 and 45%.

Importance of marketing in the poultry industry

Gyau (2011) and Ajua. (2009), observe that the poultry industry serves as employment and a

source of income to many people but that, marketing aspect has been neglected. More attention is focused only to the production aspects. He then sets out to identify the challenges and prospects of marketing poultry and poultry products in Kumasi by using Akate Farms trading and Company Limited as a case study. Collecting information by means of questionnaires, interviews, personal observations, and focused group discussion with key stakeholders and telephone conversation with actors in the industry, it was revealed that the growth of Akate Farms Trading and Company Limited is likely to decline if the challenges such as fluctuating price of maize, high interest rate on loans, government's failure to protect the local industry by enacting laws to check the importation of cheap foreign poultry products and lack of subsidies on agric inputs like feed, drugs, equipment and several others are not addressed by the company and other stake holders. From the study, it was revealed that Akate Farms trading and Company Limited does a lot of marketing but it has no defined marketing plans to address challenges in the industry. It also does not conduct marketing research. It was concluded that if Akate Farms fails to draw marketing plans and conduct marketing research, it will be overtaken by the marketing challenges in the industry. Among the several recommendations made were that the company should not be afraid of competitions from local and foreign producers. Rather it should adopt marketing plans which will help maintain and expand its market share.

From the above it is seen that the brooding of broilers stage in the poultry industry has not been given adequate attention. It is the preoccupation of the present study.

Management of Day old Chicks

Ngweke(2012) in a study of the Nazareth Agro-pastoral Training Center examined the management of Day old Chicks through participant observation. The results of this study showed that this center in its management effort faced a number of constraints lack of laboratory technicians, lack of space by chicks, toxic sent of ammonia gas, water system and inadequate personnel. In the current study our interest is focused on the causes of the challenges faced in the brooding stage proper of production and coping mechanisms adopted by the center.

Brooding of broilers

Nasa (2013) examined the brooding of broilers at the institute of Agricultural research for Development (IRAD) Mankon with aim to identify the unique techniques used and to identify the common diseases plaguing the chicks. It was found out that the center adapted the brooding process to its reality in terms of resources and the physical environment. The center faced difficulties in separating sick chicks from those in good health. There were also rats that ate feed of the chicks.

METHODOLOGY

Scope and Area of the Study

Scope of the Study

The research does not cover everything about the poultry industry. It focuses mainly on brooding of broilers especially the challenges associated with brooding techniques and the measures used to solve them. The study also examines the extent in the deviation of these brooding techniques from the expected standard.

Area of the study

This study was carried out in the Nazareth Agro Pastoral Training and Production Center (NAPTAPC).This center is owned and managed by the Piarist fathers in Cameroon. The Piarist father is a religious order in the Catholic Church founded in 1597 by St, Joseph Calasanz. On the 27th of December 1987, three Piarist priests arrived in Bamenda and began the first

community of the order in Cameroon. Their mission was to give good and quality moral and intellectual education to children and young people especially the poor.

The idea of the creation of the NAPTAPC was conceived in 1990 by the Menteh community. This idea came about as a result of the presence of children who couldn't further their education after primary education and some secondary school dropouts in the village. These children were to remain poor unless something was done to salvage their situation and to make them self-reliant. This led to the creation of the center in Menteh - Nkwen. Given that agriculture is the backbone of Cameroon's economy, educating its citizens in agriculture will likely increase the rate of growth of the country.

This Center offers the opportunity to train and employ young farmers who would increase food production where surpluses will be sold to small consumers and in turn encouraged self-employment. The above considerations then led to the construction of the project in the year 2000, at the present site in Menteh. The training did not go operational immediately until 2003.

This center admits and trains students for a period of 10 months during which theoretical and practical courses are carried out in the center, encouraged them to farm, group them into cooperatives groupings, help them to set up their small family agro pastoral enterprises and follow them up in order to ensure the sustainability of the enterprises.

Consideration for admission into the training program is not based on educational level but on the ability to acquire technical knowledge and skills. This institution admits candidates of various educational backgrounds with at least the first school leaving certificate. Applicants undertake to engage in full time agricultural and animal husbandry business.

Normally, applicants are between the ages of 18-35 years. Priority is given to young people from a poor family background or orphans. The institution currently has a student population of 20 trainees including 11 girls and 9 boys. It offers free training to its students.

NAPTPC integrates production as a pedagogic tool in its educational program. The students are trained in an entrepreneurial environment which enables them to understand the complexities of agricultural production and marketing. The centre is managed at the same time as an enterprise and as an educational institution.

The Nazareth agro pastoral training and production centre is located in Menteh – Nkwen, in Bamenda III sub division of Mezam Division, North West Region of Cameroon about 2km away from Mile 4 junction. The area experiences two distinctive seasons which are dry and the rainy seasons. The dry season runs from mid-November to mid-March while the rainy season runs from mid-March to November. NAPTPC occupies a land surface area of 11ha.

Data Collection and Analysis

The research was a field study and it was designed to collect data from primary and secondary sources. In respect of the primary sources, questionnaires and interviews were conducted among informants who worked in the brooding unit of the poultry. Observations and face-to-face discussions with key stakeholders were used as research instruments from 5th of March to the 25th of March. Data was sought on the brooding techniques, the constraints and challenges faced, the measures adopted to solve problems and the future prospects of brooding in the Center. The data collected was analyzed/presented using text, tables, pictures and line graph.

PRESENTATION AND DISCUSSION OF RESULTS

Brooding of broilers in NAPTAPC

In NAPTAPC the main system of heating used was the charcoal pot heating system. This system was supported with electric bulbs so as to meet up with the required temperature. The house covers a surface area of 300 m sq. It has six windows for proper ventilation and a foot bath to reduce infection. The inside is divided into four sections with each section sealed from the corners with plywood. The tops were sealed with polythene papers about 2m away from the ground in order to conserve heat.

4.1.1 Preparation to receive chicks.

In NAPTAPC the following steps were taken to prepare for the arrival of chicks.

- The previous litter was removed and kept in the compost unit.
- The house was thoroughly washed and disinfected with lime stone. The foot bath was also filled with disinfectant which was always changed after two days.
- The house was aerated for one week.
- Two hours to the chicks arrival, Litter was sprinkled on the ground to a depth of about 5cm.The litter used was white wood shavings. The house was heated using charcoal pots and electric bulbs.
- Thermometers were put in each section and the temperature was regularised to reach 36 degree centigrade.
- The drinkers and feeders were washed and also disinfected.
- Finally an information board was prepared with record sheets attached.

Actual reception of chicks.

ALIVERT Company was the main supplier of day old chicks to the NAPTAPC. NAPTAPC received chicks on the 5th of March 2014.On arrival , the chicks were received by a specialist who introduced the chicks to water by beak dipping. The chicks were removed one by one and the number recorded for each carton. NAPTAPC received a total number of 1536 chicks. 36 chicks being an extra to take care of future losses. The feeders were filled with starter feed and evenly distributed all over the unit. These 1536 chicks occupied two sections with each section containing 768 chicks.

Picture1: Reception and counting of day old chicks
Source: Snapped by Author

The drinkers were placed on a 10cm square plank with a 3cm height to avoid the entry of litter and droppings from the ground. The first vaccines (Newcastle, Infectious bronchitis) were given on the third day i e on the 7th of March 2014.This delay was to make sure that the chicks get use to the water. Before the vaccine was administered, the chicks were starved of water for about three hours. From the date of their arrival, a standard prophylactic treatment was strictly followed up which explains in detail every activity carried out. Below is the standard prophylactic treatment of NAPTAPC on table1.

TABLE1. PROPHYLACTIC TREATMENT FOR BROILERS

Date	Day	Temperature	Treatment	Administration
5/3/14	1	36	Anti-stress Amintotal*/SuperMultivit/Hypraminchock-p	Beak dipping
6/3/14	2	36	Anti-stress :Alyseryl/Oxykel +Amintotal	Free consumption
7/3/14	3	36	Vac: Newcastle, Infectious bronchitis and gumboro.Antwastress;Amintotal*SuperMultivit/ Hypraminchock-p	At least 2hours without water. After then free consumption
8/3/14	4	34	Anti-stress;Aliseryl/Oxykel+Amintotal	Free consumption
9/3/14	5	34	Anti-stress; Aliseryl /Oxykel+Amintotal	Free consumption
10/3/14	6	34	Anti-stress; Aliseryl /Oxykel+Amintotal	Free consumption
11/3/14	7	34	Anti-stress; Aliseryl /Oxykel+Amintotal	Free consumption
12/3/14	8	32	Anti-stress; Aliseryl /Oxykel+Amintotal	Free consumption
13/3/14	9	32	Anti-stress; Aliseryl /Oxykel+Amintotal	Free consumption
14/3/14	10	32	Anti-stress; Aliseryl /Oxykel+Amintotal	Free consumption
15/3/14	11	32	Vac:Gumboro. Anti-stress;Amintotal/ SuperMultivit/Hipraminchock-p.	At least 2hours without water. After then free consumption
16/3/14	12	32	Anti-stress Amintotal*/superMultivit/Hipraminchock-p	Free consumption
17/3/14	13	32	Anti-stress Amintotal*/superMultivit/Hipraminchock-p	Free consumption
18/3/14	14	32	Coccidiostat:Amprolium 20%*/Anticox	Free consumption
19/3/14	15	28	Coccidiostat;Amprolium 20%*/Anticox	Free consumption
20/3/14	16	28	Coccidiostat;Amprolium 20%*/Anticox	Free consumption
21/3/14	17	28	Vac; Newcastle and Infectious Bronchitwas Coccidiostat;Amprolium 20%*/Anticox	At least 2hours without water. After then free consumption
22/3/14	18	28	Coccidiostat:Amprolium 20%*/Anticox	Free consumption
23/3/14	19	28	Coccidiostat:Amprolium 20%*/Anticox	Free consumption
24/3/14	20	28	Coccidiostat:Amprolium 20%*/Anticox	Free consumption
25/3/14	21	28	Vac;Gumboro	At least 2hours without water. After then free consumption

Source: from NAPTAPC.

Looking at the prophylactic program on table 1 above, it is seen that it was of a very high standard because all the doses administered were properly timed based on specialists' prescription. From the program one can notice that the chicks were not vaccinated on arrival, this was deliberately done on the third day assuming that all the chicks must have acquainted

themselves with water. Before each vaccine was administered, the chicks were starved of water for two hours. This measure was taken to enable them get thirsty.

Also it was noticed that they were given ANTI-STRESS almost every day. This was done to relief them of all possible stress such as: transportation, noise, vaccination, cold, etc. Coupled with the prophylactic program followed up above, the brooding house was constructed with the provision of a record board consisting of record sheets and record pens. The centre ensures a strict keeping of records to ensure its future success. Below was the record kept of this batch of chicks on Table 2 . From Table 2, one can notice how explicit each activity took place. A total of 205 chicks died during the brooding period giving an average of about 10 chicks per day. The minimum number of chicks that died per day was 1 and the maximum number was 31chicks. However, there was a great drop in the mortality rate towards the end of the brooding period. This table shows also that as the days progressed there was a great increase in the intake of feed from 50kg to 100kg.The consumption of water also increased progressively from 40 litres to 280 litres.

TABLE2: RECORD KEEPING OF BATCH OF BIRDS FROM THE 5TH OF MARCH TO THE 25TH OF MARCH 2014.

Date	Day	Stock	Death	Cause	Quaran -tine	Left	Feed (kg)	Water (lit)	Weight (gr)
5/3/14	1	1536	0			1536	50	40	39.5
6/3/14	2	1536	13	Origin & transportation stress	/	1523	50	40	/
7/3/14	3	1523	14	Origin and transportation stress	/	1509	50	40	/
8/3/14	4	1509	20	Origin and transportation stress	/	1489	50	40	/
9/3/14	5	1489	23	Origin and transportation stress	/	1466	50	40	/
10/3/14	6	1466	31	Origin and overcrowding	/	1435	70	50	/
11/3/14	7	1435	18	Origin and overcrowding	3	1417	70	50	/
12/3/14	8	1417	14	Origin and overcrowding	3	1403	75	50	/
13/3/14	9	1403	14	Origin and overcrowding	1	1389	75	70	/
14/3/14	10	1389	4	Origin and overcrowding	/	1385	75	70	/
15/3/14	11	1385	11	Origin and overcrowding	/	1374	75	80	/
16/3/14	12	1374	5	Origin	/	1369	90	90	213.8
17/3/14	13	1369	6	Origin	/	1363	90	100	225.5
18/3/14	14	1363	8	Origin	1	1355	90	120	241
19/3/14	15	1355	3	Origin	1	1352	95	150	248
20/3/14	16	1352	7	Origin	1	1345	95	150	259
21/3/14	17	1345	4	Origin	/	1341	95	180	262
22/3/14	18	1341	4	Origin	/	1337	100	240	268
23/3/14	19	1337	3	Origin	/	1334	100	250	271
24/3/14	20	1334	1	Origin	/	1333	100	260	275
25/3/14	21	1333	2	Origin	/	1331	100	280	280

Source: from the naptapc information board.

CHALLENGES AND CONSTRAINTS IN THE BROODING STAGE

The main problem faced in the NAPTAPC with this particular batch of chicks was high mortality .It was suspected that this high mortality was due to its origin. i.e. the parent stock which produces the eggs were old and needed to be replaced.

TABLE3: Rate Of Loss Of Broilers

DAY	STOCK	Absolute Death	Percentage
1	1536	0	0.00%
2	1536	13	0.85%
3	1523	14	0.92%
4	1509	20	1.33%
5	1489	23	1.54%
6	1466	31	2.11%
7	1435	18	1.25%
8	1417	14	0.99%
9	1403	14	1.00%
10	1389	4	0.29%
11	1385	11	0.79%
12	1374	5	0.36%
13	1369	6	0.44%
14	1363	8	0.59%
15	1355	3	0.22%
16	1352	7	0.52%
17	1345	4	0.30%
18	1341	4	0.30%
19	1337	3	0.22%
20	1334	1	0.07%
21	1333	2	0.15%
Total	-	205	14.24%

Source: From NAPTAPC Brooding House

From the above table the trend of deaths can be derived as shown ion Figure1 below.

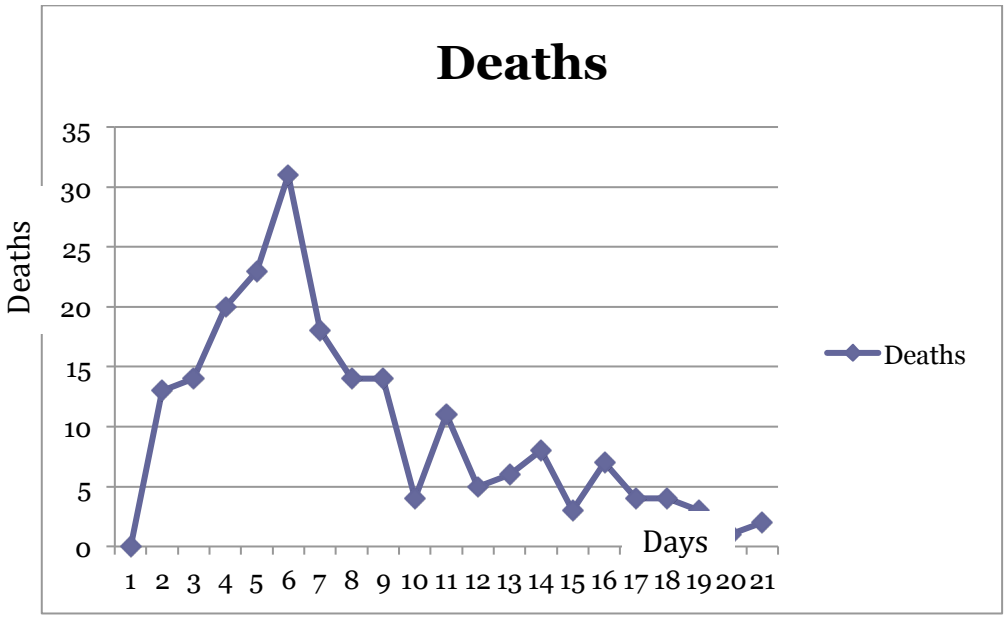

Figure 1: Trend of chick's mortality
Source: Sketched by Student Researcher

The above graph shows the trend of the deaths of day old chicks during the period of 21 days. It is seen that the mortality rate for these chicks is higher during the early brooding period. Another serious challenge faced by the NAPTAPC was the weather change which comes with a lot of infections caused by cold hence a lot of money was spent on drugs.

The lack of sufficient capital was also one of the main constraints faced by the centre. In fact, no business man accepts to have enough capital no matter how successful he/she was. The lack of

space was also one of the main problems faced by the centre. In fact, the canter did not respect the stocking capacity of 50 chicks per square meter. The insufficient space coupled with the cold weather causes overcrowding which eventually leads to the death of some chicks. The marketing of the chicks at three weeks was below average in this center. At the end of three weeks, buyers did not immediately show up. Hence the center has a marketing problem as it needs more customers of three weeks chicks.

Measures adopted to solve problems faced.

In the NAPTAPC, some measures were taken to overcome the problems faced. First of all the brooding house was constructed with provision of a foot bath containing a disinfectant to limit infections from workers entering the brooding house. Though there was a foot bath available, there was limited entry of workers in the brooding house.ie no worker from any other unit was allowed to enter the brooding room. With these measures followed up strictly, there was a great reduction of infected chicks at the NAPTAPC. There was an automatic generator to supply electric heat in case of power failure. There were also stand by bush lambs to support the heating. There was equally the proper follow up of a well organised prophylactic program which ensures the proper timing of vaccines. The surroundings were swept every morning as well as the drinkers being emptied and washed every morning. Also the litter was being refreshed by adding new litter on top of later after every week. To combat the issue of overcrowding due to space, after the first week the chicks were reduced from the two units and transferred to the other two prepared units. This measure reduced the number of chicks from 768 chicks to 384. Lastly, one very important measure taken at this centre was the provision of a bed where workers spend the night in turns to ensure an even temperature at night as well as other aspects like the availability of water, food.

Prospects of brooding.

The NAPTAPC has a positive view of brooding in future .This positive view was due to some future plans which they were putting in place. They were putting in place the required techniques, equipment and other necessary conditions required for setting up a hatchery unit which would take the NAPTAPC centre to another level. If this plan was accomplished, it will go a long way to reduce the mortality caused by transportation stress. Also, the centre plans to henceforth employ only well trained agricultural technicians into the brooding field. This will create the availability of good brooding techniques which in turn will increase the success of brooded chicks of the NAPTAPC.

CONCLUSION AND RECOMMENDATIONS

This study aimed at examining the challenges and prospects of brooding in the Nazareth Agro Pastoral Training and Production Center (NAPTAPC). More specifically, the study sought to describe the brooding techniques, identify the main brooding challenges that Nazareth Agro Pastoral Training and Production Center (NAPTAPC) faced identify measures used to solve the challenges and to determine the brooding prospects of Nazareth Agro Pastoral Training and Production Center (NAPTAPC). Data was collected from primary and secondary sources. As concerns the primary sources, questionnaires and interviews were conducted among informants who worked in the brooding unit of the poultry. Observations, face-to-face discussions with focused groups and key stakeholders were used as research instruments.

The results showed that the brooding techniques used by NAPTAPC did not deviate significantly from the standard techniques. This center faced challenges ranging from loss of birds, inadequate space, inadequate capital for expansion, adverse weather conditions which lead to diseases and low demand for three weeks chicks. As concerns coping mechanisms, the NAPTAPC has made provision for a foot bath containing a disinfectant to limit infections from

workers entering the brooding house. An automatic generator and stand by bush lambs are used to ensure a regular supply of energy/ heat/ warmth for the chicks. There is a good implementation of prophylactic program which ensures vaccines are administered at the right time. The surroundings of the brooding house are always kept clean and all equipment cleaned and disinfected as well as new litter added on top of old litter. Above all, the centre ensures that workers work round the clock in shifts so as to give adequate attention to the chicks. Lastly, one very important measure taken at this centre is the provision of a bed where workers spend the night in turns to ensure an even temperature at night as well as other aspects like the availability of water, and food. As concerns the future prospects. NAPTAPC plans to put in place the required techniques, equipment and other necessary conditions required for setting up a hatchery unit which would take the NAPTAPC centre to another level.

The brooding stage in poultry production as earlier observed is very important to the growth and success of the poultry business. Really, this stage determines both the quality and quantity f the products at the later stages of production. Consequently the brooding techniques practiced should not deviate significantly from the expected standard. If the standard practice is followed, frequent problems of loss of chicks, and inadequate space amongst others will be reduced. The problem of low demand for the 03weeks old chicks shows that all the stages of production in poultry production like in other industries are linked. This means that production could be carried out in a more efficient way if while brooding broilers marketing arrangements are made simultaneously or even in advance. Also, the findings showed that the main cause of death of chicks resulted from their origin i.e hatchery. This goes to suggest that poultry production units should seriously consider having their own hatcheries to ensure good quality day old chicks and to minimise losses from this source. Following the evolution of the death of chicks, it was found that the rate of mortality was high during the early brooding period especially during the 5^{th}, 6^{th}, and 7^{th} day. Special care should be taken during this period so as reduce the loss.

From a policy perspective, a number of recommendations emerge. To avoid sudden and massive deaths of day old chicks due to their source, it is recommended that the centre should look for an alternative supplier of day old chicks. The centre could equally sign guarantee contracts for the duration of three weeks for the day olds supplied. The centre should at the moment respect the standard stocking capacity of their brooding room. A team should be put in place to trace and identify buyers of 3 weeks and advertise to them the three weeks old. Various insurance policies could be used to protect against specific types of losses. Given that this study is a case study, its findings cannot really be generalised to represent the situation of the poultry industry in the region. In this direction, it is recommended that future research be directed towards the study of a cross section of poultry farmers in the region.

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