

CHAPTER 5

**MANAGEMENT OF POULTRY
FARMS IN ASSAM**

**Topic : A study on the economic viability of poultry enterprise of Assam---with
a special reference to Kamrup district.**

Climatic condition of the place, social acceptance of the poultry products of the locality, marketing facilities of the area, scientific knowledge of the farmer influence poultry farming to a great extent. So, in designing a farm, these practical and important factors should be kept in mind. It is observed that broiler farming and layer farming are found to be suitable in Assam. In Assam, both scientific and traditional poultry farming are practised.

5.1. Model farming

Depending on the nature of the farming, the following types of model farming may be designed :

- a. Broiler farming
- b. Layer farming
- c. Broiler and layer farming
- d. Mixed farming -
 - i. Fish cum poultry farming
 - ii. Crop cum poultry farming etc.

However, we are concentrating our study only in (a) Broiler farming and (b) Layer farming.

In scientific intensive system , necessary guidelines viz. selection of the site for the farm, construction of poultry houses, selection of birds, feeding of the birds must be followed to get the maximum profit from the farm.

i. Selection of the site

Selection of the site for the farm must be considered before undertaking the commercial farm. In site selection, the following points must be taken into account :

- a. The siting should be planned to avoid water logging, obstruction of air movement by other buildings or natural obstacles.
- b. The site should be readily reachable from a good road for convenient delivery of poultry feeds, poultry products and also for removal of litter.
- c. Proper drainage , reliable sources of water and electricity must be considered in selection of the site.

ii. Construction of the poultry houses

Generally the type of poultry houses to be built is determined by the climatic condition of the place and the financial condition of the farmer.

In Assam, as humidity is very high, use of iron netting in poultry houses for circulation of air is encouraged. At the same time, the farmer should not forget to protect his chicks from the cold of winter season. So, it is advisable, if possible, houses should be built with bricks and iron net. Again, when using poultry houses, the following points should be kept in mind :

- a. Birds should be reared in "All in all out" system.

- b. Before using, the house should be properly cleaned with dettol, phenyl etc. Pesticides like malathion may be used very carefully.
- c. Litters (beds) should be made up of dry rice dust or other materials available in the locality. For each new batch, the litter should be changed. During summer, the thickness of litter should be 2-3 inches and in winter, it should be 3-4 inches¹.
- d. Foot or shoes must be dipped in dettol water before entering the poultry houses.

iii. SELECTION OF BREEDS

Acclimatization of birds under the climatic condition of Assam is most important point in selection of breeds. It is seen many commercial breeds perform well in climatic condition of Assam. Today, hybrid broiler attains at least 1.5 kg weight in 6-8 weeks of age under farm condition of Assam. In case of hybrid layers, besides meat production, they are also able to lay about 285 eggs during its life span in prevailing climatic condition of Assam. Recruiting the chicks from a disease free hatchery is very much important for the farmer. Egg colour preference of buyer in his market must also be considered and accordingly, he may collect the respective breed.

iv. FEEDING

The efficiency of feed conversion of the bird is dependent to a great extent on the type of feed given to the bird. They have to eat not only to meet their maintenance needs, but also to produce meat and eggs.

1. Kalita, K.P. (1992). "*Byabasaeek vittit kukura palan*" (Assamese), M/S Metro (India) Paltan Bazar, Guwahati-1.

Therefore, it is absolutely essential that a well-balanced and highly nutritious ration should be given to the birds, when they are kept under an intensive system. The following table 5.1 gives the amount of feed necessary for broiler and layer at different age groups.

Table No. 5.1

Amount of feed (g) required at different age groups

Age (week)	Broiler (g)	Layer (g)
1	11-17	4-10
2	33-44	12-16
3	53-68	19-23
4	67-94	28-30
5	87-116	31-37
6	100-130	37-41
7	110-146	40-42
8	130-164-	43-46
9	-	43-47
10	-	45-48
11	-	48-51
12	-	50-54
13	-	52-56
14	-	55-58
15	-	56-60
16	-	57-62
17	-	58-63
18	-	60-65
19	-	62-67
20	-	65-70

(g) = gram

(Source: *Byabasateek Vitit Kukura Palan* by K.P.Kalita, 1992).

POULTRY PRODUCT

The broiler (meat) production under farm condition may be expected to above 1.5 kg /bird in 45 days. Growth of body weight i.e. meat production in chicken is a quantitative trait , which increases to a peak and then remains more or less stable. The pattern of growth may depend on the age, strain and on the environment under which the birds are reared. Again body weight at the age of marketing is considered to be the most important trait in determining profit from a broiler enterprise. Different study reports ^{1,2,3} suggest that juvenile body weight is highly heritable and responds well to mass or individual selection of the broiler.

A Gompertz curve may be suitably fitted to estimate the (amount of meat) body weight up to 8 weeks of age in organised farm in Assam.

Gompertz model is given by -

$$U_t = ab^c \text{-----}(1.1)$$

Where U_t =weight of the bird at time t

t = 0,1,2,-----8 weeks

a,b, c, are constant.

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1. Grossman, M and Bohren, B.B. (1985) " Logistic growth curve of chickens. Heritability of parameters , Journal of Heridity, 76 .pp. 459-62.
 2. Singh,H.; Nivasarkar, A.F.; Suman, C.L. (1991).Growth curve analysis and genetic parameters of body weight in indigenous guinea fowl. Indian Journal of Poultry Science. 26,pp.20-25.
 3. Saxena , S.C.and Mahapatra, S.C. (1981). Selection for 10 weeks body weight in meat type chicken. Indian Journal of Animal Science 51. pp.478 - 483.

Under prevailing condition of Assam, the model farming with scientific care, the broiler (Vencob) should ready for market in 45 days with the following growth model. (Fig. 1).

$$U_t = 10715.19 (0.0039)^{0.869^t} \text{-----(5.2)}$$

($R^2 = 99.8\%$) Again, egg production in chicken is a complex quantitative trait which generally increases to a peak and then decline gradually. Nandlal¹ and his co-workers have found that compartmental model

$$U_t = 30.299(1 - e^{-1.0929t - 0.349}) e^{-0.11t}, t \text{ is age at first egg}$$

explained the egg production more precisely in White Leghorn. . Again Ponnuel² reported that pure breed (egg type) Rhode Island Red (RIR) birds grew at the rate of about 2 g per day during the 1st week and 15 to 18 g /day during 8th week attaining an 8th week body weight of 624 g. (male) and 543g (female). The number of eggs produced under the farm condition was above 250 Nos. /bird/ laying period.

Following table 5.2 gives an idea of cost and income pattern of a broiler farm in Assam under scientific system.

1.Nandlal,V.and Mann, R.S. (1994) Evaluation of Mathematical Models to explain egg production curves in White Leghorn. Indian J. of Poultry Science 29 (1) pp, 528

2.Ponnuel, P.; Rajayanapathy, V; Venugopal, S. and Ganeshan, R. (1994) Performance of Rhode Island Red, pure breed under Pondicherry condition. Indian J. of Animal Production and Management. 15 (1),pp35-36

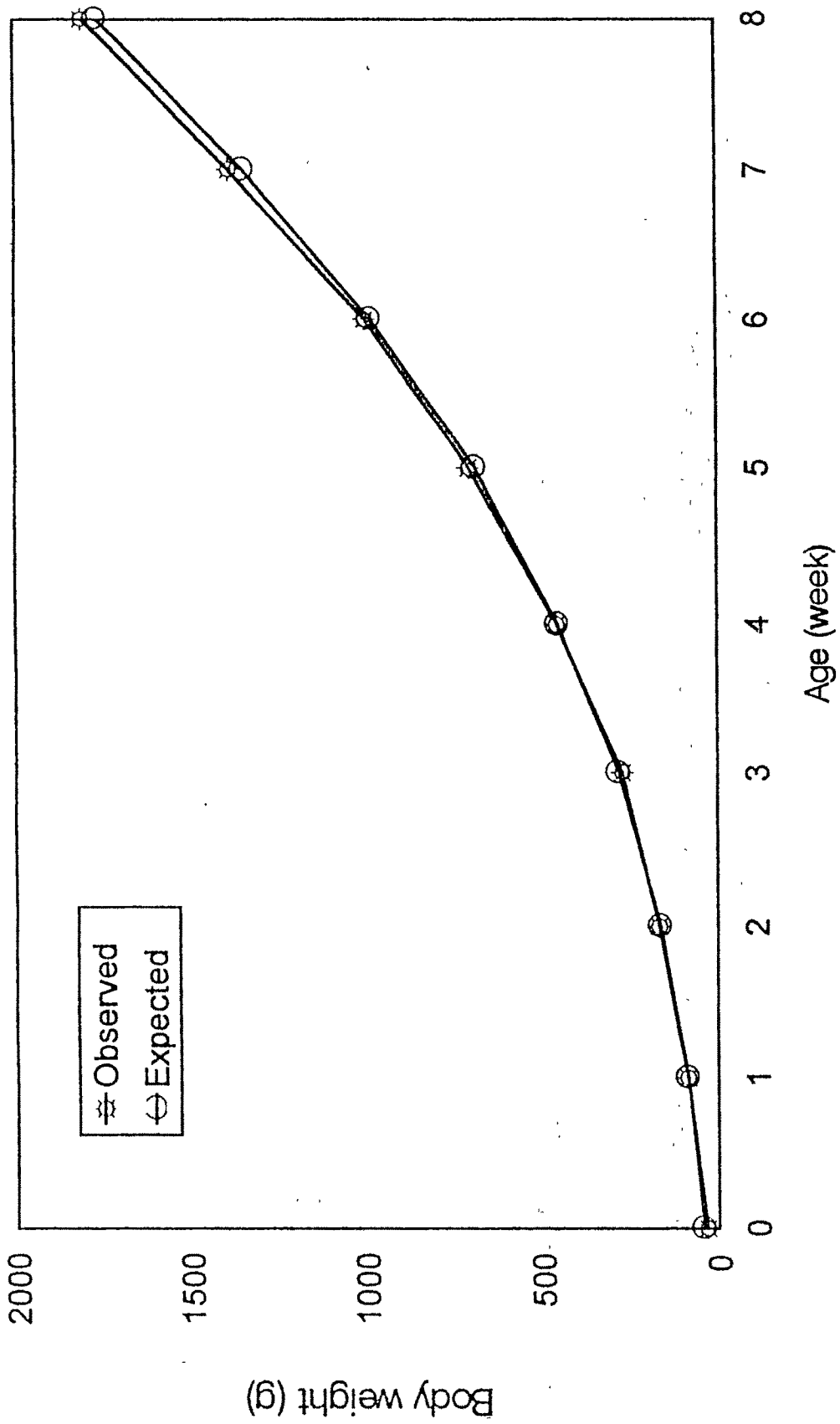


Fig.6.1. : Gompertz model showing body weight in broiler (0-8 week)

Table 5.2.

**ECONOMICS OF BROILER FARMING (500 BIRDS) IN ASSAM
(scientific system).**

<u>Expenditure</u>		
A. Fixed cost		
A ₁	Cost of land	: Rs. 10,000.00
A ₂	Cost of construction of poultry shed	: Rs.25,000.00
A ₃	Cost of store	: Rs.9,000.00
A ₄	Cost of water supply and electrification:	Rs.1,700.00
A ₅	Cost of equipment	: Rs.5,000.00
A ₆	Interest on fixed capital(10% /annum	: Rs. 578.00
	Total fixed cost	: Rs.46,778.00
B. Variable cost		
B ₁	Cost of chicks	: Rs. 8,500.00
B ₂	Cost of feed	: Rs.17,500.00
B ₃	Cost of medicine	: Rs.1,500.00
B ₄	Cost of litter and electricity	: Rs. 500.00
B ₅	Cost of insurance (Rs 1/bird)	: Rs .500.00
B ₆	Interest on working capital	: Rs. 414.00
B ₇	Labour (Rs 50/day)	: Rs.2250.00
B ₈	Misc.	: Rs. 500.00
B ₉	Depreciation cost	: Rs. 456.00
	Total variable cost	: Rs.32,120.00
C. Return		
C ₁	Income from meat (Rs 50 /kg)	: Rs.39,188.00
C ₂	Income from manure	: Rs.600.00
C ₃	Income from gunny bags	: Rs.230.00
	Total return	: Rs.42,725.00
	PROFIT MARGIN	= Rs.10,605.00
	Cost of production per kg of meat	= Rs. 38.33

Table : 5.3

Economics of Layer Farming (500 birds) in Assam (intensive system).

Expenditure		
A.	Fixed cost	
A ₁	Cost of land	: Rs.20,000.00
A ₂	Cost of construction of poultry shed (including cages)	: Rs.50,000.00
A ₃	Cost of store	: Rs. 9,000.00
A ₄	Cost of water supply and electrification	: Rs. 4,200.00
A ₅	Cost of equipment	: Rs. 2,000.00
A ₆	Interest on fixed capital	: Rs.12,780.00
	Total fixed cost	: Rs.97,980.00
B. Variable cost		
B ₁	Cost of chicks	: Rs 8,500.00
B ₂	Cost of feed	: Rs.2,58,750.00
B ₃	Cost of medicine	: Rs. 5,000.00
B ₄	Cost of insurance(Rs.1.50/bird)	: Rs. 750.00
B ₅	Interest on working capital	: Rs. 45,150.00
B ₆	Labour	: Rs. 27,000.00
B ₇	Misc.	: Rs. 1,000.00
B ₈	Depreciation cost	: Rs. 9,930.00
	Total variable cost	: Rs. 3,56,080.00
C. Return from egg		
C ₁	Income from egg (Rs.30/ Doz.)	: Rs 3,38,437.50
C ₂	Income from meat (Rs.50/kg)	: Rs 47,500.00
C ₃	Income from manure	: Rs. 7,200.00
C ₄	Income from gunny bags	: Rs 3,410.00
	Total return	: Rs 3,96,547.50
	PROFIT MARGIN	: Rs. 40,468.00
	Cost of production per egg	: Rs. 2.39

From the above tables it is clear that scientific practices are economically profitable in our state.

5.2. COMPARISON BETWEEN TRADITIONAL AND SCIENTIFIC POULTRY FARMING IN ASSAM.

Both systems i.e. traditional and scientific are in vogue in Assam.

The main differences between the systems may be explained as follows :

1. Nature of rearing
2. Feeding
3. Volume of production

NATURE OF REARING

Both systems deviate significantly from each other. As we have already mentioned that in scientific poultry farming, importance is given in constructing the poultry shed in a scientific way, making poultry litter (bed) in a hygienic way, controlling the temperature of the room etc. But in traditional system , housing is not proper. Birds are generally kept in a corner of a residential house, cowshed or some other house. Birds have to acclimatize in prevailing condition of the area. Litters are not changed regularly which affects the bird's health to a great extent. So, all the improved varieties of birds cannot be reared under traditional system in Assam.

FEEDING

Feeding and treatment are quite different in both the system. Birds are allowed to scavenge their food whole day in traditional system. In small size flock, the birds are mostly fed on household waste supplemented with a little quantity of feed. But in scientific culture, feeding is supplied with balance diet regularly. The amount of feed is different in different age groups. Besides, amount of ingredients in feed is also different in different age groups.

VOLUME OF PRODUCTION

So far as production is concerned the difference is highly significant between traditional and scientific farming. Under traditional system, the body weight of birds is hardly 400-600 g. in 45 days. But under proper scientific culture, the body weight of bird goes above 1800g in 45 days (table 5.4). A research project viz. " *In vitro* and *in vivo* evaluation of protein quality and utilization of silk worm pupae meat of Assam as protein source in poultry diet " has been undertaken in Assam Agricultural University under ICAR Ad-hoc Scheme. Principal Investigator Dr. D. Sapkota is expecting a very encouraging result in body weight gain of broilers under the above mentioned research project.

Table No.5.4

BODY WEIGHT OF VENC OB BROILER IN SCIENTIFIC SYSTEM

Age (week)	0	1	2	3	4	5	6	7	8
Weight (gram)	35	88	168	271	465	704	999	1385	1806

Source : Birubari Poultry farm, Guwahati.

Table 5.5 shows the poor performance of body weight growth of *desi* bird under traditional practice.

Table No.5.5.

BODY WEIGHT OF *DESI* BIRD IN TRADITIONAL SYSTEM.

Age (weeks)	1	2	3	4	5	6	7	8
Weight (g)	27.35	39.50	61.90	82.85	108.35	140.15	174.35	205.95

It is clear from the table 5.4 and table5.5 that, the growth rate of body weight of bird is higher in scientific practice than traditional practice. Thus the volume of production in the scientific system is higher than the

traditional system of poultry production. As a result the profit margin is generally higher in case of scientific than traditional farming.

To comprehend the distinction of economic viability, an economy of the traditional farming has been presented in table 5.6.

Table No.5.6.

ECONOMY OF BROILER PRODUCTION UNDER TRADITIONAL
SYSTEM (500 BIRDS).

Expenditure	
A ₁ Cost of chick	Rs.8,500.00
A ₂ Feed (supplemental)	Rs.1,000.00
A ₃ Contingency	Rs. 1000.00
A ₄ Interest on capital	Rs.131.00
Total expenditure	Rs. 10,631.00
Income	
Income from meat	Rs. 1,1900.00
Profit margin	Rs.1269.00
Cost of production (per kg.)	Rs.44.67

A comparison of table 5.2 and 5.6 has been presented as follows :

Table No.5.7
COMPARISON OF TRADITIONAL SYSTEM WITH SCIENTIFIC
SYSTEM (BROILER FARMING)
(500 BIRDS).

Item	Traditional system	Scientific system
1.Meat production(kg)	238	838.00
2 Gross profit (Rs.)	1269.00	10,605.00
3.Cost of production (Rs)	44.67	38.33

The table 5.7 reveals that the volume of meat production is significantly higher in scientific farming. Similarly, the scientific farming yields a profit margin of Rs. 10, 605.00 with 500 birds, which is higher than the traditional farming of Rs. 1269.00 with 500 birds. Regarding the cost of production also, it is lower in scientific farming compared to traditional farming. It is also clear that scientific farming may be considered as a primary occupation whereas, traditional farming serves as a subsidiary occupation. Regarding layer farming table 5.8 gives an idea of expenditure and return structure under traditional practices.

Table No.5.8

ECONOMY OF LAYER FARMING UNDER TRADITIONAL SYSTEM

(500 BIRDS)

A. Expenditure	
A ₁ Cost of chick	Rs.8,500.00
A ₂ Feed (supplementary)	Rs.40,000.00
A ₃ Contingency	Rs. 30,000.00
A ₄ Interest on capital	Rs. 11,775.00
Total expenditure	Rs.90,275.00
B.Income	
B ₁ Eggs	Rs. 73,125.00
B ₂ Meat	Rs. 33,750.00
Total income	Rs. 1,06,875.00
Profit margin	Rs.16,600
Cost of production per egg	Rs.2.06

Table No.5.9
 COMPARISON OF TRADITIONAL SYSTEM WITH SCIENTIFIC
 SYSTEM (LAYER FARMING)
 (50 0 LAYERS).

Item	Traditional system	Scientific system
1.Eggs production (Nos)	29,250	1,35,375
2.Meat production(kg)	675	950
3 Profit margin (Rs.)	16,600.00	26,168.00
4.Cost of production (Rs)	2.06	2.38

So far as egg production is concerned, the volume of production is significantly higher in scientific farming compared to traditional farming. The amount of meat production is visualized from table 5.9 as higher, in scientific farming. Table 5.9 also reveals that though the cost of production per egg is higher in scientific farming than traditional farming, still the scientific farming remains as more profitable with higher profit margin compared to traditional farming.

Advantages of scientific farming

1. Scientific farming requires comparatively smaller area than the traditional system. As the land holding rate is decreasing rapidly with the increase of population, therefore, scientific farming is more advisable.

2. In traditional system, the number of birds per farm (household) used to vary from 1 to 50. Again, Deka¹ reported that percentage of households having 20-50 birds is only 14.20 %. But in scientific system, even an average household can rear relatively a large number of birds.
3. The improved commercial variety of birds cannot perform well in traditional system. Therefore the productive performances are very poor in traditional system compared to scientific system.
4. Birds are reared in hygienic way in scientific system compared to traditional system and hence there is low rate of mortality in scientific farming.
5. Scientific farming provides a good amount of litter, which can be used as a source of bio-gas and fertilizer, thus brings an additional income.
6. Scientific system faces less difficulty compared to traditional practice in giving medical aid to the birds and handling of eggs.
7. Scientific system offered self-control to birds during extreme condition of weathers.
8. Scientific farming (broiler) is more economic and profitable.
9. Traditional poultry keeping is generally the job for woman flock bringing them an additional income, But, scientific rearing generates substantial employment avenues for full time works for family member and others.

1. Deka A.B. (1991) Role of Dairy and Poultry Enterprises in rural economy of Assam- A study in Kamrup district. Ph.D thesis, Deptt. of Economics, Gauhati University.

5.3. REQUISITES OF A COMMERCIAL FARM

A commercial poultry enterprise is a business enterprise that produces poultry products viz. meat, egg, manure etc. To produce these outputs, an enterprise requires the following basic inputs or productive resources.

1. Natural resources
 - i. Land
 - ii. Climate
2. Capital
3. Labour
4. Management and entrepreneurial talent.

NATURAL RESOURCES

Poultry can be reared in extensive, semi-intensive and intensive system. Range system of extensive system requires an adequate area of land along with plenty of grasses. The run system of semi-intensive system also requires a certain amount of grassland. Besides, the type of soil is also important if, the birds are to be kept on semi-open range system. A fertile well drain soil is required. This should be sandy land rather than a clay soil. Assam is endowed with available land area in the form of hills and plains without having more heavy clay soil. But at present, increasing population reduces the per capita land holding. According to 1991 census, per capita land holding was 0.35 hectare. Hence, the farmers tend to take it on a small scale for extensive and semi-intensive system. Again it is found that poultry farming in deep litter and cage rearing system is in vogue in

Assam. As these intensive system donot require much land, therefore, land is not a problem for these type of poultry farming in Assam.

Poultry enterprise has an appreciable advantage of being relatively easy to raise and at the same time the enterprise can be adopted easily under the agro-climatic condition of Assam. "Chickens being warm blooded, have the ability to maintain uniform temperature of their internal organs. This mechanism is efficient only when the ambient temperature and humidity is within certain limits"¹. It has been already mentioned that the ideal temperature and humidity level for the growth of poultry farming should be in the range of 21.2^o C to 23.9^o C and 30 to 70 per cent, repectively as against the state's average temperature and humidity level of about 27.4^o C to 36.6^o C and 78.59 per cent , respectively.

According to Borah (1990) "Weekly body weight of broiler was found to be more in winter season at 21.49^o C than summer season (28.77^o C). Moreover, in summer season, one week more was necessary to attain 1500g body weight. Whereas, in winter 7 weeks was necessary to same body weight"². Hence, the state's temperature is found to be suitable. Whereas the humidity level is slightly higher than the ideal one. Humidity of air inside . . .

1. Chandravashi.,R.R.S (1988) Environment control houses -simple cheerful Poultry Guide. 25 : 45-46.

2. Borah, J.N. (1990). Effect of varying protein and energy levels on the growth performance of broiler in different season. PhD thesis Deptt. of Animal Nutrition, College of Veterinary Science, AAU, Khanapara.

the poultry house is very important. Fresh air is important for good health and well being of chicks. Again wet litter may result in an outbreak of various diseases (Coccidiosis etc.). So, there should be enough ventilation for free moving of fresh air and to keep the litter dry. Therefore, in order to get the maximum result, humidity should be artificially controlled.

CAPITAL

In commercial poultry enterprise, the word capital has two meanings (1) fixed capital and (2) working capital.

1. Fixed capital includes the investment in housing, equipment etc. that provide productive services over a period of time. Some enterprise require a large investment in capital goods in relation to other expenses. But in poultry farming, it is found that in Assam, the poultry sheds are usually constructed with locally available materials at relatively cheaper cost, which reduces the investment in capital goods to a great extent.
2. Working capital is the money that is needed to buy chicks, feed, medicine, to pay labourers etc. for day to day operations. As already mentioned in our previous chapter, finance is now not a major problem in Assam for a poultry entrepreneur desiring to start a new enterprise. There are several organisations/agencies like banks, Government and private etc. to provide financial assistance to the farmers who come forward for establishing poultry farms against viable projects.

Banks can provide as much as 70 –80% of the capital investment as loan¹.

Banks generally offer three schemes for loans :

1. Table egg production
2. Broiler production and
3. Hatchery schemes.

Labour is the work done by human beings to produce goods and services. The quantity of labour available to enterprise depends on several factors *viz.* size of the population engaged in work or seeking work and the hours each person works. Assam is endowed with a huge working force including a good number of educated , unemployed youths. But the state does not have enough of technical/trained hands in readiness, for engaging in poultry enterprise. Appropriate education and training in the line of poultry rearing can increase their skills in the poultry farming.

In our study area, we found that both man and woman labourers are engaged in poultry farming. Besides, members of the family being engaged in poultry farming, full time paid labourers are also engaged in the commercial poultry farms which generated substantial employment avenues for family members and others.

Rao, MV. (1994). How to start a poultry farm. Indian Poultry Industry Year Book. pp. 159.

MANAGEMENT

Management is the art and science of combining ideas, facilities, processes, materials and labour to provide a worthwhile product successfully. Scientific management requires limited resources of the farmer to maximise return from his farm.

" Take the best birds, give them the best of balanced feed. Protect them against common diseases with all due preventive vaccination. Yet their performance will vary widely- from very good to very bad. The result can be profit or loss. The critical factor that makes all the difference is management"¹. Thus the biggest single factor that a farm is running at a profit or loss is management skills. Study revealed that " about two third of net farm income is a return of the farmer's managerial skills and labour "². Efficient management of farm and effective marketing of products are the farmer's responsibilities to make his farming productive and profitable.

The broiler are generally reared in deep-litter system in Assam. Litter (bed) is provided to the birds in a house, equipped with brooders, feeders and waterers. A broiler is generally given 1sq.ft. floor space. Recently growing interest is rearing broiler in cages. Layers may be reared by deep litter system or cages or combination of the both the systems. In deep litter system floor spaces needed per layer is about 2 sq.ft. whereas, 0.5 sq.ft. in cage system.

Experiments have

1. Reddy, K.A.(1997). "Management pointers" Poultry Industry Year Book. pp.229-238.
2. Bandyopadhyay, V.K. and Agarwal, S.K. (1995)." Emerging trends in poultry management" Jr. of Indian Poultry Review, Sept. pp. 15-19.

been carried out to find out relative merits of the cage and deep-litter system for management of layers.

According to Reddy¹, the main advantage of cage system over deep-litter are :

a. **Economy in space** : Double the number of birds could be accommodated in the cages, which reduces shed size to half.

b. **Disease prevention and control** : Birds are subjected to less chances of infection. Deep-litter diseases like coccidiosis can be eliminated to a great extent.

c. **Definite feed saving** : A total saving of up to 10g/bird can be obtained¹.

d. **Increased laying efficiency** : It is informed that farmers have achieved up to 2 to 3 extra-hen housed .

e. **Labour saving** : Labour needed to manage 1000 birds in deep-litter system is sufficient to manage 5000 birds in cages.

With the modernisation in poultry production, cage system is gaining popularity, as it is the only answer to today's acute problem of land scarcity.

1. Reddy, K.A.(1994). "Cage Rearing" Indian Poultry Industry Year Book. pp.239 -240.

But a lot of controversy exists about the optimum number of birds in a given size and type of cage as the cage floor space per bird seems to depend upon so many factors like the body weight, age, sex, breed, temperament of the bird, feeder and water space, environmental factors like temperature, humidity, ventilation etc.

For obtaining the high growth rate of eggs and broiler production, following points should be considered for the overall management of a poultry farm.

A. HOUSING

The design and construction of poultry shed depends on certain factors like climate and location of place, orientation, construction, materials etc. Besides, appropriate measures have to be taken during summer, winter and rainy season to face the seasonal influences as and when required. With the progress of modern poultry housing technology, an environment controlled house i.e. a house in which conditions are maintained as near as possible to the bird's optimum requirement of temperature is being used particularly in large commercial farms.

B. LITTER

The litter is the most important aspect of the poultry production. In our study area we have found that wood shavings, saw dust, rice husks, wheat straw and dry grasses are commonly used as litter. The most important factor in the management of litter is especially the moisture percentage which should be between 20 to 25 per cent. Litter should be removed after

marketing of each batch and the complete shed should be cleaned and disinfected.

C. EQUIPMENT

Usually a total of 100 birds will drink about 5 to 7 tonnes of water in a year. Again, water content in egg is 74 percent, so birds should get sufficient supply of water. The waterer may be placed on a stand above the litter with a guard over the waterer to keep birds out of it. Researches are going on to modify the existing equipment or to invent new one. The problem related to traditional drinkers like regular cleaning and filling of waterer, contamination and spillage of water, wetting of litter etc. are claimed to be avoided by automatic drinkers -the nipple and the cup, which ensure the supply of clean water. There should be about 13 cms of feeder space per bird and feeder should be about 25 cm above the litter level. Hanging type of feeders are becoming popular as they reduce feed wastage, labour and conserve floor space.

D. LIGHTING

The use of artificial lights stimulate egg production during winter season (October to March). Layers need a certain level of light intensity for 14 to 17 hours per day to achieve maximum egg production. Bulbs of 25 to 40 watts should be attached 7 ft. above the floor and 8 to 12 ft. apart. Reflectors should be used to direct all light downward and cleaned regularly to remove dust from bulb. For broiler from 6 to 8 weeks of age, 18 hours light is most efficient. Again, use of two hours on and one hour off during

night claimed some improvement in feed efficiency, growth rate and marginal saving in electricity.¹

E. FEEDING

For faster growth and better feed conversion, the broiler are generally full fed from start to market. As broiler has to take full advantage of the strong growth ability during the first three weeks, it is necessary that the starter ration should have high protein and a very low crude fibre. The energy level can be increased by using animal fats to the diet. Research works are going on under Assam Agricultural University to evaluate suitable economic ration for broiler, particularly in the climatic condition of Assam. According to Borah² body weight gain were found to be better in ration containing 16 per cent protein and 3000 ME kcal/kg. Besides, some growth promoters may be used for better performance of the broiler under climatic condition of

1. Reddy, K.A (1997). "Management Pointers". Indian Poultry Industry Year Book. pp. 229 -238.

2. Borah, J.N.(1990). Effect of varying protein and energy level on the growth performance of broiler in different season. PhD Thesis, Department of Animal Nutrition, College of Veterinary Science. Khanapara.

Assam. Certain amount of economic benefit can be derived by supplementing any one of three growth promoters viz. antibiotics colidex, probiotic protein and herbal product LIVOL¹ in the diet of broilers.

The layer is also generally fully fed. Farmers should give proper attention to prevent wastage of feed by using good feeders.

F. DISEASES

Diseases are always a big risk to the poultry farmers. With intensive commercial poultry keeping, disease problems become more pronounced as the unnatural concentration of birds in a limited space produces higher incidence of diseases. As the birds come into closer contact with each other and the faeces, they become more exposed to infection.

Coccidiosis is the most serious disease in poultry. It can be reduced by keeping litter clean and dry. Birds should be vaccinated for fowl pox, bronchioles, laryngotracheitis at 6 weeks of age. When Ranikhet is known to exist in an area, all birds should be vaccinated with Ranikhet vaccine. As protective measures, farmers should buy their chicks from flock known to show a very low incidence of avian leukosis complex, which is without any cure.

Tuberculosis generally affects the older birds. Chicks should be grown on clean litters and it is advisable to sell all the old birds after 1 year of production.

1. Buragohain,P.(1994). Efficacy of different growth promoters on growth performance of broiler. MVSc thesis.Department of Animal Nutrition, College of Veterinary Science. AAU. Khanapara.

Large round worms and tape worms are the most serious internal parasites of poultry. Poultry houses should be cleaned before placing a new batch and raise them away from the adult flocks.

Bio-security in animal production is the collective term for all the management practices designed to minimise introduction of diseases. Infectious germs can be transmitted through all available agencies like air, feed, water, workers etc. and the important function of bio-security is to prevent the entry of germs causing diseases through these agencies. Some of the important function of bio-security concerning the prevention of diseases include proper selection of sites, restricted entry of visitors and vehicles, proper storage of feed and feed ingredients, control of insects, feeding, watering, disposal of sick birds, vaccination programme, personal hygiene of the farm workers etc.

G. RODENT CONTROL

It is observed that many farms experience rodent damage to poultry feed. On average about 50 g per rat per diem of poultry feed is damaged in the rodent affected farm. Rats damage the same quantity of food stuff as much they eat. About 0.5 per cent to 10 per cent of total egg production is damaged by rodent. It is reported¹ that, in Punjab, 2.2 per cent chicks were observed to have been killed by rodent attack. Rodent also contaminate poultry feed and floor material by their faecal matter, urine and hair. They

1.Mathur, R.P.(1994). "Rodent control in poultry farms". Indian Poultry Industry Year Book. 10th Edn, . pp.230.

also transfer organisms of several disease like Salmonella, *E Coli*, Ranikhet to birds. To control the rodent, farmers should make the in and surroundings of poultry houses less favourable for rodents besides using chemical rodenticide.

H. MARKETING

The development of any enterprise depends not only on production ability but also on efficient marketing network. Marketing the products should be so arranged that the farmer gets a reasonably good price in the market. Knowledge of various marketing techniques and ability to market the products with minimum overhead charges are the important things for a successful poultry farmer. Birds are either sold live or dressed. Common people and hotelers prefer a bird weighing around 1 kg body weight (live). Therefore, when a chick gets the optimum weight ie. 1kg to 1.5 kg, it should be sold as per the market requirement.

It is generally reported that there exists a big difference between what the farmers get and the consumers pay. Marketing agencies are blamed to absorb a major share of the consumer's rupee. It is , therefore necessary to reduce price to the desired level. If agents /wholesalers arrange to collect broiler/eggs from the producers on their own vehicles, then the transportation costs will be reduced considerably due to higher volume at transportation. In its absence the farmers can collect their products in the vehicle hired on co-operative basis. These measures will help in reducing marketing cost and thus increasing the producer's share in consumer's rupee considerably.

In the next Chapter an attempt is made to comprehend the idea of progress and economics of poultry rearing with the help of statistical analysis.