INTRODUCTION

Poultry

The term poultry applies to a group of domesticated birds of several species having economic importance and which reproduce freely under care and management of man. The term includes a number of avian species such as chicken, duck, goose, swan, pigeon, quail, turkey, guinea fowl, pea fowl, ostrich, pheasants and partridge.

Poultry Science

Poultry science is a branch of animal science which studies about poultry, especially principal and practices involved in the production and marketing of poultry. It includes breeding, feeding, incubation, brooding, housing, disease prevention, poultry farm management and also marketing, processing, distribution of poultry and poultry-products.

Ornithology

The study of birds which are not classed as poultry is known as Ornithology.

Importance of Poultry Industry

1. Poultry meat and eggs are highly nutritive food.

2. Poultry and poultry products provide low cost protein.

3. Poultry farm requires minimum investment to start.

4. It ensures rapid return of profit.

5. Poultry farm requires small space. Multi-story building and cage rearing is possible.

6. Scope of other related industries, like - feed industry, hatchery industry, chicken and egg processing industry, poultry equipment industry, veterinary medicine industry etc.

7. Poultry farming in rural area has become a cottage industry.

8. It creates employment opportunities directly or indirectly.

9. Poultry farm provides a continuous source of income.

10. It stabilizes farm income.

11. Poultry farming as a tool of socio- economic transformation of rural people.

12. Marketing is not a problem.

13. Farm management is easy.

14. Availability of superior stock.

15. Many poultry feeds not commonly used for human.

16. Poultry manure used as bio-fertilize, feed of fish and bio-gas (220g droppings/bird/day).

Poultry Meat and Eggs as Food

Human body needs protein for its structural component. Source of protein may be plant and animal. Plant protein is incomplete due to deficiency of essential amino acids. But animal protein is complete. Poultry is a great source of protein. Poultry meat and egg is very nutritious food for all ages of peoples. Poultry meat contains less fat than red meat. Egg contains all essential nutrients that we need for growth, maintenance, lactation and reproduction. It is also a rich source of vitamins & minerals. A man needs 120g meat per day, but a man of our country gets only 25g per day. According to Indian Nutritional Advisory Council a man needs 200 eggs/year, but a Bangladeshi gets only 46 eggs/year as compared to 400 eggs in Denmark, 340 eggs in USA and 250 in UK. This is due to law production of meat and eggs in the country than our national demand.

	Demand /Capita	*Supply*	*Deficit*	***% Deficit***
Meat (g/d)	120	25	95	79.0
Egg/year	200	46	154	77.0

Acceptance of meat is also related to religious norms. Beef is prohibited to Hindu, pork to Muslim but chicken meat is acceptable to all community people. Recent a wide range of dressed broiler and cut-parts have played an important role in achieving the continued growth of poultry market.

Origin of Poultry

1. Chicken

Different archaeological surveys indicate that chickens were originated from the Red Jungle fowl (*Gallus gallus*) in the Indus valley about 200 B.C. and believe that it may be the chief ancestor of modern chicken. But it is also believed that another three wild species of chicken have been contributed to develop modern chicken which found in South East Asia. India and throughout mainland of Southeast Asia to the off-shore island of Indonesia are the ancestral home of the present day domestic fowl. The another three species are-

01. the Grey Jungle fowl (*Gallus sonnerati*)

02. the Ceylon Jungle fowl (*Gallus lafayetti*)

03. the Black/Green/ Java Jungle fowl (*Gallus varius*).

2. Duck

The wild duck was first domesticated in Asia also. The modern improved duck breeds or varieties are derived from the wild stock. The wild Mallard duck (*Anas boschas*) is the progenitor of all domestic with the exception of the Muscovy which has been derived from the South American tree duck (*Cairina moschat*).The domesticated duck belongs to the genus *Anas* and species *platyrhynchos*.

3. Pigeon

Pigeon was first domesticated in Libya or Babylon or Egypt. The rock pigeon (*Columba livia)* is the ancestor of modern domestic pigeon. Many varieties of pigeon the domestic pigeon today were decedent from the wild pigeon, Blue Barred Rock, *Columba livia.*The pigeon of today still resemble to this ancestor. Pigeons were referred to in the Bible as a symbol for the holy sprit. There is record of pigeon being raised and used for food by the Egyptian

6. Quail

Japanese quail (*Coturnix japonica*) also known as Coturnix quail, Pharoah`s quail, Eastern quail. Coturnix is widely distributed in Europe, Africa and Asia, where they are reared as migratory species. Apparently quail were either domesticated in Japan about the 11th century or brought to Japan from China about that time. They were first raised as pet and singing birds, but by 19th century Japan had become widely used quail for meat and egg production.

1. Chicken Terminology

Some terms are used in poultry science to denote particular bird considering its age, sex and purpose.

Chicken: Any member of domestic chicken irrespective of sex at any age

Day old chick (DOC): Hatching day of chicks

Baby chick: Chick within one week of age

Chick: Chick within eight week of age

Growing chick/Grower: Chick within 9 to 16 weeks of age

Pullet: Female adult chicken of 5 to 6 month age, which not laid egg

Pullet hen: Newly laid female chicken over 6 month of age

Hen: An adult female chicken which has laid eggs

Layer: A hen of laying condition/ Commercial female chicken raised to lay eggs

Cockerel: A non caponized male chicken less than one year

Capon: Caponized male chicken usually less than 8 months of age for table use as meat is softer, fine texture and flavor

Caponization: Method of removing sex gland or inactivation the function of sex gland

Cock: A mature male chicken over one year with coarse skin, darkened meat, hardened breastbone tip and use for breeding purpose

Broiler: A hybrid chicken raised for meat for 4 to 8 weeks of age. It has smooth skin, meat is very soft and fine texture, flexible breastbone cartilage. The FCR is below 2 :1 or less

Grand parent stock (GPS): Foundation stock used for breeding as male and female line to produce parent stock chicks

Parent stock (PS): Stock which are used for breeding to produce hybrid chicks

Hybrid: Offspring of parent stock. Commercial broiler/ layer having high meat/egg producing capability, they can not transfer traits uniformly to their offspring

Cannibalism: Toe picking, feather picking, vent picking, head and tail picking within the birds.It occurs due to nutrient deficiency or other environmental stress.

Debeaking: Process of cutting beak to prevent cannibalism by debeaker machine

Ration: The feed allowed for an animal for 24 hrs

Broody hen: A hen that stops laying eggs when her 'maternal' instincts kick in. When this happens, she'll sit on a clutch of eggs, waiting for them to hatch.

Incubator: A heated device used for hatching eggs

Litter: The bedding material spread on the floor of a chicken house (i.e. wood shavings, straw)

Straight run chicks: When baby chicks have not been separated by gender

Comb: The red flap of fleshy 'skin' sticking up on top of a chicken's head

Vent/cloaca: Opening or organ of genital, urinal and fecal discharge

2. Duck

Duck: Any member of *Anas platyrhynchos*, irrespective of sex at any age. Besides the term indicates adult female duck also

Duckling: Young offspring of duck

Drake: An adult male duck

3. Goose

Goose: A mature female goose

Gander: A mature male goose

4. Pigeon

Fancier - the name given for a person who devotes his entire time (spare or otherwise) raising pigeons.

Cock - a male pigeon.
Hen - female pigeon.
Squab - a baby pigeon.

Food value of egg and chicken meat

Egg

Egg is an ovulated reproductive cell which is naturally completed in the female genital organ of birds and obtained after laying. It is the largest cell of the nature and widely used as delicious nutritive food of human.

Egg is the most nearly a balance food of all the foods available to man. It contains all essential nutrients that we need for growth, maintenance, lactation and reproduction. The edible portion of the egg is made up of the yolk and the albumen. A hen's egg weighing 57g

gives us about 51g of food materials made up of by 18g yolk and 33g albumen. The nutrients include proteins, fats, vitamins and minerals.

Composition of Chicken and Duck Egg (100g edible)

	Energy (cal)	Water %	Protein %	Fat %	Carbohydrate %	Ash %
Chicken	163	73.7	12.5	11.5	0.9	1.0
Duck	191	70.4	13.0	14.5	0.7	1.1

Protein: The yolk and albumen contain about 17.5 % and 11.0 % protein respectively. An egg of 57g contains 6.7g protein (3.64g in albumen and 3.15g in yolk). It is highly digestible quality protein. The biological value of egg protein is 95% as compared to 85% for milk and 70% for meat protein. It is a complete protein, because it contains all essential amino acids required to maintain body, promote growth and reproduction

Chemical composition of an egg of 57g.					
	Whole Egg	Albumen	Yolk	Shell	Energy calories
Water	37.50	29.04	8.64	-	
Protein	6.70	3.64	3.15	-	

Fat Ash	6.20 6.60	0.06 0.26	5.85 0.36	- 5.76	
Total	**57g**	**33g**	**18g**	**6g**	**90**

Fats: Egg yolk contains 32.5% fat & only 0.2% in albumen. An egg of 57g contains 6.2g fat.

Egg fat is very well-emulsified unsaturated fats which are easily digestible.

Carbohydrate: As egg is an animal product so its carbohydrate content is below 1%.

Energy: Egg is moderate from the standpoint of calorie content. An egg of 57g supplies 90 calories energy to our body.

Vitamins: Egg contains all fat soluble vitamin- ADEK and all members of B-complex including vitamin-B_{12} which are stored in the yolk. Egg yolk is a potential source of vitamin-A varies from 200 to 1000 I.U. Its component is present in pure forma as well as in precursor i,e., as carotenoid pigments. The quantity of vitamin-D depends on direct sunshine to the layers and vitamin-D supplement in the poultry ration. An egg supplies 15% vitamin-D of the daily needs of an adult person.

Minerals: The egg contains a large number of mineral elements. It contains 116 mgm phosphorous of which 110 mgm present in yolk, iron-2 mgm mostly in the yolk, calcium in the edible portion is about 2gm per egg. Others are Na, K, Mg, S, Cl, Zn, Cu, Mn, etc. are also present.

A man recommended 3000 calories energy, 70g protein, 50g fat and 570g carbohydrate per day. A man gets 90 calories energy, 6.7g protein and 6.2g fat from an egg.

Food Value of Chicken Meat

Nutritionally, people eat poultry meat for its high quality protein and its low fat content. Chicken meat is higher in protein and lower in fat than beef and other red meats. Human body needs protein for its cell structure and repair. Poultry meat is a great source of protein with all essential amino acids. Poultry meat is very nutritious food for all ages of peoples. Poultry meat contains less fat than animal

Comparison and Composition of Some Carcass Parts of Chicken & Beef

Species	Carcass cuts	Protein	Fat	Moisture	Food energy

		%	%	%	(100g)
Chicken **(Roasted& boned)**	Breast(white meat)	32.2	5.0	61.3	182
	Leg(dark meat)	29.2	6.5	62.7	185
Cattle **(Cooked &boned)**	Round steak	28.6	15.4	54.7	261
	Rump roast	23.6	27.3	48.1	347
	Hamburger	24.2	20.3	54.2	286

Effect of Eating Raw and Cooked Eggs

Eating of raw egg

One may think that it is preferable to consume the egg contents in the raw state rather than after cooking. But this is not so far the following reasons:

1. Raw egg white (albumin) contains an *anti-trypsin* factor and also particular protein, *avidin* which are in combination of vitamin *biotin* thus render the vitamin unavailable. But by cooking harmful properties of albumen are destroyed and it also become more digestible.

2. The raw egg may contain harmful organisms capable of causing diseases. The organisms will be destroyed by cooking temperature.

3. Cooked eggs also stimulate more secretion of the acid in the stomach required for protein digestion.

Eating of cooked egg

There is several types' of egg cooking methods. High or low temperature influence digestion of egg and even loss of nutrients.

1. Egg boil:

Egg half boiled: There is no loss of protein and vitamin

Egg full boiled: Trace loss of nutrients.

2. Egg fry:

Fried at low temperature - If frying is done at low temperature, only about 0.1 gm protein (out of 6.5 gm) may be lost.

Fried at high temperature -At high temperature 0.6 gm protein and significant amount of vitamins are lost.

3. Egg omelette: The loss of protein is about 0.2 gm (fried with spices)

4. Egg poach : The loss of protein is about 0.5 gm.(broken egg in boil water)

5. Egg scrambled: The loss of protein is about 1.0 gm.

6. Spiced egg curry: Indian type curry with other foods, loss of protein is 1.2 gm with vitamins.

COMMERCIAL POULTRY FARMING AND ITS RELATED BUSINESS

Poultry statistics in Bangladesh:

Poultry	Number (million)
Chicken	207.0
Duck	40.0
Total Poultry	247.0

Egg production/year: 5,000 million

Broiler production/year: 400 million

Native chicken contribution: 30-40%

Commercial farm contribution: 60-70%

Govt. poultry: One in every district

Central Poultry breeding farm: Mirpur

Central Duck breeding Farm: Narayangonj

Private poultry farms: 1,50,000

Private hatcheries: 130 (Leading not exceed 10)

Total investment in this sector: 80,000 million taka

Dependent people in this sector: About 6 million

Commercial feed mills: 50

Poultry Farming

It creates jobs and employment opportunities. Poultry farming also create different related industries like processing, industrial and research field. These diversifications are due to huge market demand of poultry meat and eggs.

Poultry and its related business

1. Layer farming
2. Broiler farming
3. Duck farming
4. Breeder farming
5. Pigeon farming
6. Quail farming
7. Turkey farming
8. Broiler, chicken and duck meat processing
9. Live and dressed poultry meat business

10. Egg business
11. Hatchery farm
12. Incubator business
13. Day-old chick business
14. Poultry feed business
15. Poultry feed industry
16. Poultry vaccine and medicine
17. Poultry transportation
18. Poultry hatchery equipment
19. Poultry housing equipment
20. Poultry & egg carrier cartoon and packaging industry
21. Bio- gas plant
22. Manure and compost **etc.**

Economics of poultry farming

Leading poultry producing countries

It is impartment that poultry producers have a global perspective concerning poultry in order to know which countries are potential competitors and what is ahead.

Chicken	Duck	Turkey
China	Vietnam	USSR
Former USSR	Poland	Canada
USA	Indonesia	USA
Brazil	Thailand	Brazil
Japan	USA	UK
France	Brazil	Poland
Poland	China	Turkey
Mexico	Bangladesh	Yugoslavia
India	Egypt	Madagascar
UK	Burma	Bulgaria

Poultry meat consumption

Country	Kilograms
Israel	41.4
USA	29.8
Saudi Arabia	28.1
Hong Kong	26.7
Kuwait	26.0
Canada	22.7
Spain	21.4

Broiler meat Export

Country	1000 metric tons	Percentage (%)
France	370	38
Brazil	289	29
Netherlands	220	22
USA	196	20
Total	981	100

Global poultry meat production

Country	Percentage (%)
USA	31.0
USSR	11.2
Brazil	6.1
Japan	5.2
Spain	3.3
Canada	2.4
Mexico	2.3
Hungary	1.5
EC	16.0
Rest world	21.0