

Poultry

This section will give you detailed and exhaustive information about the animal husbandry topic you have selected. The information is categorised into various subheads. Depending on the nature of the information you require, just click on the relevant link. This will open out a set of sub-links to further narrow down your selection.

For example 'Disease management' poultry section contains a list of sub-links that give you information on a whole host topics concerning that topic, like : Coryza, Marek disease, Fowl pox, Loose dropping, viral arthritis and many others.

Development Milestones In Poultry Industry during 50'S

- A cottage / rural enterprise
- Government backed massive grading program with supply of exotic cocks.

Late 60's

- Establishment of Government commercial farms, launching of IPDP (Integrated Poultry Development Projects)
- Support from world food programmes through supply of grains
- Emergence of private sector hatcheries
- Setting up of various institutes in the field of breeding and health

70's & 80's

- Emergence of farms in the line with SSIs
- Liberalized loans from banking sector
- Emergence of support industries e.g. feed pharmaceuticals
- A shift from government to private sector with ever increasing dedicated entrepreneurial ventures
- Beginning of integrated approach with entry of foreign technology

90's

- Emergence of corporate farms
- Achievement of self-sufficiency in breeding operation
- Emphasis on cost control & efficiency through automation in operation
- Era of full-scale vertical integration coupled with entry into export world.



Indian Broiler Industry

- Indian poultry industry is a gamble on market price.
- The problems faced by the broiler producer are many. They include higher cost of production than the sales price for most part of the year, variable demand for meat products, attitude of the banking sector.
- The frequent and severe fluctuations in sales price of broilers do not reflect in the price to the end users. The annual per capita consumption of chicken meat in India is less than a kilogram. The demand for broiler meat is increasing with the emergence of nuclear families with increased purchasing power and the shift in consumer preference for broiler meat.
- In India less than 2% of the total broiler production is sold as processed and packed poultry meat. Consumers prefer broiler processed before them due to the availability of fresh chicken, lack of awareness of the quality of processed chicken meat, and unable to realize the hidden costs of feathers and offal while purchasing the live poultry for processing before him.
- Export of poultry meat has tremendous potential. The problems in export are the inadequate support from the Government, international price structure, and improvements required in technology of packaging, transportation and preservation.

Broiler Poultry

- Indian economy depends on agriculture as about three fourths of the Indian population thrive on agriculture and related activities.
- A concept towards sustainable agriculture is being developed now. All along, the base of Indian agriculture has centered on crop production.
- Poultry production utilizes the residue or by-products of Indian agriculture, which are unfit for
- human consumption and converts them to good nutritional poultry meat. The broiler industry, which came into prominence in early years between farmers and professionals have been developed for the sustainable poultry rearing activities. It is estimated that for every 1000 broiler birds sold per week there is an employment potential for 15 persons and actually there is an additional opportunity for 10% growth annually.
- Though poultry rearing seems to have developed into a boom in recent years why many producers are thrown out of the business? Let us examine the issues involved.

Fixing Price of Bird

- It is said that Indian agriculture is a gamble on monsoon.
- Likewise the Indian poultry industry is a gamble on the market price.
- The concerned broiler co-ordination committee in the particular region fixes the price of the bird. The market demand is the major point considered while fixing the price.
- The cut off price for the farmer is the cost of production plus a small margin. Many a times for more than half of the year the price fixed would be lower than the cost of production.
- This situation when continued, all farmers who can not afford to supply birds at the price

lower than the cut off price as demanded by the market will be thrown out of the business and it affects the supply.

- Thus after every time the selling price goes below the cost of production many farmers are wiped out of the industry. The supply thus will be lower than the demand and the price increases.
- This will attract fresh batch of farmers who would like to invest in poultry business and try to reap profits in the shortest possible time.
- Those farmers who are out of business will also try their luck by recentering into business. This will again lead to surplus production and result in unremunerative price and cycle will continue.
- Moreover the varied customs and cultures prevailing in India readjust the consumption of meat products during certain days in a month and certain months in a year. But the producers are unable to restrict their production capacities during such periods due to technical reasons and also for fear of loss of market share.

Attitude of Bankers

- Though crores of rupees are invested in the industry the banking sector is skeptical about the future of the industry and they always have a second thought to finance a poultry unit.
- At the same time other high risk avenues are under the shelter of priority sector. The members of the industry should join hand to represent our case strongly so the poultry rearing may be looked at as a profitable venture.

Exploitation by middleman

- As described above there are frequent and severe fluctuations of the selling price of live bird in the market.
- But it is interesting to note that the price to the end users is not affected much. It remains almost static throughout the year.
- Thus it shows that the middlemen are benefited out of the fluctuation and to be more precise are responsible for the wiping out of farmers from the industry.

Future for broiler industry

- Broiler industry in India has got a bright future. The per capita consumption of chicken meat in India is less than a kilogram which when compared to other developed and developing countries is very much meager.
- Emergence of nuclear families with higher per capita income and increased purchasing power will help in increasing the consumption of chicken meat.
- We have witnessed a shift in preference towards broiler poultry meat from meat of other species of livestock. Thus the potential for increase in demand is always there.
- But then also the integrators with financial back up and high production capacities are not able to influence the selling price either during the high demand periods or during the low demand period, whereas the middlemen always enjoy a cost plus benefit throughout the year. As producers we have to take steps to stabilize the market price in such a way that the price is always at

least marginally above the cost of production for most part of the year so that more and more entrepreneurs are attracted towards the industry and make India to move up the ladder as one of the largest producers of broiler poultry meat.

About Proceed Chicken

Processing

- Chicken business in India at consumer level is still at primitive stages. Consumers seem to prefer only live bird from live bird shops, dressed in their presence. Processed and packed poultry meat as a commodity is yet to be accepted by the consumers.
- In India only less than 2% of the total broiler production is sold as processed and packed poultry meat. There are several factors for this.

Preference for "Fresh materials"

- Consumers especially from south India are blessed with the presence of fertile land, availability of rain and water streams, and seashore.
- These aid them to enjoy availability of fresh seafood, vegetables etc. from time immemorial. Availability of livestock and the support from government for various livestock development programs had helped in producing milk also in large quantities.
- Thus people have an affinity for fresh food. This affinity has developed into apartheid against the frozen food, whether it is meat or fish or vegetables. In this part of the country frozen food is accepted only at those places where fresh and items are not available due to geographical reasons.

Lack of Awareness

- In the minds of the consumers meat means the chunk of slaughtered goat or bullock hanging at the meat shop which might have been slaughtered in a clandestine manner.
- Still the customer is happy to buy meat from the place because the meat shop owner "processes" the meat in their presence and they see that the meat is good. It is true in the case of chicken meat also.
- The customer goes to any live bird trader and the trader dresses the bird in their presence and sells to them. Whatever a meat technologist has to say about the quality of meat such processed the customer so believes strongly that the meat dressed in his presence is safer than what is coming from an organized processing plant.

Hidden Cost

- The customer when goes to a live bird trader the trader weighs the bird, dresses the same and releases the price of the live bird plus the dressing charges.
- But he compares it with the price of the meat from any processing plant, which requires no further dressing, and no hidden costs are there.
- In the first place the customer is playing for the feathers and other inedible portions but

the poor customer does not know the same.

Price factor

- Processed and packed poultry meat is slightly higher priced than the meat from live bird processed before the customer.
- The high price speaks about the quality and the processing. First unlike the dressing done by the trader, processing is carried out in modern plants and second the materials are subjected to freezing for which additional expenditure will have to be made.
- The final product to reach the customer refrigerated, transport is required to maintain the cold chain, and in retail shops deep freezers are required.
- At the processing plants back up power supply by using diesel generators are required to ensure the freezing. Due to heavy capital investment in the form of equipment and freezing facility the processors have to operate at 100% capacities so as to break even.
- Any reduction in capacity utilization due to erratic demand, the cost of processing will go up disproportionately. All this, add to the price of the processed poultry meat vis-à-vis that of the live bird. The housewife who decides to buy the chicken from a shop makes a calculation to see how much she saves if she buys a live bird from a trader or processed meat from a supermarket or cold store.
- If only the difference is about one to two rupees, she will prefer to buy the processed meat but if the difference is wider she will definitely opt the other one. Thus price has become the most critical factor affecting the purchase decision of an average chicken customer, and naturally due to value addition the processed poultry meat from organized processing plants are sold at a price higher than the live bird.
- This limits the sale of processed meat from organized processing plants and that is why most of the modern poultry processing units in India are becoming unviable.

Export

- A mirage dream Exporting of poultry meat has tremendous potential.
- But the price has to match with international market. However there is a need to improve the packaging, cold chain transportation and preservation to meet international standards.
- The domestic market has to be strengthened to make a profitable export. Fiscal relief and incentives should back this up.
- Import duties on poultry processing equipment should be waived, low interest loans should be offered to activities related to poultry processing and marketing, duty drawback for poultry export as in the case of marine export etc. may be considered for promoting the chicken export.
- When India produce quality product, Indian producer can not compete with producers from Brazil, America etc., as they are offering much lower price an international market. Without support from the Government export is still a dream as a mirage for the Indian producers.

Conclusion

- The broiler producers should maintain their level of broiler production at par with the

market needs only.

- The year average prices per kilogram of live broiler chicken should be maintained between Rs.28.00 to Rs.30.00 ex farm gate.
- There should not be much variation in the price levels throughout the year.
- The broiler producers should avoid the mediators.
- As long term measures, the integrators should try and reduce their production costs and only when the production cost per kilogram is brought to below Rs.25.00, any producer can think of exports.
- Without limiting the production cannot survive.



An Overview of Indian Poultry Industry



- The strides Indian poultry has made during the last 3 decades is something to be proud of by us all engaged in poultry.
- From backyard poultry we have today small, medium, big and very big farms, breeding farms and hatcheries catering to the needs of the farmers;
- We have all the vaccines and medicines required;
- we have genetic research centres;
- equipment and feed manufacturing units;
- training and research institutes both in the public and private sectors;
- IVRI and CARl being the pioneer institutions.
- We have everything to develop poultry on the scientific and latest technological lines and above all we have that urge to learn more and more from our own experiences and developments around the globe in the field of science and technology.
- Today we are producing 34,000 million egg and 630 million broilers and we rank the 5th largest in eggs and 20th largest in broiler production in the world.
- We hope to touch 40,000 million eggs by the beginning of the next century.
- From 1990 to 1997, egg production went up by 37%, broilers 231%, commercial layers 44%, poultry meat production 154%, per capita availability of eggs by 18% and poultry meat by 122%, value of poultry products by 162%, feed production by 77%.
- As per the current estimates we hope to reach 40 eggs per person per year by 2000.
- Today we produce eggs and meat very cheaply as compared to mutton and other meats.
- In fact poultry meat consumption has been increasing all over the world basically because it is considered healthier compared to other kinds of meat like beef and pork.
- By the year 2000 the world population will be around 620 crores of which 140 crores constituting 22% will be in South Asia.
- F AO estimates reveal that India alone will have to provide food for about 16% of the people and an equal percentage of livestock units living in the world.

South Asia is faced with acute shortage of animal proteins -a major constraint in food production which is mainly due to

1. Highest rate of population growth (2.3%)
 2. Highest density of population (3.1 persons per hectare)
 3. Highest number of unproductive animals (more than 50%)
- According to F AO 1996 Report the percentage of annual growth in egg and poultry meat production in most of the South Asian countries is higher than the world average.

- In spite of this, the per capita consumption of eggs and poultry in South Asia is much lower than the other Asian nations and the world averages, indicating a greater need for expansion of poultry in South Asian region.
- In this context, poultry which is recognised as one of the important segments in animal agriculture has a high potential to improve rural incomes particularly in areas where soil and climatic conditions are not conducive for remunerative crops.
- India today is the world's largest and fastest growing market.
- We have 30 crores plus affluent middle class.
- India has,
 - a. Infrastructural facilities
 - b. Cheap labour
 - c. Managers and trained personnel
 - d. Large resources of raw materials, and
 - e. An easy communication due to widespread use of English language among the educated.
- No doubt we have made rapid progress, but among the major constraints on our march forward are the marketing and availability of poultry feed ingredients.
- On the one hand we say with pride that our layers are equal to the best in the world laying 280- 300 eggs a year and our broilers grow upto 1500 gills in about 6 weeks.
- But is the farmer getting the right price of his stock? The answer is a definite no and it applies to both eggs and broilers.
- In northern India the egg market is in the hands of about half a dozen people who decide the egg rates on daily basis.
- The wholesale rates fluctuate between 30 and 40% in the course of 3-4 weeks and that too during the peak season sometimes.
- The situation is worst with broiler sales.
- Our well bred healthy stocks are sold by the most outdated and primitive method of auction with 'Kori' as the unit.
- When poultry birds are sold all over India, say all over the world; by weight there is no reason why we should not say good-bye to the primitive auction systems.
- Furthermore the farmer is not made on the spot payments for the stocks sold, but is issued a post-dated 'parchi'.
- With this 'parchi' in hand the farmer goes from shop to shop to buy his needs of day old chick, feed, vaccines and medicines.
- Is this 'parchi' a legal tender? Under what law or authority these 'parchis' are being issued? ,If for some reason, which should not become a practices, immediate payment cannot be made, a proper post dated cheque can be made out and given; atleast cheque is a legal tender.
- We have banking facilities in the urban and semi-urban areas around which our poultry farms are established.
- In very special cases cash payments can also be made on the spot.
- PFI have been struggling for the last ten years to end these mal-practices but of no avail.
- Sometimes it is the vote bank politics, some times it is the strong lobby against any change, corruption in administration and/ or money power which is at play.
- The solution are deferred and put in cold storage.

- Another bottleneck is the shortage of feed ingredients.
- If poultry has to keep its growth rate of 10% in the egg market and 15% in the broiler market, it will require about 8.5 million tonnes of maize by the year 2005.
- In contrast the total production of maize.
- In the country during 1994-95 was 7.8 million tonnes and maize is the biggest single component- 40- 50 percent of the total poultry feed.
- Some long-term strategies will have to be evolved to overcome these shortages.
- Concentration of poultry in certain States/ pockets is another bottleneck.
- Our efforts should be to produce egg and chicken near the consumption centres.
- Having huge quantities of eggs and chicken to long distances, thus adding to the costs by way of freight, packing, breakages, etc is not conducive to healthy growth.
- Consumer must get egg and chicken at the minimum price in any case cheaper than the vegetables throughout the year.
- Another step forward to bring stability in the poultry market will be establishment of egg powder plants and broiler processing plants on top priority.
- Somehow the progress on this front has been dismal.
- We have very few broiler processing plants and even those existing are running much below their capacity and running into huge losses.
- Instead of encouraging establishment of processing plants, the Government has levied excise duty on the branded poultry products.
- Whereas 'Sweets' and 'Namkeens' have been taken out of the excise drag I)et, chicken which is a healthy food item has not been spared.
- Government will not get much revenue by this levy, but it will prove to be a great disincentive.
- Another issue, which needs govt. intervention, is the high rate of interest being charged from poultry farmers.
- Poultry business on the small/ medium scale cannot afford to pay 18-22% interest on bank loans.
- Govt. is coming out with Insurance Scheme for agricultural farmers in case of failure of crops.
- Lastly we strongly feel that it will be a step in the right direction if we have a National Poultry Development Board on the lines of the National Dairy Development Board.
- The paper work in connection with the formation of the Board has been completed and it is time we implement it.
- The proposed Board should function under the professional management and should have representations from all segments of the poultry industry.



Future Prospects of Egg Industry

- The egg industry in India grew at 7-8% during the last two decades.
- The present per capita availability of eggs is about 35.
- The potential for Indian layer industry is bright.

The hurdles for this are

- Egg distribution and availability in rural areas,
- Price fluctuations due to the present transportation in open condition to long distances.
- Gap in producer price and consumer price for eggs,
- Factors reducing egg consumption
- Under developed, unorganized, under invested, short sighted distribution system
- Mismatch between feed price and egg price and
- Inadequate government effort.

Some changes desired to come in the next decade for the growth of layer industry are,

- Increasing the availability of maize,
- Setting up of National Poultry Development Board,
- Increasing egg consumption through Government programs,
- Provision of infrastructural facilities at new poultry production centers,
- Reducing challenges and hardships for egg processing,
- Education of egg producers,
- Provision of low cholesterol eggs,
- Availability of eggs at super markets under refrigeration and
- Supply of pasteurized eggs / poultry to bulk consumers.

Introduction

- The egg industry, in India, grew at an average of 7% to 8% during the last two decades.
- The present per capita egg consumption is about 35, while in the neighbouring countries it is about 90.
- The potential for growth of Indian layer industry should be bright if the requirement of neighboring countries is taken as indicative for future trend in our country.
- In India human population is over 1000 million and geographically it is ideally located to cater to the Middle East and Far East.
- With WTO likely to come into effect soon, the subsidies offered by developed countries should be slowly phased out and India could improve its share in world market for poultry products.

Hurdles to over come

- However, there are few hurdles that the industry has to over come before the potential

could be converted to growth.

Egg distribution

- The egg distribution and availability till now has come up only around the urban centers and vast areas in rural India still remain untapped where 70% of the country's population lives.

Egg transport

- Over the last three decades, layer farms came up in concentrated pockets while consumption is all over the country. As a result, every day eggs have to be transported to long distances taking 4 to 8 days of transit time.
- As it is in open condition and the temperatures and climatic conditions vary from season to season and region to region, the eggs are at least 10 to 12 days old by the time they reach the consumption center.
- As it is without any refrigeration, the shelf life will be maximum one week and therefore, price fluctuations are substantial with even minor changes demand and supply.

Gap in producer price and consumer price

- The typical egg purchase is mostly in small number and near home by the consumer. There is practically no cold chain and the number of retail outlets is too many warranting many intermediary channels thereby, widening the gap between the producer prices to the ultimate consumer price.

Factors reducing egg consumption

- India is more of a continent than a country with many religious beliefs and taboos. Egg consumption is affected by seasons and festivals, which vary from region to region. All through the year, at one center or the other there is some factor affecting consumption i.e. Ramanavami, Shravan, Ayyappa, Pithru Paksh, Summer, School vacations, fish catch, etc.

Distribution system

- Due to low trade margins and no value addition i.e. no processing or grading, the distribution system remained under-developed, unorganized, under-invested and very short sighted.

Mismatch between feed price and egg price

- Once in every 3 years, the industry witnesses a mismatch between feed prices and egg prices, though the industry has grown steadily, the availability of feed ingredients, especially energy sources, remained static resulting in periodical shortage and an

abnormal increase of its prices.

Government effort

- The growth of industry till now has been solely through a private effort and there has been very limited involvement or received from Government in marketing of eggs.
- Certain agencies like NECC, ACIL, etc., have actively worked for promotion of eggs and have reduced trader exploitation.
- However, the industry requires special efforts for promotion of eggs and in developing distribution networks in various states like Bihar, Northeast, UP, MP and others.
- Private entrepreneurs as the cost will not undertake this and risks are high. Instead, the Governmental agencies that already have a network establishment like PDS, Mid-day meal scheme, Anganwadi etc., should be motivated to take-up eggs along with other products. In the short-term, many of the above challenges would continue affecting the industry.
- However, in the long-term, the industry would have to take steps or motivate agencies like NECC, BEPA or Government and accelerate the infrastructure changes required for ensuring a sustained growth of the industry.

Changes to come in the next decade

- Some changes that should come about in the next decade listed below.

Increased availability of maize

- The availability of Maize has to be increased i.e., through introduction of high-yielding varieties and more acreage under Rabi season. The poultry industry should in consultation with Universities promote use of substitute energy sources to reduce pressure on Maize.
- Further, whenever parity permits, import of poultry ingredients should also be undertaken so as to stabilize the prices.
- Some form of contract between Maize farmers and poultry associations could also be established for reducing the role of middlemen and to obtain uniform prices throughout the year.

Setting up of national poultry development board

- An organization like National Poultry Development Board (NPDB) has to be set-up which would be entrusted the job of the market intelligence for feed ingredients, co-ordinate with State and Central authorities for having policies benefiting the industry, build the necessary infrastructure for dry and cold storage facilities for exports and rural distribution and for promotion of eggs.

Governmental efforts to increase egg consumption

- The consumption of eggs in rural areas may be increased through governmental programs like Mid-day meals, Anganwadis, Public distribution system, Social welfare hostels, etc.

Provision of infrastructural facilities at new production centers

- New production centers nearer consumption, especially in states like Uttar Pradesh, Bihar etc., would come up in the coming years as a result of ever increasing freight and packing costs.
- Various agencies connected to development of poultry have to plan for the requisite facilities to meet the future demand i.e. Feed industry, hatcheries, banks, etc.
- Further the existing surplus centers would have to identify new centers close to production, especially in villages for increasing consumption and farms have to improve their efficiency so as to survive in the new scenario.

Egg processing

- The egg processing industry is currently facing lot of challenges and hardships. However, with WTO coming into effect and subsidies phased out, there would be scope to tap the world market for egg powder.

Future demand for quality eggs

- As the consumer is becoming health conscious, some changes shall come-up specially in urban centers, such as (a) Demand for low cholesterol eggs like Omega-3 eggs, (b) Graded eggs and sale through Super markets under refrigerated condition and (c) Demand for pasteurized eggs / powders from bulk users like Star hotels, Bakeries, Biscuit manufacturers etc.

Conclusions

- While there is scope for egg industry to grow, the challenges are many, which shall affect cyclically in the short-term.
- However, in the long-term, with the consolidation of capacities the economies of scale would necessitate farmers invest in market development.
- India with a population of over one 1000 million and low per capita of 35 shall only grow in the coming few decades.



Poultry situation in India

- India's Present Low Per Capita Consumption Holds Promise For Future Growth

However, despite this phenomenal growth, the per capita consumption of poultry products is lowest in India even as compared to selected Asian countries, let alone the Western world, as is clear from the following table: Per Capital Poultry Meat Consumption In Selected Asian Countries:

Countries	1995	1997	1997(f)
China	8.1	9.5	10.2
Hongkong	49.4	53.9	52.5
Japan	14.4	14.0	13.6
South Korea	10.1	10.9	9.9
Singapore	5.3	5.4	4.9
Taiwan	10.9	12.6	13.2
India	0.6	0.8	0.9

- Likewise, the overall poultry scenario in India is dismal as compared to the world situation. The following data proves this:
- **WORLD & INDIAN POULTRY SITUATION, 1998** World Poultry Production 54,916,000 Tonnes India's Poultry Production 595,000 Tonnes World Poultry Exports 5,750,407 Tonnes India's Poultry Exports 407 Tonnes Main Producing countries USA(27%), China(22%), EU(15%), Brazil(8%) Main Consuming countries USA(23%), China(22%), EU(14%), Brazil(7%) India's Poultry Consumption 595,000 Tonnes Main Importing countries FSU(18%), Hongkong(17%), China (15%) India's Poultry Imports Nil Nevertheless, it is gratifying to note that over the years there has been a definite and pronounced shift in the market share of poultry meat in India, vis-à-vis other meat, which the following table illustrates:
- **MARKET SHARE OF VARIOUS MEATS IN TOTAL PRODUCTION IN INDIA:** Year
 Beef & Veal Buffalo Meat Mutton & Lamb Goat Meat Pork Meat Poultry Meat
 1978 34% 34% 6% 12% 10% 4% 1988 33% 32% 5% 13% 10% 7% 1998 31% 31% 4% 10% 10% 13%
 The overall growth in the Indian poultry sector is propelled through a compounded, annual growth rate of 10% in the case of egg production and about 15% in the case of broiler production.
- Besides, Indian poultry sector provides for 5 million jobs in the semi-urban and urban centres. The poultry house litter accumulated over a period of 9 - 12 months is an excellent organic fertilizer for crop cultivation.
- On an average, 40 birds reared on deep litter for a year produce one tonne of manure, adequate for one hectare of paddy or maize cultivation or two hectares of sorghum.
- By this standard, the poultry sector contributes as much as around 20 million tones to the pool of organic fertilizer, the vital agri-input. That is not the all.
- The poultry industry in India has remarkably grown also in respect of poultry health care products, poultry hygiene and sanitation, poultry equipment and other areas of infrastructure, as also up stream and down stream projects, such as poultry breeding and feeding, poultry processing and other areas. With all these, the stage is well-set for a sustained and all-round, rapid growth of the poultry and industry in India.



Problems of Poultry Industry

Cull bird marketing

- Andhra Pradesh stands first in layer population with 4 crores which is 1/3rd of country's population. Hyderabad zone has 1.2 crore layers.
 - The layers start production from 20th week and they are kept till 72 weeks of age for egg production and they are sold as cull birds.
 - These cull birds are sold on piece basis and their cost vary from Rs. 25-45 depending on the season and demand.
 - These cull birds are mostly consumed by middle-class people, labour in cold mines and in the border districts of Karnataka, Maharashtra and Tamilnadu. The consumption of cull bird is gradually coming down as the people are preferring tender broiler meat.
 - The marketing of cull birds is not very well organized and their price is often decided by the particular day's demand and number of birds offered for sale by the farmer on that day.
 - Further, the cull bird rates are not declared in newspapers. Farmers are not aware of the market price of the cull bird and it is often observed that cull birds are sold on different corners of the city on the same day with a price difference of Rs. 2-10 per bird.
 - Except Hyderabad zone and other parts of A.P. in India the cull birds are sold on kg. basis, by which farmers get fairly reasonable price without much exploitation by traders.
1. In the existing system, traders always demand lesser price saying that the particular farm birds are weigh less when compared to other farms.
 2. Trader often stops the lifting of birds in the middle and lifts the birds of other farmer saying that the second farmer has offered less price for cull bird as he has some disease or financial crisis.
 3. Traders say that a big farmer is selling the big farmer is selling the big batch of 1-2 lac birds in the next ten days, that's why the prices are low. So, in the existing system, trader is exploiting the farmer saying that there are lot of birds in the market without proportionate demand, and he quotes less price.
- In the light of the above information, A.P. Poultry Federation has decided to coordinate with the farmers and traders and try to fix the cull bird rate depending on the demand and supply basis and declare the prices on weight basis in the newspapers as we are already doing in the case of egg prices.
 - For declaration of prices, Federation is planning to gather/collect the information regarding availability of cull birds and assess the demand in Hyderabad zone and in surrounding zones where our birds are going on weekly basis and declare the price in paper accordingly.



WTO and impact of removal of quantitative Restrictions on Indian Poultry Sector

- The Uruguay rounds of trade negotiations were aimed at liberalising the world trade environment and thereby providing improved market access to the member countries.
 - The World Trade Organisation (WTO) since its establishment in 1995 has been enforcing various agreements that were concluded in the Uruguay rounds.
 - As a part of the agreement on the market access the member countries have made offers of reductions in the tariff and non-tariff barriers to trade.
 - The implications of these offers of trade liberalisation depend on the nature of the reduction in the barriers, in the scope of the coverage of the goods included in the offer package.
 - There are 135 nations who are presently members of WTO.
 - In the Uruguay rounds, all the GATT member countries agreed to
 1. provide tariff liberalisation on large number of commodities / items.
 2. Remove all types of prohibitions or restrictions other than duties (i.e. tariff) .
 3. For the tariff liberalisation submitted to the WTO "offer rates", also called "bound level" or "bound rate of duty".
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- The member countries are required to maintain the applied rate at or below the "bound rate".
 - India has agreed to make adjustments in the tariff rates to the level of bound rates for more than 3,300 commodities.
 - It has also agreed to phase out quantitative restrictions on all commodities except for around 600 commodities for security, religion, health and other reasons by 2002 -3 as per the mutual agreement with her major trading partners and WTO.
 - Other member countries of WTO have also taken steps for tariff liberalisation and removal of quantitative restrictions.
 - In fact, developed countries had made similar commitments in earlier rounds of multi-lateral trading arrangements.
 - It was for the first time that the developing country like India took part in the tariff negotiations in Uruguay rounds.
 - The main objective of the tariff negotiations has been to enhance the market access.
 - The underlying principal of Uruguay rounds of agreements was to create a fair and equitable multi-lateral trading agreements that leads to development and increased income.
 - These principals are amplified further through specific provisions in various individual agreements under WTO.
 - Unlike most of the countries of the world, India's import has been subject to different types of quantitative restrictions.
 - These restrictions are in the form of non-automatic licences, import through canalised agencies, special import licence (SIL) 1 actual user criteria etc.
 - These restrictions are imposed because India presumes that it has unfavourable position of balance of payment (BOP).
 - In the early 1990s and even earlier to that, India had serious balance of payment problem.
 - However, this has declined significantly during the recent years.

- The article relating to balance of payment mentions that a member country has to publicly announce a time schedule for elimination of quantitative restrictions.
- India presented a case of time schedule of nine (09) years where Australia, Canada, Japan, EU, New Zealand, Switzerland and the US had objections to this -time schedule and brought the dispute settlement proceedings against India, which India ultimately lost.
- The dispute settlement body of the WTO had adopted the panel and the subsequent appellant body reports ruled out that India was not justified in maintaining the QRs on balance of payment ground and advised India to bring its measures in conformity with the obligations under WTO.
- The panel and the appellant body reports were adopted by the dispute settlement body on 22nd September 1999.
- Pursuant to this, India and the US entered into a bilateral agreement on 28th December 1999 on the reasonable period of time for India to implement the rulings and recommendations of dispute settlement body.
- According to this, the reasonable period of time given to India would expire on 1st of April 2001.
- Further, the bilateral agreement envisages that, out of 1429 tariff lines (out of total 2714), on which quantitative restrictions are still being maintained as on date by India on balance of payment ground, on 714 tariff lines quantitative restrictions are to be removed by 1st of April, 2000 and on the remaining 715 tariff lines by 1st of April, 2001.
- At present, these items fall under the categories of restricted list, SIL list and the canalised list.
- The significant number of items from which quantitative restrictions will be removed belongs to agriculture sector and the items pertaining to poultry i.e., frozen and cut chicken which falls in the restricted list for which the tariff have to be removed by April, 2001, in any case.
- Once these quantitative restrictions are removed, it will have a more serious impact on the poultry sector.
- There have been reports that once the imports are free and on the OGL without any bound rates of tariff the poultry industry in India which has grown with the efforts of millions of farmers', scientists and visionaries like Late Padmashree Dr. B. V. Rao will be destroyed in few days time by the multinational companies operating in the chicken business.
- I would like to quote a report from poultry and egg marketing magazine of September-October'99 issue published from Washington and the news item which reads as under, "Russia has purchased 54524.6 MT of US chicken leg quarters under USDA Food Aid Programme when the bids were opened on August 16th by USDA Export Credit Division.
- The bids were awarded to companies like AJC International, AP USA, Gold Crist, Koch Foods, Perdue Farms, Sanderson Farms, Cellary Enterprises and Tyson Foods.
- These contracts were given at a price of 22.43 cents per pound to 25.42 cents per pound making an average of US\$ 550.2 per ton or 24.96 per pound.
- If we take this price at even 25 cents per pound which would mean 50 cents per kg. and if converted into Indian Rupees, this means Rs 22 per kg. landed in Russia duly frozen, packed and delivered.
- Can you imagine a situation where chicken legs dressed, packed, frozen lands in

Bombay, Hyderabad, Delhi and Madras at Rs 22 per kg. and you can well imagine what will happen to your broiler industry.

- The threat is real and not imaginative.
- The poultry sector in India has developed over four decades from a backyard poultry and is an integral segment of the agriculture economy which contributes over 11,000 crores to the GNP.
- This sector provides direct and indirect employment to over 1.5 million people basically in the rural areas and also plays a significant role in our national effort to improve the nutritional, health standards especially the weaker sections of the society and helps in combating the malnutrition.
- The per capita consumption of the eggs in the country is 36 eggs per annum and that of chicken meat is 700 gms per annum.
- The National Institute of Nutrition, an organ of Indian Council of Medical Research recommends that every Indian should eat half an egg per day and 11 kgs of chicken meat per annum to meet their nutritional requirements.
- By increasing the per capita consumption by just one egg alone results in the generation of 25,000 additional jobs and similarly an increase in the consumption of 50 gms. of chicken meat per capita results in the generation of 20,000 additional job opportunities predominantly in the rural areas.
- The day when we reach a figure of consumption of 180 eggs and 11 kgs. of chicken meat per annum, this sector has a potential to provide additional job opportunities to 7 million persons in the rural areas. "
- In US, Europe and other developed countries, the poultry farming is controlled by few hundred people and the processing and distribution by half a dozen companies in each country.
- A single company in US by the name of Tyson Foods slaughters around 50 million chicken per week and they have market share of 26 per cent in the us market.
- For their own fads and other reasons, the US and other developed countries have promoted the breast meat, which they call the white or lean meat whereas for them the leg meat is dark meat and a by-product.
- They load their complete margins of profit on the breast meat which is sold for around US\$ 2.76 per pound which comes to US\$ 5.52 per kg. or Rs. 250 per kg. whereas, legs or leg quarters being considered as a dark meat is thrown away at any price sometimes at even less than 25 cents per pound.
- In India we do not differentiate between leg and breast meat.
- Chicken is sold as chicken which is available currently anywhere from Rs. 60- 65 per kg.
- Similarly, while the eggs in the local markets, in Europe and USA are sold at anywhere from Rs. 4 to Rs.6 per egg these are dumped in places like Dubai at little over a rupee.
- In addition to this, these countries are giving huge subsidies to their exporters in the form of export enhancement scheme in US and restitution refund money scheme in EU whereas there is no subsidy on exports or otherwise in India.
- The developed countries therefore are able to export their products at throwaway prices because the products they export are either surplus production or they are by-products or they have the advantage of huge subsidy they get from their respective governments in different garbs.
- Therefore, if the import of chicken and chicken products and eggs is allowed into India,

the survival of the whole industry would be at great risk.

- In such a situation more than 1.5 million farmers and their dependant families will be without any livelihood, more than 11,000 crores of investment in this sector will be destroyed and the industry which has grown on its own for four decades with its own genetic base will be eroded.
- Under these circumstances, the Government should negotiate for a maximum bound rate of 300 per cent as applicable for agricultural products under WTO.
- I would also like to quote a report on poultry and egg marketing published from Seattle which gives the views of Dr Paul Aho, an Economist and expert on Agri-Business, where he says that poultry industry in the rest of the world feels threatened by cheap leg quarters and it creates barriers for importation.
- If leg quarters were somewhat higher in prices they would be less threatening other countries and they would enjoy greater access.
- He further adds that even in the US, the cheap prices of leg quarters actually hinders their own marketability.
- "Americans need to be sold more dark meat", he said, "as the demand of the dark meat in the US rises it has a . possibility of creating a virtuous cycle."
- Moreover, the Indian poultry sector is going to face an uneven competition because of several factors, which do not provide us a level playing field.
- It is also a reality which we should not forget that all countries protect their agriculture and allied sectors like poultry in the garb of different agreements and their implications.
- In some places it is the sanitary and phyto-sanitary measures and in other places it is the technical barriers of trade which hamper us to compete with the developed world.
- Though, it is clearly mentioned in the SPS and TBT Agreements that members shall take account of the special needs of the developing country members and in particular of the least developed country members.
- Likewise, agreement on technical barriers of trade also provides for a differential and more favourable treatment to developing country members and stipulates further that members shall in the preparation of application of technical regulations, standards and conformity assessment procedures, take account of special developments, financial and trade needs of developing country members, with a view to ensuring that such technical regulations, standards and conformity assessment procedures do not create unnecessary obstacles to exports from developing countries.
- But here again, we continue to observe the impositions of standards by developed countries, that are either beyond the technical competence of the developing countries or do not take into account the special developments, financial and trade needs of developing countries or fundamental climate or geographical factors or the fundamental technical problems of the developing countries. We also do not see a corresponding willingness on the part of the developed countries to transfer to the developing countries better and more advanced technologies at a fair reasonable cost.
- The agreements on technical barriers of trade and sanitary and phyto-sanitary measures are not implemented in their real sense and the developing countries like India are put to disadvantage.
- Since ~standards are emerging as one of the major long-tariff barriers to the market access of the developing countries, it has become the -light of the might to dictate to the others LOW they can stop the other person from asking advantage of the market access in

the other countries.

- The whole egg powder processing industry has faced these barriers and still are facing because of the new standards being introduced or upgraded, all of a sudden.
- It would not be out of place to mention that some of the countries do not adhere themselves to these standards what they have documented for others.
- But in -reality their strong point is that they have documented them so well and their presentation is excellent whenever you question them.
- Under the TBT Agreement the three basic needs should be kept in mind:
- Participation of the developing :countries in the setting up of standards for International Standard Setting Organisations.
- Technical cooperation to upgrade conformity assessment procedures in developing countries to gain their acceptance in the developed market.
- Mutual recognition of agreements between the national standard setting bodies and also providing equivalence of standards for each other.
- I would like to illustrate this that if we have to export our egg powder or chicken products to other countries, we first need to get the country approved as such and also seek equivalence for our standards.
- Thereafter, the importing country team will visit our plants and approve them whether we really meet their standards or not.
- Why such a condition cannot be placed on the countries which intend or would export their poultry products to India ?
- Why we cannot put a condition that our team will visit their plants and if satisfied for scientific and technical reasons, only then the import will be allowed into India.
- I think the Government need to look very seriously in this direction because other countries have been creating the barriers in the garb of SPS and TBT Agreements.
- It is also a reality that in developed countries the industry gets financial support on 4 to 5 per cent interest rate and power is available in plenty and at a cheaper rate as compared to India.
- I would not hesitate to say that in India finance is extremely costly which you get at a rate of 14 to 16 per cent for agriculture, power first of all is scarcely available and if available is very costly and same is the case with infrastructure facilities.
- Now where is the level playing field for the Indian poultry sector as compared to the developed countries.
- Therefore, it is essential that while we frame our policies the Government should give a serious thought before deciding any policy on the removal of QR's by putting sufficient bound rates for the products covered in poultry sector.
- It would be prudent for the policy makers to defend the gains of the poultry sector which it has made and the tremendous contributions it is making to the rural development, employment generation and providing nutritional food to millions of people.
- The basic objective of the WTO agreement on agriculture was to bring about a discipline in one of the most distorted sectors of trade by disciplining the unrestricted use of production and export subsidies as well as by reducing import barriers including non-tariff barriers.
- At the same time, as indicated in the preamble, the agreement recognised the importance of non-trade concerns including that of food security and rural employment.
- This is completely true in India where 66 per cent of population of about one billion is

dependent on agriculture sector for its livelihood.

- Moreover, a population of about 320 million is surviving just around the poverty line.
- Therefore, countries like India where large population is dependant on agriculture sector including poultry, need to exert its right of certain degree of autonomy and flexibility in determining their domestic agriculture policies.
- It must also be recognised that in countries where the main source of assured and entitlement to food is food production, these either in the form of subsistence farming or through generation of farming comes, the import of food cannot be an alternative to domestic production.
- Therefore, without protecting the domestic sector, which is sensitive to fluctuations, the opening up could have serious socio-economic ramifications particularly on the rural farming community.
- The developing countries with predominantly rural agrarian economy should use appropriate measures and safeguard mechanism to minimise the ill-effects of import which can destroy our food security. It is, therefore, imperative that all support wherein amber, blue or green box is brought out to the common objective of present production value by the developed nation apart from creating a level playing field.
- The huge amount of export subsidy still continue to distort the world agriculture trade which are given in the new garbs repeatedly by the developed countries.
- It would be important for Government to address issues related to circumvention and rollover of export subsidies by the developed countries during their negotiations.
- Last but not the least, the Government has to give a very serious thought while going for tariffication and bounding of poultry sector products.
- If the bound rates are kept very low the poultry sector really faces a very serious threat of its complete destruction.
- It would be, therefore, prudent that while doing the tariffication maximum bound rates should be worked out to protect this very important rural based sector, which is very vital for the progress of this nation.



Project report

- The project report envisages 19758 commercial layers to be reared per year ·
- The rearing system is called 1+1+2 ·
- One brooding batch of 10500 birds will be reared in deep litters for 9 weeks ·
- One growing batch of 10185 birds will be reared in cages for 9 weeks · 2 laying batches of 9879 birds each I.E. total 19758 birds will be reared in cages for 54 weeks.
- The starting date of the layer farm is February, 98 · Statement No. 3 gives the sample flock schedule considered from the starting date of purchase ·
- The egg production is considered to be 300 per year and the average egg price is assumed at 113 paise ·
- The culls will be sold @ Rs. 34/- per bird ·
- The brooding period mortality is 3%, the growing period mortality is 3% and laying mortality is 7% ·
- The other income is of gunny bags and manure ·
- The brooding feed consumption is 0.30 kgs per bird @ Rs. 6.00 per kg ·
- The growing feed consumption is 0.52 kgs per bird @ Rs. 5.25 per kg ·
- The laying feed consumption is 0.80 kgs per bird @ Rs. 50.00 per kg ·
- Costs including the purchase and sale prices are constant for preparation of project report ·
- The project cost is Rs. 53.75 lakhs of which Rs. 40.31 lakhs will be financed by the bank under NABARD financing scheme ·
- The interest rate on term loan is 16.50% ·
- Loan will be repaid in 32 quarterly instalments starting from second year ·
- Administrative expenses have been considered as 2% on total income ·
- 5% free chicks are taken into consideration for calculating production of eggs, feed and medicine cost, but are excluded in calculation of chick cost.



Layer strains and Capabilities of commercial layer

Growing period (0 to 18 weeks)

- Livability 95% to 98%
- Feed Consumed 5.7 kg to 5.9 kg
- Body weight at 18 weeks 1.26kg to 1.28 kg

Laying period (0 to 72 weeks)

- Percent Peak 93% to 97%
- Hen-day eggs to 72 weeks of age 304 to 317
- Hen Housed eggs to 72 weeks of age 300 to 312
- Livability of 72 weeks of age 93% to 96%
- Days to 50% production 150 to 155 days (from hatch)

- Total Egg Mass per Hen-Day (19 to 72 weeks) 20.0 kgs.
- Average egg weight (32 weeks of age) 57 gms/egg
- Average egg weight (72 weeks of age) 61 gms/egg
- Shell strength & internal quality of egg - Excellent
- Body weight (32 weeks of Age) 1.5 Kg.
- Body weight (72 weeks of Age) 1.58 to 1.62 Kg.
- Average feed consumption (20-72 weeks) 105 to 115 gms/Bird/day (about 275 to 310 Kcal per day)
- Feed consumption per egg (20 to 70 weeks) 125 to 130 gms
- Kg. feed /Kg. Eggs (72 weeks of age) 2.19
- Kg. feed/Kg. Eggs (72 weeks of age) 2.21

Layer strains available in India

- Babcock
- Hy-line
- Bovans
- Dekalb
- Hi-sex
- Lohmann



Capabilities of Commercial Broiler

- Livability 0 to 7 weeks of age 95% to 98%
- Body weight at 7 weeks would be 1.8 kg to 2.2 kg
- Feed per gain 1.70 to 2.2 kgs

Broiler breeds available in India

- Hubbard
- Cobb
- Anak
- Kasila Broiler
- Indian River
- Samrat
- Arbor Acres
- Ross
- Hypeco
- Hybro



Salient points for achieving good results in poultry

Chick Management (0-8 Weeks)

- Maintain the brooding temperature at 90-95 F by providing 1-2 watt per chick, depending upon the climate.
- Fresh, clean water has to provide for chicks.
- Test water quality and use water sanitizers, if required.
- Debeak the birds between 8-10 days preferably with automatic debeaker. Later the debeaking, more the stress. Single debeaking enables the flock, more uniform and less stress to the chicks. In case you need to second debeaking, do it during 12th -13th weeks of age.
- Ensure ND Killed for chicks along with Lasota on 5-7th day in all seasons.
- Avoid overcrowding in the flock.
- Monitor the body weights and uniformity of the flock every 2 weeks and compare with our standards.
- Monitor the feed intake on weekly basis.
- Please ensure the usage of good quality anticoccidial in the feed for the batches reared on deep litter.

Grower Management

- Provide adequate floor space, feeder space and water space.
- Feed the birds with high energy diet during the growing phase.
- Ensure potent fowl-pox vaccine (Sarabhai/Solvay) twice by wing-web method only and observe for the "Vaccine takes".
- Balance the feed for Methionine, Lysine, available phosphorus and Calcium
- Avoid excess calcium in the feed. Please note that if you use excess calcium you need to also give higher level of phosphorus in feed which will increase your feed cost without any additional benefits.
- Avoid stress during 7-11 weeks as the growth is maximum during this phase.
- Monitor the body weight and uniformity every 2 weeks during growing phase as it is the prime criteria for the laying performance. If body weights are lesser than standard continue the chick feed upto 10-12 weeks.
- Do not provide lighting during the growing period.
- Shift the birds to layer house not later than 16 weeks and avoid handling thereafter.

Calcium requirements of Hy-Line

Age in weeks	Calcium % in feed
0-17	1.0%
18-20 or upto 5% production	2.1%
21-23 or upto 50% production	3.3%-3.5%
24-72 upto 72% production	3.6%-4.0%

Layer Management

- Vaccinate the pullets with ND killed in place of R2B at 16th -17th week.
- Provide prelayer mash from 18th week.
- As Hy-Line eats less feed, formulate the feed based on the feed intake.
- The feed consumption should be monitored closely and if consumption is less, try to improve the consumption by use of Rice Polish, Liver tonics to get the peak production on time.
- Clean the bulbs often to get brighter light.
- Replace the worn out bulbs with new bulbs and verify the uniform light distribution.
- Initiate lighting for Hy-Line at 18th week or at the point of attainment of 1250 gms body weight, whichever is earlier.
- Grade the birds once in every 2 weeks.
- Do not overcrowd the birds in the cages.



Nutrition

1. Feeding excess calcium during chick and grower stage farmers are giving 1.2 to 1.7% calcium with 0.3 to 0.4% available phosphorus during laying period the calcium content of the diet is 4.2 to 5.5% and phosphorus is 0.25 to 0.35%.
2. Regarding lighting schedule farmers doubt have a fixed schedule
3. Egg weights: In our country eggs are most sold by weights. However farmers pay Rs. 2-5/- compensation towards pullet / medium eggs to the traders. It is not only the financial loss but farmers have serious problem in selling these eggs during lean periods like summer / Shravan months.
4. Egg markets in India: One of the main reasons for poor per capita consumption and poor demand for eggs is improper distribution of eggs in rural areas and their ignorance about the nutritive value of eggs.

- There is a definite need to conduct research and to give recommendations to improve egg consumption. After GATT agreement Indian market is open to the world markets for supply of eggs and chicken.
- To face competition from world markets our product has to be of premium and also economical. Today majority of the farmers know very little about producing eggs with food external and internal quality.
- When we export eggs / egg powder they look for good shell quality, uniform sized eggs more egg solids, bright yolk color, higher HU units.
- Farmers need to be trained to produce higher egg weights with good egg quality so that our eggs can c with other countries in quality and price.
- Awareness about feed quality - Feed and quality control is not seen in most of the farms.
- Raw material / finished feed is not weighed in more than 95% of the farms.
- Correct feed formulations as per the age, consumptions and production is not followed.
- Feeding excess protein (18-21 gms /day) to layers is very common.
- Record keeping on feed, production etc. is not maintained.



Nutrition composition of raw materials

Amino acid analysis % of Amino Acids

Amino acids	Rice broaken	Ragi	Maize	Parame	Dorb	Nut cake	fish	Soy bean	Sun flower
Taurine	0.00	0.00	0.00	0.00	0.00	0.00	0.89	0.00	0.00
Hydroxy proline	0.00	0.00	0.00	0.00	0.00	0.00	0.89	0.00	0.00
Aspartic acid	0.83	0.47	0.60	0.52	1.3	4.09	4.10	5.05	2.55
Theromine	0.35	0.31	0.32	0.22	0.6	1.12	1.74	1.77	1.14
Serine	0.43	0.34	0.41	0.26	0.66	1.8	1.49	2.25	1.26
Glautemic acid	1.57	1.49	1.71	0.96	1.99	7.2	6.39	8.10	5.61
Protein	0.35	0.46	0.79	0.27	0.66	1.45	2.00	2.37	1.15
Glycine	0.46	0.28	0.67	0.33	0.96	1.53	2.91	1.91	1.28
Cystine	0.30	0.23	0.25	0.14	0.35	0.68	0.43	0.66	0.73
Valine	0.59	0.49	0.44	0.33	0.92	1.70	2.25	2.20	1.53

Methionine	0.34	0.29	0.16	0.12	0.37	0.60	1.33	0.68	0.79
Isoleucine	0.40	0.33	0.3	0.22	0.58	1.36	1.86	2.02	1.25
Leucine	0.75	0.71	1.11	0.43	1.12	2.51	3.06	3.46	1.88
Tyrosine	0.25	0.20	0.18	0.20	0.45	1.4	1.24	1.64	0.71
Phenylalanine	0.49	0.39	0.44	0.28	0.72	1.96	1.65	2.30	1.38
Histidine	0.25	0.18	0.26	0.14	0.42	0.98	0.87	1.19	0.76
Lysine	0.42	0.23	0.26	0.25	0.73	1.52	3.07	2.64	1.23
Ammonia	0.19	0.20	0.21	0.12	0.26	0.75	0.81	0.87	0.65
Arginine	0.67	0.28	0.37	0.44	1.17	4.23	2.22	3.38	2.51
Tryptophan	0.11	0.09	0.07		0.16	0.39	0.39	0.67	0.33
Glucosamine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Percentage totals	9.30	7.40	8.87	5.60	14.25	37.65	42.80	45.27	28.4



Commercial Feeds and Price list

S.No	Name of the product	Price (1995-96)	Price (1996-97)	Price (1997-98)	Price (1998-99)
1.	Broiler Concentrate	550	762	816	849
2.	Chick Concentrate	550	0	0	0
3.	Layer Grower Concentrate	434	587	690	680
4.	Broiler Starter	495	600	629	680
5.	Broiler Finisher	491	608	628	630
6.	Chick Mash	454	544	577	567
7.	Grower Mash	390	409	464	472
8.	Layer Mash	390	453	495	480



Mycotoxins The Silent Killers

- More than 40 years have passed since researchers discovered the link between mycotoxins that contaminate grain, other feed ingredients, as well as complete feeds with the health disorders of animals.
- All have begun with the spectacular discovery of aflatoxins & their deleterious effects on man & animals following ingestion of food or feed contaminated by them.
- However, to date scientists have identified several hundred mycotoxins & in many cases they have described their mode of actions too.
- Although several mycotoxins are known, those mycotoxins of most concern other than aflatoxins are, ochratoxin, vomitoxin, zearalenone, fumonisin, T2 toxin, citrinin, oosporin, cyclopiazonic acid, etc. Depending upon the chemical structure, these mycotoxins entering the poultry gut exert systemic effects and cause damage to specific organs or organ systems.
- Whatever may be the target organ and the mode of action, the ultimate result is decreased productivity leading to substantial economic losses. Mycotoxins lower the profitability of poultry production by decreasing growth rate, feed conversion efficiency, livability and reproductive potential.
- Under field conditions, mycotoxicoses involve low level of chronic intake of fungal metabolites, resulting in a measurable decline in performance together with non specific changes such as immunosuppression.
- No regions of the world escape these silent killers and their negative impact on poultry productivity.

Economic impact of mycotoxicoses

- Losses due to mycotoxin induced death and growth suppression, can be quantified. In contrast, subtle effects of mycotoxins, such as immunosuppression and reproductive dysfunction, are difficult to recognise and evaluate.
- The financial impact of mycotoxins on intensive poultry production can be inferred from field studies conducted in the poultry industry.
- Market competition and relatively large volumes of production in broiler, turkey and commercial egg segments dictate high standards of efficiency to maintain profitability.
- Deviation from determined production standards, at either the breeding or commercial level, will impact revenue and hence the return on investment. Safe level of mycotoxins Controlling the mold growth and mycotoxin production can be accomplished by keeping moisture low, feed fresh and equipments clean.
- However, even with the best quality systems, mycotoxin contamination of grain or feed by one or more than one mycotoxin is unavoidable.
- Controlling mould growth and mycotoxin production
- Mycotoxin contamination can take place at any stage from the point of harvesting to the ingestion of compounded feed by the bird.
- Hence several strategies have been devised to reduce the risk of mycotoxin contamination

which involves selection of mold resistant varieties of crops, careful harvesting to avoid damaging the kernel, adequate drying & moisture control, proper feed storage & feeding practices.

- Despite all these measures, under field conditions, mycotoxins invariably creep into the feed. Today, the presence of multiple toxins in the feed necessitates a multifaceted approach in controlling their adverse effects, which begins from the pre-harvesting stage of grain till it is fed to the birds. Many of the times, controlling measures at the point of harvesting & transport of feed ingredients goes out of control & selective usage of feed additives such as mold inhibitors & toxin binders become a necessity.

Mold Inhibitors

- The use of chemical mold inhibitors is a well-established factor in feed industry. However mold inhibitors are one of the several tools useful in complex process of controlling the growth of molds.

The main types of mold inhibitors are

1. Individual or combination of organic acids eg. Propionic acid, acetic acid etc.
2. Copper salts The practice of recommending Copper Sulphate for fungal inhibition goes back to many decades. However several disadvantages associated with the same paved the way for oxine-copper, which is of-late recognized as a very potent antifungal agent.

Toxin Binders

- The recent approach to mycotoxin contamination problems has progressed beyond a simple focus on preventing fungal growth; as there are too many possible routes of contamination to protect realistically.
- A current emphasis is on reducing the deleterious effects of the mycotoxins in feeds while enhancing production and improving immune response. Although numerous chemical agents have been tested for their ability to bind mycotoxins only few have proven to be successful and used commercially.
- Hydrated Sodium Calcium Aluminosilicate Of all these clay products Hydrated Sodium Calcium Aluminosilicate (HSCAS) has proved to bind aflatoxin to a greater extent and recognised as safe to be used in poultry diet.
- The molecular surface gets saturated with water within the system, attract the polar functional atomic structure of mycotoxin and trap it against its surface. This isolates the mycotoxin from the digestive process and thereby prevents it from entering into the circulation.
- Yeast Culture Viable yeast culture based on *saccharomyces cerevisiae* strain 1026 added to broiler diet having aflatoxin resulted in significant improvement in weight gain and enhanced immune response.
- Invitro studies have established the binding of aflatoxin by yeast cells in a dose dependent response upto 90%.



Enhancement of Immunity in Poultry By use of Probiotics

- Antibiotics are used in poultry as growth promoters as well as in disease control.
- Use of antibiotics, both indiscriminately as well as not sub-therapeutic levels has led to development of resistant pathogens, Hence, use of antibiotics in the poultry feed is increasingly rejected by environmental and consumer groups of poultry.
- In view of all these, Probiotics generated a considerable interest among researchers as a substitute to antibiotic in poultry industry.
- The word "Probiotic" is derived from the Greek meaning 'for life' and is defined as 'A live microbial feed supplement that beneficially affects the host animal by improving its intestinal microbial balance.
- Probiotics for chicken are designed either to replace beneficial organisms that are not present in the alimentary tract or to provide the chicken the beneficial effects. In addition to lactic acid bacteria, other bacillus, yeast, biomas and other agents are also classified as Probiotics.
- They may be used alone or in combination. Yeast, especially strain *S.cerevisiae*1026 and *L.acidophilus* are employed extensively in poultry industry.
- Recently Mannan oligosaccharide derived from yeast cell wall has generated considerable interest among researchers and also has been viewed with considerable enthusiasm by commercial livestock producers.
- It can be concluded that Probiotics, especially *S.cerevisiae*1026, *L.acidophilus* and Mannan oligosaccharides, significantly stimulate the immune response in broiler chicks.
- It seems, day is not far off when poultry industry can look more healthier as birds can perform better and disease incidence will be at its lowest.
- This will bring more monetary benefits to poultry farmers as well encourage for healthy growth of poultry industry.

Aspergillosis

Cause

- The disease is caused by a fungus, *Aspergillus fumigatus*.

Transmission

- Transmission is by inhalation of fungus spores from contaminated litter (e.g. wood shavings) or contaminated feed.
- Hatcheries may also contribute to infection of chicks.

Species affected

- Young chicks are very susceptible, older chickens are more resistant to infection.
- Turkey poults, pheasant chicks, quail chicks, ducklings, and goslings may also become infected.

Clinical signs

- Infected chicks are depressed and thirsty.
- Gasping and rapid breathing ("pump handle breathing") can be observed.
- Mortality is variable, from 5 to 50%.
- Gross lesions involve the lungs and airsacs primarily.
- Yellow-white pin-point lesions can be found.
- Sometimes all body cavities are filled with small yellow-green granular fungus growth.

Diagnosis

- The presence of *Aspergillus fumigatus* can be identified microscopically or sometimes even with the naked eye in the air passages of the lungs, in the air sacs or in lesions of the abdominal cavity.

Treatment and control

- There is no treatment for aspergillosis.
- Affected chicks should be removed and destroyed.
- Strict hygiene in breeder and hatchery management is necessary.
- Choice of litter material is important so that no spore-bearing wood shavings are used.



Marek's Disease (MD, Neurolymphomatosis)

Cause

- Marek's disease is caused by a herpes virus.

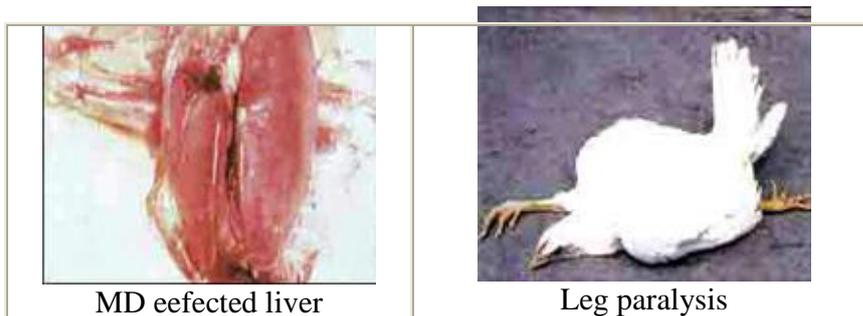
Transmission

- Main transmission is by infected premises, where day-old chicks will become infected by the oral and respiratory routes.
- Dander from feather follicles of MD-infected chickens can remain infectious for more than a year.
- Young chicks are particularly susceptible to horizontal transmission.
- Susceptibility decreases rapidly after the first few days of age.

Species affected

- The domestic fowl.

Clinical signs



- Infected birds show weight loss. or may exhibit some form of paralysis.
- Mortality varies from 5 to 50% in unvaccinated birds.
- The classical form (paralysis) with leg nerve involvement causes a bird to lie on its side with one leg stretched forward and the other backward.
- When the gizzard nerve is involved, the birds will have a very small gizzard and intestines and will waste away.
- Mortality usually occurs between 10 and 20 weeks of age.

Diagnosis

- The presence of tumours in liver, spleen, kidneys, lungs, ovary, muscles, or other tissues is indicative of MD, but they can also be indicative of lymphoid leucosis.
- However, nerve involvement, either grossly (swelling of leg, wing or other nerves) or microscopically, is typical of MD.

- Eye involvement can be visible as an irregular constriction of the iris (ocular lymphomatosis).
- Skin involvement (skin leucosis) often consists of tumours of feather follicles or in between follicles.
- Skin leucosis is a reason for broiler condemnation in certain parts of the world.
- A proper diagnosis to differentiate MD from LL requires histological examination.

Treatment and control



- Vaccination of day-old chicks is an effective mean of control.
- It has been demonstrated that MD vaccine only prevents the appearance of Marek's disease tumours and paralysis, it does not prevent the birds from becoming infected with MD -virus.
- It is therefore of major importance to maintain high hygienic and sanitary measures by good management to avoid early exposure of young chickens.



CONTROL OF MAREK'S DISEASE (M.D.) IN CHICKENS

FACTORS INFLUENCING OUTBREAK OF M.D

Factors 1st order	Pathogenic M.D. virus				
2nd order	Genetics	Age			
3rd order	Sex	Maternal antibodies	Inheritance		
4th order	Viral infections	Coccidia	Helminths	Bacterial infection	
5th order	Nutrition	Husbandry	Water	Light	Air

Factors of 1st order

- Presence of pathogenic M.D. virus at the farm is the biggest etiologic factor of M.D. The infection is followed by a quick and heavy multiplication of the virus in the defense organs of the body such as bursa, thymus, spleen etc.
- This explains why M.D. is an immunosuppressive disease. Then a stage comes when multiplication of virus decreases and now we can see formation of tumors and affection of the nerves.

Factors of 2nd order

Genetics

- Several lines of chickens with genetic resistance to MD have been selected and maintained experimentally.
- Spencer et al (1976) found genetically resistant chickens were protected by vaccination to a greater extent than more susceptible ones.
- Breeding for genetic resistance may be a valuable adjunct to immunization for control of MD.

Age

- Prevention of early exposure of vaccinated birds with virulent M.D virus (MDV) enhances the efficacy of the vaccine.
- If one can achieve his, he will definitely emerge victorious over M.D.
-

Factors of 3rd order

Sex

- It is interesting to know that females are more sensitive to M.D. than males. This is indicated by a shorter duration incubation period, higher frequency of clinical

manifestations and larger no. of females with tumors.

Maternal Antibodies

- The presence of maternal antibodies (MABs) significantly impedes the multiplication of MDV during the first stage of disease.
- The degree of this protection depends on the antibody titre. Maternal antibodies also impede propagation of MD vaccine virus.

Factors of 4th order

Viral infections

- Chicken anaemia agent (CAA) and Reo virus can predispose the birds to or aggravate MD.

Bacterial infections

- Mycoplasma synoviae can act as a predisposing factor for MD

Factors of 5th order

- Aflatoxin induced immunosuppression can make the birds prone to MD.
- Sanitation and biosecurity play very important role in the occurrence of Marek's disease.

EPIZOOTIOLOGY

- All strains of MDV develop in an infectious form in the cells of feather follicles. Therefore, the no. of produced and released MD viruses increase during the chicks, a young animal and layer's moult.
- From the feather follicles, MDV reach the air and get settled in the dust. In dust, the effectiveness of MDV is preserved for a very long time.
- The dust usually concentrates on the ceiling and walls but also in the ventilation of the chicken house. A thorough mechanical removal and an innocuous disposal (heating) of the infectious dust are important measures against further infections.
- Various insects which live in the litter as for ext. black lesser mealworm is a carrier of MDV. If these insects (beetles) are eaten by chickens, they might be infected.
- The most significant way of MDV transmission is the inhalation of infected dust. Any alternate ways of infection (mentioned below) which are common with other viral diseases, are meaningless for MD.

1. Vertical spread (Vertical via the hatching eggs)
2. Genital spread (during the mating of a male and female)
3. Oral communication (through feed or drinking water)

PREVENTION

- The occurrence of Marek's disease can be successfully prevented if one carefully studies the following points:

Preventing the pathogen's introduction

- MDV strains are never vertically transmitted (i.e. via the hatching eggs). The only source for infection for chicks and chickens of all age groups is dust containing the virus.
- They get infected in an environment which is contaminated with MDV. Cleaning and disinfecting can decontaminate the chicken houses.
- The interested readers can obtain the protocol of disaffection program from our office. The introduction and spreading of MDVs in farms can be effectively and continuously prevented by appropriate architectural measures.
- This method is used by the producers of specific pathogen free (S.P.F) hatching eggs. SPF flocks are kept in positive pressurized houses having filters to nullify possibility of entry of any microorganisms.

Proper vaccination

- Faulty application of the vaccine such as dilution mistakes during the preparation, faults in the technique of injection, too long times of storage or too high ambient temperature of reconstituted vaccines.
 - In the modern hatchery practices possibility of such lapses is very minimum. · Too low content of viruses in the vaccine. The protection by inoculation depends on the dose of injected viruses.
 - Ventri's MD vaccine contains minimum 4000 to 5000 P.F. US/ dose as against British pharmacopeia (Vet), standards of 1500 PFU/close. A higher content of viruses does not lead to any significant improved protection. In case of severely affected farms, a booster dose of MD vaccine may be tried on 18th day. There are some reports of encouraging outcome with such practice of MD booster vaccination.
 - If an infection with virulent MDV occurs simultaneously with or a few days after the vaccination, there can be no sufficient protection from the vaccine. In our opinion, this applies to all available vaccines. The older the chicks are at the time of infection by MDV, the lower the rate of spread of field strain (pathogenic) is. This can be achieved only with the help of accurate cleaning / disinfection and strict biosecurity measures, for first 15 days post hatchery vaccination. ·
 - As it is known of other live virus vaccines, the contamination of a vaccine can lead to damage to the inoculated chick by concurrently present microorganisms. This explains the need of accurate sterilization of injection appliances before being used.
 - The presence of high maternal antibodies can also impede the development of immunity in the vaccinated chicks.
 - In short, occurrence of MD cases despite of vaccination can be attributed to
1. Improper sanitation and poor biosecurity.
 2. Early exposure to virulent MDV

3. High maternal antibody
4. Poor vaccination procedures

- In 1982, two American scientists found that vaccination of 18-day-old embryos accelerated development of protective immunity by several days and proposed this technique for controlling detrimental effects of early exposure to virulent MDV. This technique is named as: "In ovo Marek's vaccination". The in ovo method eliminated the need for manual post-hatch inoculation of day old chicks and result in healthier chicks due to earlier introduction of disease preventing vaccines and less stress to the chicks. Tri-bio laboratories, U.S.A. (collaborator of Ventri biologicals Divn) have already produce one such in ovo MD vaccine.

Prevention of other infections

- clinically healthy chicken only can develop protective immunity after the vaccination. This means that in order to have a successful program to control MD., other pathogenic agents must be eliminated. Certain infections which can make the bird susceptible to Marek's disease are mentioned below:
- Certain species of avian mycoplasma enhance the multiplication of Marek's disease virus in cell cultures according to Dr. Kaleta Gieban, an eminent European scientist.
- Chicken Anaemia Agent (CAA)- Experimental dual infections with CAA and subclinical doses of MDV caused enhancement of MDV antigen shedding to feather follicles.

Nutritional Prophylaxis

- Aflatoxins increase susceptibility of poultry to Marek's disease.
- The mechanism is through depression of the cell-mediated immune response. Certain vitamins like vitamin A, C, E, B6, H etc., are very essential for the development of lymphoid (defense) organs of the body like bursa, thymus, spleen, liver etc., one should always use the vitamins which are procured from a dependable source only because the use of substandard vitamins may lead to immunosuppression.

Environmental factors

- According to a study undertaken in hot climates successively for two years by Dr. Raghard Al-Khoja, the heat stress can affect the efficiency of immunity build up against Marek's disease. He found that the chicks hatched during summer (i.e March to June) are more susceptible to MDV infection. So one should take extra care during summer to prevent MD incidences.
- Marek's disease vaccination is carried out during the 1st 24 hours of a chick's life and its effectiveness is determined until the chicks reach the age of at least six weeks. Therefore, chicks should be protected from exposure to field (Pathogenic) MDV for atleast first 6 weeks are even more crucial.
- Only persons working on the farm and dressed in clean protective clothing shall be admitted to the chicken houses.

THE SIGNIFICANCE OF MARK'S DISEASE

- Prior to the use of vaccines, MD constituted a serious economical threat to the poultry industry because of heavy mortality and losses. Since vaccine does not mean full proof protection, losses still occur but they are no longer as serious a problem.
- Perhaps the greatest impact of MD is immunosuppression (impairment of immune system) apparently caused by the damage to the bursa, thymus, spleen, liver etc. Both humoral antibody and cell mediated immunity can be depressed by MD. These are reflected by reduced antibody response to a variety of vaccines and by alteration of T cell functions. MDV infection could increase susceptibility to primary and secondary infections with coccidia and reduced antibody response to *M. synoviae*.
- In broilers, MD may exist in sub clinical form if not in clinical form. This may lead to vaccine failure. That is why MD vaccination (at least half dose) is recommended in day old broiler chicks.



Infectious Anaemia (CAA/CIAV)

- A very resistant small virus known as CAA (Chicken Anaemia Virus) or CIAV (Chicken Infectious Anaemia Virus) causes infectious Anaemia.

Transmission

- The major mode of transmission of Infectious Anaemia is vertical transmission from infected breeder hens.
- Horizontal transmission from bird to bird or by infected equipment, clothing, etc. is also possible.

Clinical signs and lesions

- CAA causes a syndrome in young chicks up to approximately 3 weeks of age.
- Adult birds may get infected but will not develop clinical signs.
- The disease is characterized by increased mortality and anaemia associated with atrophy of the haematopoietic tissues in the bone marrow.
- Subcutaneous and intramuscular haemorrhages can be found accompanied with atrophy of the lymphoid system.
- Affected birds may show focal skin lesions (also known as blue wing disease).
- Mortality rates vary from 20% to 70%.
- Affected flocks will show poor growth reflected in economic losses.

Diagnosis

- The diagnosis can be based on the clinical signs and pathological findings in affected birds.
- Blood serum testing for specific CM antibodies can be carried out (IFT, VN, etc.) Virus isolation is also possible but it is time-consuming and expensive.

Treatment and control

- No treatment is available for Infectious Anaemia.
- Maternally derived antibodies can offer protection.
- The induction of high maternal immunity in the progeny by vaccinating breeders is the best approach to successful CM control.



Inclusion Body Hepatitis

Cause

- The disease is caused by an avian adenovirus (for example the Tipton strain) and is usually simultaneously accompanied by other immunosuppressive diseases such as Infectious Bursal Disease or Infectious Anaemia.

- There are 12 known serotypes of avian adenoviruses that may be involved in the development of this disease.

Transmission

- Egg transmission is an important factor.
- Horizontal transmission from bird to bird by contact with droppings.
- Once the bird becomes immune, the virus can no longer be isolated from the droppings.

Species affected

- Chickens, turkeys and pheasants and possibly other birds can be affected by avian adenovirus.

Clinical signs

- Chickens with inclusion body hepatitis are affected at usually 5 to 7 weeks of age.
- The birds are listless, with ruffled feathers.
- Mortality is usually quite severe, up to 25% in the first 10 days of the disease.

Internal lesions

- Affected chickens have mottled livers, many with pinpoint necrotic and haemorrhagic spots.
- Pale bone marrow and, in some cases in presence of Infectious Anaemia, gangrenous dermatitis can be seen.
- Kidneys are pale and swollen.
- The spleen is usually quite small (atrophy).
- If Gumboro disease (Infectious Bursal Disease) has been present in the birds, even if sub-clinical, the Bursa of Fabricius will be very small (atrophic).
- Such chickens are immune-suppressed and usually have more severe cases of inclusion body hepatitis and/or infectious anaemia.
- Mature birds do not have clinical signs of adenovirus infection, they only start showing antibodies in their blood.

Diagnosis

- Typical mottled livers with pin-point lesions, pale bone marrow and kidneys, small spleen and bursa are good indications of the disease.
- Histological examination (intranuclear inclusion bodies) of liver and/or virus isolation are helpful means of diagnosis.

Treatment and control

- No treatment exists.
- Antibiotics can be used to prevent secondary bacterial infection and possible gangrenous

dermatitis.

- The best method of control is to ensure adequate immunity against other immune suppressive diseases (e.g. Infectious Bursal Disease).
- Breeder chickens may be vaccinated with live vaccine, followed by inactivated oil-emulsion vaccine application before egg production begins.
- This procedure ensures adequate maternal immunity against IB disease in the offspring which assists in preventing inclusion Body Hepatitis.



Bronchitis

Cause

- Corona-virus is the causal agent.
- Several different serotypes of IB virus are known to exist.

Transmission

- The virus is transmitted from bird to bird through the airborne route.
- The virus can also be airborne between chicken houses and even from farm to farm.

Species affected

- Only chickens are susceptible to IB virus.

Clinical signs



- In young chicks IB-virus infection causes a cheesy exudate in the bifurcation of the bronchi, thereby causing asphyxia, preceded by severe respiratory distress ("pump handle" breathing).
- In older birds IB does not cause mortality.

- Respiratory signs include wet rales, gurgling, and wheezing.
- Egg production will decrease dramatically, deformed eggs with wrinkled shells will often be laid.

Internal lesions

- Mucus and redness in tracheas froth in airsacs in older chickens.
- In young chicks a yellow cheesy plug at the tracheal bifurcation is indicative of IB

infection.

Diagnosis

- There are three main factors to be considered in order to arrive at a diagnosis
- The clinical picture including post-mortem findings in the flock.
- Isolation of the virus In the laboratory.
- Rising antibody titre when the serum is tested against a known strain of bronchitis virus.

Treatment and control

- There is no treatment for Infectious Bronchitis.
- Secondary bacterial infections may be prevented by, or treated with antibiotics.
- Prevention by vaccination is the best method to control.



Infectious Bursal Disease (IBD, Gumboro Disease)

Cause

- The disease is caused by a birna virus of serotype.
- Virus strains can be divided in classical and variant strains.
- The virus is very stable and is difficult to eradicate from an infected farm.

Transmission

- IBD virus is very infectious and spreads easily from bird to bird by way of droppings.

- Infected clothing and equipment are means of transmission between farms.

Species affected

- Chickens and turkeys appear to be natural hosts.

Clinical signs



- Clinical IBD occurs usually between 4 and 8 weeks of age.
- Affected birds are listless and depressed, pale and huddling.
- Mortality varies usually new cases of IBD have a mortality rate of about 5 to 40% but can be as high as 95% depending on the pathogenicity of the strain involved.

- In subsequent infection on the same farm, mortality is lower and eventually, with successive attacks, there is no mortality noted.
- The sub-clinical form caused by the immunosuppressive effect of the IBD virus is now of more economic importance in that the immune system of the bird is damaged.
- In broilers this form of the disease results in bad performance with lower weight gains and higher feed conversion ratios.

Diagnosis

- In acute cases the Bursa of Fabricius is enlarged and gelatinous, sometimes even bloody.
- Muscle haemorrhages and pale kidneys can be seen.
- Infection by variant strains is usually accompanied by a fast bursal atrophy (in 24-48 hours) without the typical signs of Gumboro disease.

Also in chronic cases the bursa is smaller than normal (atrophy). The bursa destruction is apparent on histologic examination.

- The lack of white blood cells (lymphocytes) results in a reduction in the development of immunity and decreased resistance of the birds to other infections.
- Typical signs and lesions are diagnostic of IBD.
- Histopathological examination, serology and/or virus isolation are helpful tools. IBD can be confused with sulfonamide poisoning, aflatoxicosis, and pale bird syndrome (vitamin E deficiency).

Treatment and control

- No treatment is available for IBD.
- Vaccination of parent breeders and/or young chicks is the best means of control.
- The induction of a high maternal immunity in the progeny of vaccinated breeders is the most effective approach to successful IBD control.



Chronic Respiratory Disease (CRD) (Airsacculitis)

Cause

- The underlying cause of CRD is *Mycoplasma gallisepticum* (Mg). The condition is frequently triggered by respiratory viruses such as NO and 18 and subsequently complicated by bacterial invasion.
- The main agents involved in the infection are *Mycoplasma gallisepticum*. Stress caused by moving the birds, by de-beaking or other operations or other unfavourable conditions e.g. cold or bad ventilation, make the birds more susceptible.

Transmission

- The main problem is that parent birds infected with *Mycoplasma gallisepticum* can transmit the organism through the egg to their offspring.
- In addition, infection can occur by contact or by airborne dust or droplets. The incubation period varies from 4 days to 3 weeks.

Species affected

Chickens and turkeys.

Clinical signs

- Young chickens (broiler chicks or layer pullets) will show respiratory distress. The birds frequently show a lack of appetite, decreased weight gain and increased feed conversion ratios.
- In adult birds the most common symptoms are sneezing, coughing and general signs of respiratory congestion. In laying birds a drop of egg production between 20-30% can occur.
- CRD does not normally cause an alarming number of deaths. The effect is more of a chronic nature causing reduced weight gain and feed conversion ratios in broilers and lower egg production in breeders and layers. In this way the overall economic loss can be very great in broilers but less dramatic in breeders and layers.

Internal lesions

- A reddish inflamed trachea and/or cheesy exudates in airsacs, especially in complicated cases (e.g. with secondary *E. coli* infections) are observed. In mild Mg infections the only lesion might be slight mucus in trachea and a cloudy or light froth in the airsacs.

- Turkeys with Mg infection usually have swollen sinuses under the eyes.

Diagnosis

- Diagnosis of Mg infection can be made by blood testing of chickens, post-mortem examination and ultimately by isolating the causative Mg organism from tracheas or airsacs of affected birds.

Differential diagnosis

- Respiratory virus infection (Newcastle disease or Infectious Bronchitis) with secondary infection (E. coli, etc.) can give similar lesions.

Treatment

- Treatment of Mg-infected chickens or turkeys with suitable antibiotics or chemotherapeutics has been found to be of economic value.
- However, control by medication or vaccination and eradication of Mg infections has been by far the most effective method of combating the disease.
- Fertile eggs from infected birds can be treated with antibiotics such as tylosin to eliminate the Mycoplasma gallisepticum organisms.
- Methods used are the injection of fertile eggs or egg dipping.
- Blood serum testing of breeder chickens for Mg antibodies has become a routine to test flocks for a Mg infection.



Coccidiosis

Cause

- Coccidiosis is caused by protozoa, unicellular parasites.
- In chickens there are 9 different species of coccidia of which the main 5 are *Eimeria acervulina*, *Eimeria necatrix*, *Eimeria tenella*, *Eimeria maxima*, *Eimeria brunetti*.

Transmission

- Infected droppings, containing oocysts of coccidia are the main means of transmission between birds.
- The incubation period is 4 to 6 days.

Species affected

- Chickens have their own specific coccidiosis types, which do not cross-infect other bird species.

Clinical signs/Diagnosis

Coccidiosis can be divided into 2 groups.

1. The caecum is involved (Caecal coccidiosis)

- Mainly caused by *E. tenella* in chickens up to 12 weeks.
- Mortality may run as high as 50%.
- Infected birds are listless, have bloody droppings, a pale comb and show a lack of appetite.
- Laboratory examination will show haemorrhages in the caecal wall.
- After severe bleeding a core will be formed in the lumen.

2. The small intestine is involved (small intestinal coccidiosis) Caused by *E. acervulina*, *E. brunetti*, *E. maxima*, *E. necatrix*.

E. acervulina



- *E. acervulina* is not normally very pathogenic, but in some cases considerable mortality may be seen.

- Birds infected show loss of weight, combs may be shrivelled and a drop or even cessation of egg production in layers may be seen.
- At necropsy, haemorrhagic lesions of *E. acervulina* are seen throughout the upper portion of the affected intestine and also grey or whitish patches may be present.

- May affect birds of any age.

E. brunetti



- May affect birds of any age.
- E. brunetti is definitely pathogenic, in severe infections
- Mortality can be high. Birds infected show emaciation and diarrhoea.
- At necropsy a white cheese-like material is found in the lumen of the lower intestine and rectum.
- The caeca and cloaca are inflamed. The gut wall is thickened.

E. maxima



- May affect birds of any age.
- E. maxima is less pathogenic than E. acervulina, necatrix and brunetti, mortality is generally low.

- Diarrhoea, loss of weight and a drop in egg production of layers, will be seen; bloody droppings are common.
- At necropsy the lower portion of the small intestine is dilated and the wall is thickened; the gut is filled with thick mucus, greyish, brownish or pinkish in colour.

E. necatrix



- Mainly in chickens up to 4 months of age.
- E. necatrix is very pathogenic.
- Infection with E. necatrix may result in a two stage clinical outbreak of coccidiosis.
- In the acute stage mortality may be high in the first week after infection.
- In the chronic stage blood may be seen in the droppings, the birds are listless and lose weight.

- In layers a drop in egg production will be observed.
- At necropsy the middle portion of the intestine is affected, haemorrhage will be seen.
- The unopened intestine looks spotty, white areas (schizonts) intermingled with bright or

dull red spots (haemorrhages) will be observed.

Treatment and control

- This is most appropriate in the case of coccidiosis as there is no disease group in poultry where both control and treatment are employed more.
- The well-established principles of good management and husbandry are of basic importance.
- It is common practice to include low levels of chemotherapeutics in the feed of birds.
- These chemicals are referred to as coccidiostats and as such keep in check the development of the parasites so that a pathological situation does not develop.
- It should, however, be taken into account that coccidia can develop a resistance to all chemicals so far used for this purpose and for this reason it is necessary to change from one chemical to another periodically.
- Treatment of infected flocks may be carried out by the administration of coccidostats at a higher therapeutic level to the affected birds.
- There are certain products available which are specifically designed for treatment and which are not satisfactory for prevention.
- These chemicals are sometimes referred to as coccidiocidal agents. Whenever administering these products, particular attention should be paid to the dosage recommendation of the manufacturer.



Coryza

Cause

- The bacterium causing this disease is *Hemophilus paragallinarum*.

Transmission

- The disease spreads from bird to bird and flock to flock by contact and airborne infected dust particles and via the drinking water.
- Spread by equipment and personnel has also been reported.
- The incubation period varies from 1 to 3 days.

Species affected

- Chickens appear to be the only natural hosts of *H. paragallinarum*

Clinical signs



- The main signs of the disease are inflammation of eyes and nose with foul-smelling discharges, conjunctivitis, sneezing and facial swellings.
- Feed and water intake is reduced, leading to loss of weight.

- Egg production in laying birds will drop.
- Mortality will vary with the virulence of the infection but is generally low.

Diagnosis

- A field infection produces similar symptoms to Chronic Respiratory Disease, a diagnosis is difficult to establish.
- The most certain diagnosis may be obtained by the isolation of organism from the sinus or airsac exudate from affected birds.
- Procedure must be carried out in the laboratory.

Treatment and control

- Treatment with antibiotics can be given to subdue clinical infections but eradication and prevention are the most desirable means of control of coryza.
- Vaccines have been developed, but are only used in areas where the disease is endemic and cannot be eradicated.



Egg Drop Syndrome 1976 (EDS '76)

Cause

- The disease is caused by an avian adenovirus (strain BC14, virus 127), the EDS virus does not belong to any other 12 fowl adenoviruses.

Transmission

- The virus is transmitted through the egg to a few birds in a flock, these birds carry the virus until the flock comes into lay at which time they begin to excrete virus and infect birds kept in the same house.
- Horizontal spread through infected litter can and does occur once a flock shows the disease but it seems that the virus is not very infectious or the level of virus excretion is low.

Species affected

- Only chickens are susceptible to clinical disease due to EDS virus; however, the virus is widespread in ducks but does not cause any problems.

Clinical signs

- EDS '76 affects only layers and breeders at the start of or during their egg production.
- Affected flocks show a failure to reach peak egg production or a drop in egg production accompanied by an inferior eggshell quality and in the case of brown eggs, a loss of shell colour.
- Affected birds may also appear to be anaemic, may show transient diarrhoea and sometimes the food intake may be reduced.
- No increased mortality or other symptoms are observed.

Internal lesions

- No specific internal lesions have been observed.

Diagnosis

- Clinical signs provide the diagnosis for EDS '76.
- Virus isolation and antibody tests can confirm this.

Differential diagnosis

- Infectious Bronchitis and to a lesser extent Newcastle disease and Infectious Laryngotracheitis will have to be considered.

- Proper diagnostic tests such as the antibody tests will eliminate doubt.

Treatment and control

- There is no treatment against Egg Drop Syndrome 1976.
- Vaccination with an inactivated vaccine before point of lay is the only available, effective, method for the control of EDS '76.



Endoparasites

- Worms living in the intestines of chickens fall mainly into four categories.
- Roundworms (Ascarids), usually 5 to 7 cm (2-3 inches) long.
- Hairworms (Capillaria), only measure 1-1.5 cm long.
- Caecal worms (Heterakis), usually 1.5 cm long.
- Tape worms, usually 7 to 10 cm long, consisting of many small segments.

Clinical signs

- Mature roundworms are not a major cause of disease, but the larvae can damage the intestinal lining, causing enteritis, anaemia, decreased egg production and at times eggs with pale yolks.
- Capillaria cause more damage to the intestinal lining and can cause enteritis and anaemia with decreased egg production and the appearance of pale egg yolks ("Platinum yolks")
- Caecal worms are found in the caeca and do not cause disease, except that their eggs can transmit blackhead – mainly in turkeys.
- Tape worms are infrequently found and do not cause serious damage, except that they use the nutrients of the host chicken.

Diagnosis

- Examination of the intestinal contents will reveal roundworms, caecal worms, and tape worms without difficulty.
- Capillaria can usually be found when intestinal contents are washed through a fine mesh sieve.

Treatment and control

- Roundworms and caecal worm infections can be treated with piperazine.
- Piperazine is not effective against tape worms and capillaria for which other anthelmintics are required.



Avian Encephalomyelitis (AE) Or Epidemic Temor

Cause

- Avian Encephalomyelitis (AE) is caused by an enterovirus belonging to the picornavirus group.

Transmission

- Egg transmission is the major route of transmission of AE virus.
- Infected breeders will transmit the AE virus for several weeks and cause a decrease in egg hatchability.
- Infected chicks that hatch will show clinical signs of the disease and spread the infection in the incubator to other newly hatched susceptible chicks.
- Young chicks can also be infected on the farm.
- The incubation period varies from 5 to 14 days depending on the route of infection.

Species affected

- Primarily chickens are susceptible to AE, but turkeys and pheasants have been reported as natural hosts.

Clinical signs

- The disease is mainly seen in young chicks, between 1 and 3 weeks of age.
- Affected chicks sit on their hocks, do not move well, and many fall on their sides.
- A fine, rapid trembling of the head and neck can be seen, but especially felt when affected chicks are held in the hand.
- In laying and breeding flocks, AE virus infection causes a marked drop in egg production, which returns to normal in about 2 weeks.
- Mortality in naturally infected chicks varies and can be as high as 75%.

Diagnosis

- Clinical tremors in chicks, together with a drop in production and hatchability in the parent breeders, is indicative of AE infection.
- Chicks will not have gross lesions, but histological examination of brain, proventriculus and pancreas reveals typical lesions of AE.
- This will also differentiate the diagnosis of AE from encephalomalacia (vitamin A deficiency, crazy chick disease).
- Laboratory testing of blood serum from breeder flocks, or their hatching eggs, can determine if an infection occurred.

Treatment and control

- Preventive vaccination of breeder pullets with live AE vaccine before egg production is

the only effective means of AE control.

- If a breeder flock has not been, or has been inadequately, vaccinated against AE and an outbreak occurs, it is advisable to stop hatching eggs from the flock for several weeks until the breeders have acquired immunity and no longer transmit AE virus through their eggs.



Fowl Cholera (Pasteurellosis)

Cause

- Fowl cholera is caused by a bacterium: *Pasteurella multocida*. (several serotypes)

Transmission

- Transmission of fowl cholera is mainly from bird to bird by water or feed contamination.
- Rodents (rats and mice) also appear to play role in contamination of water and feed with *Pasteurella multocida*.

Species affected

- Chickens, turkeys, game birds and other bird species are susceptible.

Clinical signs



- Affected birds are depressed and have decreased appetite.
- Egg production will drop 5-15% and mortality will be high in acute fowl cholera.
- Birds that die from acute fowl cholera frequently have bluish combs and wattles.

- Chronic fowl cholera will not cause high mortality, although there will be an increase in deaths.
- Swollen wattles is a feature of chronic fowl cholera.

Internal lesions

- Gross lesions in acute cases are mainly internal haemorrhage and congestion of liver, spleen and kidneys.
- In chronic fowl cholera cheesy exudates can be found between the intestines, and on liver and heart.

Treatment and control

- Treatment with appropriate antibiotics or chemotherapeutics can be successful in halting mortality and restoring egg production.
- However chronic carrier birds have been found in flocks of chickens after treatment.
- If clinical fowl cholera, with mortality, reappears in such flocks, one must treat again.
- Rodent control is also very important to prevent reintroduction of the infection.

- Vaccines, both inactivated bacterins as well as live vaccines are available.



Fowl Pox (Avian pox; Avian diphtheria)

Cause

- Fowl Pox is caused by a poxvirus.

Transmission

- Introduction of infected or "carrier" birds in a susceptible flock will cause an outbreak by direct contact and water or feed transmission.
- Mosquitoes and other flying insects can also transmit the virus from bird to bird and also transmit the disease to nearby flocks.
- The incubation period varies from 4 to 20 days.

Species affected

- Chickens, turkeys, pheasants and pigeons can be affected by different fowl poxvirus strains.

Clinical signs

- The lesions of Fowl Pox can be external (mainly on the head) or internal ("wet pox") in the mouth, oesophagus and/or trachea, they can also be found on other parts of the body (skin of legs, cloaca etc.).



- The lesions on the head, combs, and wattles are usually wart-like in appearance, yellow to dark brown in color.
- The internal lesions in the mouth, oesophagus and/or trachea are yellow-white and cheesy in appearance.

- Affected birds will be depressed, lack appetite and when "wet pox" is present they breath laboriously.

Mortality

- Mortality is variable, from a low 1 to 2%, when slight head lesions are present, to over 40% when the diphtheritic form ("wet pox") is more prevalent.
- Reduced egg production can be observed in laying birds, this will return to normal in a few weeks.

Diagnosis

- Wart like lesions of the head particularly of the comb and around the eyes or yellow cheesy lesions of the mucous membranes of the nasal and buccal cavities are suggestive of Fowl Pox.
- A definitive diagnosis can be made in a diagnostically laboratory by histological examination (inclusion bodies) or virus isolation in embryonated chicken eggs.

Treatment and control

- It is difficult to treat affected birds.
- Treatment of local lesions with disinfectant and/or removal of the diphtheritic membranes from the throat to improve respiration has been practised.
- Preventive vaccination using a live vaccine is by far the most successful control method.
- Even when an outbreak of Fowl Pox has been diagnosed, it is advisable to vaccinate the flock immediately to stop further spread of the infection.



Loose Droppings In Poultry

- Loose droppings in poultry are not a strange or a new phenomena. This usually occurs in various conditions such as,
- High salinity in drinking water or high salt content in the fish
- High fiber or molasses content in the feeding stuff and
- Enteritis.
- The above situations can be tackled by setting right the causative factor or administer a suitable anti-diarrhoeal agent.
- There is one more "Loose Droppings" phenomena particularly in "young layers" with high production.
- There is no apparent reason for this loose droppings and even the salt, fiber adjustment or using of anti-biotics or chemotherapeutic does not give any desired results.
- The reason being that this is a physiological diarrhea.
- When the production is high the oviduct jerks backwards pushing the formed egg towards the cloeca for laying.
- Since the alimentary canal is situated just beneath the oviduct the rate of peristaltic moments are increased resulting intestinal "Hurry" and loose watery faecal matter resulting in loose droppings.
- This watery droppings phenomena when continued for long the farm becomes a breeding centre for number of bacterial and parasitic infections with formation of Ammonia gas, worms, maggots and obnoxious stink.
- The entire farm will be under a bad sanitary condition with poor bio-scrutiny rendering the birds more susceptible for diseases and other stress conditions including opacity of the cornea due to ammonia liberation.
- Various compounds that work on the 10th cranial nerve were tried including Atropine and Belladonna alkaloids.
- The results with alkaloids were good but with serious side effects.
- Due to the inhibition of the "Vagus" the digestion got disturbed as sufficient enzymes were not liberated.
- Further due to the dilation on egg laying, some other compounds inhibited the peristalsis and also movements of the uterus as they are working on the smooth muscles of the internal organs effecting the laying and also recorded shall less eggs.
- Screening of old compounds resulted in finding out Pot.
- Phenolanamide, which is only an intestinal sedative that reduces the peristaltic moments with out disturbing the endogenous liberation of digestive enzymes or dilation of the pupils disturbing the photoperiodism and the Hormonal secretion (FSH & LSH) and stimulation.
- There was no other adverse effect on Liver, Kidney, Lungs, Heart or Production to the best of our knowledge and no other side effects, ill effects or after effects.



Malabsorption Syndrome

- This complex disease has been reported under various names such as helicopter disease, femoral head necrosis, brittle bone disease, infectious proventriculitis, pale bird syndrome, running disease and stunting disease.

Cause

- The malabsorption syndrome appears to be a disease complex involving avian reoviruses and other viral and bacterial agents which may affect the digestive system resulting in nutritional and deficiency signs and lesions.

Transmission

- Only circumstantial evidence is present at the moment to indicate that the causal organism(s) may be vertically transmitted.
- Horizontal transmission also seems to play a role on infected sites.

Species affected

- Chickens and possibly turkeys.

Clinical signs



- The main signs of the disease are inflammation of eyes and nose with foul-smelling discharges, conjunctivitis, sneezing and facial swellings.
- Feed and water intake is reduced, leading to loss of weight.

- The disease is mainly observed in broiler flocks. Many affected broiler flocks have a history of diarrhoea, beginning as early as a few days of age and lasting until 10-14 days of age.
- Light or dark brown, foamy droppings can be found with undigested food particles. Several affected broilers in a flock may exhibit mal-positioned feathers, especially on the wings.
- Early rickets with extreme paleness of legs and heads can be observed. Encephalomalacia is also regularly found.
- At a later age (5-6 weeks) osteoporosis becomes clinically evident, frequently unilateral causing the birds to limp.
- Later an important effect is the delayed growth of the affected birds. Mortality is variable and in general as low as 4%.

Diagnosis

- The clinical disease is characterized by one or more of the Following lesions: enteritis with watery brown and foaming contents and the presence of undigested food in the intestine.
- Mucosal and submucosal proventricular lesions. Pancreatic inflammatory infiltration with degenerative changes have been found.
- Osteoporosis and osteomyelitis, femoral head necrosis whereby the bone of the epiphysis of the femur is unusually soft.
- Since the causal agent may differ it is difficult to base a diagnose on virus isolation or serology.

Treatment and control

- Treatment is impossible, vaccination against reovirus in the breeders helps to reduce problems in the progeny.
- Strict hygienic and sanitary measures will reduce the incidence



Newcastle

Cause

- Newcastle disease is caused by a paramyxovirus.
- Only one serotype is known.
- ND virus has mild strains (lentogenic), medium strength strains (mesogenic), and virulent strains (velogenic).
- The strains used for live vaccines are mainly lentogenic.

Transmission

- Newcastle disease virus is highly contagious through infected droppings and respiratory discharge between birds.
- Spread between farms is by infected equipment, trucks, personnel, wild birds or air.
- The incubation period is variable but usually about 3 to 6 days.

Species affected

- Chickens and turkeys.

Clinical signs

- Newcastle disease causes high mortality with depression and death in 3 to 5 days as major signs.
- Affected chickens do not always exhibit respiratory or nervous signs.
- Mesogenic strains cause typical signs of respiratory distress.
- Laboured breathing with wheezing and gurgling, accompanied by nervous signs, such as paralysis or twisted necks (torticollis) are the main signs.
- Egg production will decrease 30 to 50% or more, returning to normal levels in about 2 weeks.
- Eggs may have thin shells and eggs without shells may also be found.
- In well-vaccinated chicken flocks clinical signs may be difficult to find.

Internal lesions

- Inflamed tracheas, pneumonia, and/or froth in the airsacs are the main lesions.
- Haemorrhagic lesions are observed in the proventriculus and the intestines.

Diagnosis

- Is made by virus isolation from tracheal or cloacal swabs together with blood testing to demonstrate high antibody levels.
- Infectious bronchitis or infectious laryngotracheitis can give similar clinical signs, but lesions, blood tests, and virus isolation tests are decisive.

Treatment and control

- There is no treatment for Newcastle disease.
- Vaccination against ND with live and/or inactivated (killed) adjuvant vaccines is the only reliable control method.



Pullorum Disease And Fowl Typhoid

Cause

- Pullorum disease is caused by a bacterium, *Salmonella pullorum*.
- Fowl typhoid is caused by *Salmonella gallinarum*, which is related to, but not identical to, *S. pullorum*.

Transmission

- Pullorum can be transmitted by infected (carrier) breeder hens through their eggs.
- Chicks that hatch from such infected eggs will have typical pullorum disease (white diarrhoea) and high mortality.
- Infected chicks can also infect other chicks via droppings.
- Fowl typhoid is more a disease of adult chickens, with high mortality and morbidity.
- Horizontal transmission is important with fowl typhoid through infected droppings, dead bird carcasses, and infected clothing, shoes, utensils and other fomites.

Species affected

- Chickens, pheasants, ducks, geese and guinea fowl can contract both pullorum and fowl typhoid.

Clinical signs

- Pullorum in chicks causes typical white bacillary diarrhoea, with pasted cloacas and high mortality.
- Infected adult breeders do not have clinical signs of the disease but have internal lesions in the ovary (mis-shaped, dark coloured follicles).
- Fowl typhoid in adult chickens causes listlessness and sulfur- coloured diarrhoea.
- The birds have generalized infection with swollen livers, spleens, and kidneys and haemorrhages in such tissues.
- Mortality is usually high: 25 to 60%.

Treatment and control

- Treatment of pullorum disease will not bring about a cure and is undesirable from a standpoint of eradication.
- It is far more practical to control the disease by elimination of infected carrier breeder hens.
- Blood testing of breeder chickens by the serum plate or tube agglutination test with suitable *S. pullorum* antigen will detect infected carrier birds, which can then be culled.
- Such control measures will stop the incidence of egg-transmitted pullorum disease.
- If hatching eggs from tested pullorum-free breeders are kept free from contamination through infected eggs from infected breeders or through contaminated incubators, or through other contaminated equipment, chickens can remain pullorum-free.

- Treatment of fowl typhoid with drugs like sulfonamides, tetracyclines, or furazolidone, has been more or less successful however, infected carriers may remain after treatment.
- The best control method is eradication of infected birds.
- Breeder flocks should be blood tested with antigen for typhoid.
- The typhoid carriers can then be eliminated.
- Vaccination for fowl typhoid with a special *S. gallinarum* (9R strain) has been practised in several countries, but it should be discouraged in breeders when an eradication programme is in operation.



Infectious Synovitis

Cause

- This disease is caused by *Mycoplasma synoviae* (Ms)

Transmission

- The major mode of transmission of Ms is vertical (egg) transmission from Ms-infected breeder hens.
- Horizontal transmission from bird to bird and by infected equipment, clothing, shoes, egg boxes and other fomites.

Clinical signs and gross lesions

- Vary from a symptomatic infection to mild respiratory signs, airsacculitis and synovitis, an inflammatory swelling of the joints of legs and wings and inflammation of the sternal bursa ("breast blisters").
- Creamy exudate in joints extending into tendon tissues is indicative.
- Airsacculitis with frothy to cheesy exudates in the airsacs can be found, especially if secondary infection with *E. coli* is present.

Diagnosis

- Blood serum testing for specific Ms antibodies with Ms antigen and the findings of specific lesions are indicative of Ms infections.
- Isolation of the causative Ms organisms is decisive for diagnosis.

Differential diagnosis

- *Staphylococcus* arthritis can also cause swollen joints with a creamy exudate sometimes extending into the tendon sheaths.
- Viral arthritis/tenosynovitis can also cause swelling of joints and tendon sheaths, but the exudate is more watery or blood-tinged, unless secondary *Staphylococcus* infections occur.

Treatment and control

- Ms infections can be treated with antibiotics with variable degrees of success (tetracycline, erythromycin, tylosin, tiamulin).
- However, control of Ms has been largely successful by blood testing of breeder chickens and elimination of positive Ms reactors.



Viral Arthritis / Tenosynovitis

Cause

- Viral arthritis/tenosynovitis is caused by an avian reovirus.

Transmission

- The virus may be transmitted by droppings from bird to bird.
- Egg transmission is also a factor when breeder flocks become infected during egg production.
- Reovirus is a common inhabitant of the intestines of birds and not all strains are pathogenic.

Species affected

- Chickens, turkeys and possibly pheasants are natural hosts.

Clinical signs

 <p>Swollen Hock joint</p>	<ul style="list-style-type: none">• The first signs of viral arthritis/tenosynovitis are usually observed in broiler breeder chickens between 6 and 10 weeks of age.• The birds are reluctant to walk and when forced up have a painful, trembling gait.• A distinct swelling of the tendons of the shanks and also above the hock joint can be observed.
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Internal lesions

- The hock joint may be somewhat swollen, but usually not as severely as with *Mycoplasma synoviae* or *Staphylococcus* infections.
- Upon opening the legs the tendons usually appear discolored, brown or blood-tinged, with straw coloured fluid between them.
- Ruptured tendons may occur and, in older broiler breeders (29-30 weeks old), one may feel a hard scarry knot in the tendon above the hock joint. When the infection is complicated by Ms or *Staphylococcus* the fluid may appear yellow and creamy.
- In commercial egg-laying breeds of chickens, the disease is not .as common as in broiler breeders and broilers.

Diagnosis

- Leg problems in broilers or broiler breeders associated with swelling of shank tendons or tendons above the hock joint sometimes accompanied by ruptured tendons, are indicative of viral arthritis/tenosynovitis.
- A positive blood test with the agar gel precipitaton (AGP) test is of some value as an indication of exposure to reovirus, but does not constitute proof of diagnosis.
- Histopathological examination of affected tissues and isolation of virus from such tissues are needed for a definite diagnosis.

Treatment and control

- Viral arthritis/tenosynovitis cannot be treated successfully, but antibodies are of help in preventing secondary bacterial infections, particularly Staphylococcal infections.
- Vaccination of broiler breeders with certain live and inactivated vaccines to ensure maternal immunity in their offspring appears to be of benefit to the birds themselves.



Vitamin D3 Deficiency (Rickets; "Rubber legs")

Clinical signs and gross lesions



- Young chickens, 2 to 5 weeks of age, with Vitamin D3 deficiency are unable to stand and have very soft, pliable, legs and beaks.

- The rib joints are swollen like beads and curved inward, the breastbone often twisted.
- In layer chickens, Vitamin D3 deficiency causes soft-shelled eggs and a drop in production.

Treatment and control

- Vitamin D3 can be given as treatment, usually in combination with calcium and phosphorus.



Vitamin E Deficiency (Crazy Chick Disease; Encephalomalacia)

- Clinical signs and gross lesions
- Vitamin E deficiency in chickens affects the brain, causing degeneration, oedema and haemorrhage, especially in the small brain (cerebellum).
- Affected young chicks appear unable to walk, they fall on their sides or stand with their heads between their legs.



- The main signs of the disease are inflammation of eyes and nose with foul-smelling discharges, conjunctivitis, sneezing and facial swellings.
- Feed and water intake is reduced, leading to loss of weight.

- The cerebellum shows gross swelling, with yellow or brown discolouration and pinpoint haemorrhages may be observed.
- Encephalomalacia can also be found in mature chickens.

Treatment and control

- Adequate levels of Vitamin E and selenium in the diet of chickens and their parent breeders is of prime importance.
- Treatment of affected birds with Vitamin E preparations (alpha- tocopherol) is effective if

the condition is not too far advanced.

Marketing of poultry products in India - An Analysis

- Marketing plays an important role in the economic system of a country .It ensures full and complete flow of products continuously from the centres of production to the centres of consumption.
- A complete and continuous flow of products from the producers to the consumers contributes to the maintenance of high level of economic activity.
- Efficient marketing of poultry products is a strong bridge between production and consumption.
- It contributes to the avoidance of cyclical fluctuation like boom and depression and in the promotion of economic activity.
- Importance of poultry marketing Efficient and effective marketing of poultry products is essential to provide reasonable returns to rural producers, which they find it extremely difficult to get from small poultry units.
- Marketing of poultry products involves all the functions and processes taking place soon after bird lays egg.
- Various marketing functions are performed continuously.
- The poultry marketing provides gainful employment to millions of people and thereby increases income of the people.
- Effective marketing of poultry products enhances the in demand for poultry products, thereby creating employment opportunities to rural masses.
- It also improves the income level and standard of living of poultry farmers. Amino acid, fatty acid, vitamins, minerals etc are essential for the growth and maintenance of physical existence.
- These vitamins and minerals are rich in egg and poultry meat.
- Poor people can easily obtain these nutrients at a lesser cost.
- Marketing of poultry products makes available the poultry products at the right time, right place, in right quantity and at right price.
- Poultry is marketed in the country in various forms and conveniences to suit consumers choice.
- The main stumbling block in the marketing of poultry and egg is its perishability.
- The Nutritional Advisory Committee of India has recommended half an egg daily, per person, for maintenance of normal health.
- To meet this recommended consumption requires more than 99,000 million eggs per year.
- Thus, by marketing the poultry products throughout the country, malnutrition can be avoided.
- But, in India, there exists no such efficient and organised market.
- Now, the planners have to be attentive on the development of adequate arrangements for marketing of eggs and other poultry products.

Marketing System of Poultry Products

- Presently, there is no network for marketing of eggs and poultry products.
- Poultry marketing is predominantly in the hands of private traders and commission agents operating in various metropolitan cities and other leading towns.

- As commented by Chandan S.S.I, the wholesale trade of eggs in big cities of the country is in the hands of a few traders who have monopolized this trade to their own advantage resulting in neither the poultry farmers getting proper remuneration of the produce, nor the consumer getting egg at reasonable rate.
- According to a study made in 15 states, over 60 to 70 per cent of the population consume less than the minimum requirement of protein and calories, leading to imbalance in protein and calories and consequent health problems, especially in growing children.
- In order to keep away the spectre of malnutrition, an organized poultry marketing is very essential.
- Organized marketing system contributes to the rise in the standard of living on the society by identifying the needs of the society, which would ensure required supply of poultry products in the country.
- Above all, it ensures supply of essential nutrients required to every individual to keep the ideal body.

Channels of Distribution

- Nearly 75 per cent of the total poultry products are being sold through various channels of distribution, as a result, consumers pay more money while producers get less margin.
- A major share of consumer's rupee goes to middlemen.
- The present channels of distribution of poultry products in the Indian poultry market are:
 1. Producer- Consumer
 2. Producer -Wholesaler -Retailer- Consumer
 3. Producer -Collector -Assembly Merchant - Consumer
 4. Producer- Retailer
- Consumer Major portion of eggs and meat are marketed through the above indicated Channel No.2.
- Direct marketing is much better than all other channels (No.1), wherein, both farmers and consumers are benefited.
- In Channel No.4, about 12 to 15 per cent of consumer's rupee is shared by the retailers.
- While in Channel No.2, about 26% of the consumer's rupee is shared by middlemen.

Organizational Structure of Poultry Marketing

- There are two private sector organizations, which represent the poultry community.
- These organisations are:
 1. National Egg Co-ordination Committee (NECC)
 2. Agro-corpex India Limited
- At the central level, we have National Agricultural Co-operative Marketing Federation which is operating in many parts of the country.
- Many a state government also have organisations operating with similar objectives, e.g., MAFCO, MAPDEC, TAPCO etc.
- All these institutions can work together for common objectives.

- A state of mutual trust and mutual dependence can be created through inter-linking representations.
- For example, NECC can have representatives of these organisations in its executive committee: Agro-corpex can have some of these people in its board of directors, and, similarly, these institutions can have some representatives of NECC and Agro- corpex in their governing bodies also.
- Such an arrangement will give rise to uniformity in their objectives and a symbolic relationship.

