

POULTRY FARM MANUAL

A Reference Guide for Central & State Poultry Farms



**DEPARTMENT OF ANIMAL HUSBANDRY
DAIRYING AND FISHERIES**

MINISTRY OF AGRICULTURE AND FARMERS WELFARE

GOVERNMENT OF INDIA

Krishi Bhawan, New Delhi - 110 001

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2014-15



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Department of Animal Husbandry, Dairying & Fisheries,
Ministry of Agriculture and Farmers Welfare,
Government of India, Krishi Bhawan, New Delhi - 110 001

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Disclaimer:

Utmost care has been taken in compiling this Manual mainly drawing from the actual practices followed in Central Poultry Development Organisations (CPDOs). However, many general guidelines or SOPs practiced, in the poultry sector, both public and private, and pictures etc. have been drawn from various publications, literature, and online available material, some of which might not have been referred inadvertently or because proper reference / citation were not available.

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सत्यमेव जयते

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Government of India

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FOREWORD

It is reasonably well established and generally accepted that the Livestock Sector and Poultry have a major role to play in providing safe and healthy animal food/ protein for our growing population. The real challenge is to do this sustainably.

This is where the four Central Poultry Development Organizations (CPDOs), located in four regions of the country at Chandigarh, Bhubaneswar, Hessarghatta (Bengaluru) and Mumbai have a clear role to play. These CPDOs are our apex poultry farms, responsible for providing good quality low-input technology stocks and training to trainers and farmers in good poultry practices.

In this backdrop, there was a dire need for a Poultry Farm Manual, encompassing relevant Technical and Administrative activities and processes, to serve as a Reference Guide for not only our CPDOs but also State Poultry Farms. Some of the general tenets on breeding, feeding and nutrition, biosecurity, vaccination etc. may also be useful for entrepreneurs, students, academicians and other stakeholders. Many portions of this Manual are dynamic in nature and will need continual updating as per changing technological and farming practices and as per evolving requirements of trade, food safety, environment and pollution norms. This manual is therefore to be seen as a beginning. Congratulations for this outstanding effort are due to the team of officers and scientists of the Department and CPDOs under the leadership of Shri Sanjay Bhoosreddy, Joint Secretary.

(Anup Kumar Thakur)



सत्यमेव जयते

संयुक्त सचिव
भारत सरकार
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PREFACE

The publication of this Poultry Farm Manual, would act as a Reference book for all Poultry Farms in public sector including Central Poultry Development Organizations (CPDOs). We have planned the Manual broadly in three parts: History & Planning, Technical and Administrative. The Technical Portion is applicable to most of other public sector farms besides CPDOs.

We have structured the History & Planning with anamnesis and vignettes of the CPDOs with future strategic planning; The technical part of the manual is a comprehensive document encompassing General Management, Breeding, Nutrition and Feeding, Feed Analysis, Hatchery Management, Health, Biosecurity, Training & Extension components. The disaster management chapter is just indicative and needs to be developed over time. The latest updates on Biosecurity guidelines including application of HACCP principles have been incorporated in this Manual.

The breeds and disease chapters have been attempted as a visual guide. We have also included the Central Poultry Performance Testing Center SOPs and protocols for Stock Testing- Layers and Broilers. The appendices give valuable information on maintenance of Records- List, Infrastructure Plan, Stock position Records, Trainee records, Costs and Prices, Post-Mortem format, Hatchery record Acts and Policies and Committees details etc.

The next section on Administration and Planning (including Establishment & Accounts) is envisaged with various information and documents on Organizational Set-up, Duties & Responsibilities, RRs, Delegation of Financial Powers, various Rosters, Service Books record details, Leave maintenance record, Store-keeping records, Tender Process followed (e-tendering), Machinery and Equipment inventory, etc.

Each of these chapters, it is felt, can be developed into full-fledged Manual but we are restricting the same so as not to make it formidable and more user-friendly. We further intend to add on newer developments germane to the poultry sector and your valuable feedback would be welcome


(Sanjay Bhoosreddy)



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ACKNOWLEDGEMENT

This Poultry Farm Manual could be compiled due to inputs from many persons, who through their contributions, have put in the hands-on knowledge and field experiences so as to make this Manual more practicable.

I would like to specially mention Dr. A. Arun Kumar and Dr. Sujit Nayak for their dogged determination in compiling and editing this Manual with great care and enthusiasm.

Special thanks go to all those who gave their valuable technical inputs like Dr. Ravvi Kumarr, Dr. Bandi Kumar Mallik, Dr. P. S. Mahesh, Dr. Bharti Singh, Dr. S. Ganesan and Shri A. Gaffar.

Preparation of this Manual would not have been possible without the cooperation and hardwork of my team and all hands assisting them in providing and compiling all the valuable inputs.

Special acknowledgement is due to Dr. P.K.Shukla, Professor & HOD, DUVASU, Mathura for sparing his time in designing the chapters, proof reading and also for his invaluable inputs to this manual.

I look forward to continued concerted efforts of all in further evolving this Manual.

(P. Blahwar)
Joint Commissioner (Poultry)

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LIST OF ABBREVIATIONS USED

| | |
|-----------|---|
| AI | Avian Influenza |
| AIA | Acid Insoluble Ash |
| ANF | Anti Nutritional Factor |
| BIS | Bureau of Indian Standards |
| CAC | Codex Alimentarius Commission |
| CARI | Central Avian Research Institute |
| CF | Crude Fibre |
| CP | Crude Protein |
| CPBF | Central Poultry Breeding Farm |
| CPCB | Central Pollution Control Board |
| CPDO | Central Poultry Development Organization |
| CPDO & TI | Central Poultry Development Organization & Training Institute |
| CPIO | Central Public Information Officer |
| CPPTC | Central Poultry Performance Testing Centre |
| CPTI | Central Poultry Training Institute |
| CTIPPM | Central Training Institute of Poultry Production & Management |
| DADF | Department of Animal Husbandry Dairying and Fisheries |
| DPR | Directorate of Poultry Research |
| EMI | Emergency Management Institute |
| FAO | Food and Agricultural Organization |
| FEMA | Federal Emergency Management Agency |
| GMP | Good Manufacturing Practices |
| GOI | Government of India |
| HACCP | Hazard Analysis Critical Control Point |
| ICAR | Indian Council of Agricultural Research |
| IPEMA | Indian Poultry Equipments Manufacturers Association |
| ISO | International Organization for Standardization |

| | |
|--------------|--|
| KAU | Kerala Agricultural University |
| ME | Metabolizable Energy |
| MoEF/MoEF&CC | Ministry of Environment and Forests & Climate Change |
| NIHSAD | National Institute of High Security Animal Diseases |
| NIR | Near Infrared Spectroscopy |
| NSP | Non Starch Polysaccharides |
| OIE | Office International des Epizooties |
| PCC | Pollution Control Committee |
| PMES | Performance Monitoring and Evaluation System |
| PPE | Personal Protective Equipment |
| QMS | Quality Management System |
| RDDL | Regional Disease Diagnostic Laboratory |
| RFAL | Regional Feed Analytical Laboratory |
| RFD | Result Framework Document |
| RIR | Rhode Island Red |
| RPE | Respiratory Protective Equipment |
| RRS | Reciprocal Recurrent Selection |
| RSLTU | Random Sample Laying Test Unit |
| RSPPTC | Regional Sample Poultry Performance Testing Centre |
| RTI | Right to Information |
| SOP | Standard Operating Procedure |
| SPCB | State Pollution Control Board |
| TA | Total Ash |
| TANUVAS | Tamil Nadu Veterinary and Animal Sciences University |
| TPI | Technical Project Institute |
| WHO | World Health Organization |
| WLH | White Leghorn |

SECTION - 1

FARM HISTORY AND FUTURE PLANNING

Poultry rearing has always been an integral component of livestock production system in India. Poultry production in India has taken a quantum leap in the last four decades, emerging from an entirely unorganized and unscientific farming practice to a commercial production system with state-of-the-art technological interventions. Indian commercial poultry sector has advanced remarkably due to a scientific approach adopted by the industry and an enabling environment created by the Government. The Indian Poultry Sector is broadly divided into organized and unorganized sub-sectors. Needs for each of the sub-sectors are very different. Government of India is catering to the needs of each of the sub-sectors through development programs of Poultry Development and for entrepreneurship development. Central Poultry Development Organizations are playing a pivotal role in the coordination and dissemination of these developmental programs of the Government.

1. FARM HISTORY

The genesis of the Central Poultry Development Organizations (CPDOs) located at Chandigarh, Bhubaneswar and Mumbai, Central Poultry Development Organization & Training Institute, Bangalore and Central Poultry Performance Testing Centre, Gurgaon is briefly described as follows:

1.1. Regional Poultry Farms

1.1.1 During the first Five Year Plan a modest beginning towards commercial poultry-keeping was made in the First Plan (1951-55) with the launching of a pilot project in Odisha. The Odisha pilot project developed into an all India Poultry Development Programme during the Second Plan (1956-60) which marked the first large scale organized effort to lay the foundation of modern poultry farming in the country. Three Regional Poultry Breeding Farms at Hessarghatta (Bengaluru), Bhubaneswar and Bombay (Mumbai) were set up on regional basis to acclimatize the genetically superior stock imported in 1956 from America under the Technical Cooperation Mission and introduce them in different regions.

1.2. Central Poultry Breeding Farm, Chandigarh

1.2.1 This Organization was initially set up by the Punjab Government for the development of poultry in the state during 1963. After the reorganization of Punjab state on 1.11.1966, this institute came under the control of Chandigarh Administration in the name of Poultry Project, Chandigarh. It was further taken over by the Ministry of Agriculture, New Delhi on 1.4.1978 from the Chandigarh Administration under its direct administrative control and it was given the name of Central Poultry Breeding Farm, Chandigarh.

1.3. Central Poultry Breeding Farms

1.3.1 From 1973, the Regional Poultry Farms were renamed as Central Poultry

SECTION - 2

INFRASTRUCTURE PLAN

The demand for modern poultry infrastructure in India is fuelled by an increase in the size of the poultry farms. Previously poultry farms had production of only a few hundred birds (200-500 chickens) per cycle. However presently, poultry units with fewer than 5,000 birds are an exception with the majority of the farms breeding more than 500,000 birds. Similar is the case with layer poultry farms.

The Indian poultry equipment market is estimated at hundreds of millions of dollars and estimated to grow at 10 percent annually. Another factor that provides substantial stimulus to the poultry machinery industry is the rapid growth of the poultry processing industry. With increasing demand for quality poultry products, the adoption of better machinery to ensure quality has become very important to the Indian poultry units.

Barring a few items like egg graders, poultry processing equipment etc. most of the equipment are available / produced in the country. India is almost self-sufficient in indigenous production of most of the basic equipment like hatchers/ incubators, feeders, poultry houses, even environmentally controlled & pre-fabricated houses etc.

1. Basic tenets of Poultry farming

- 1.1 The location and design of the farm shall comply with the State Pollution Control Board.
- 1.2 The farm shall not be located at least 100 meters from any major water drinking source and 500 meters from any other livestock / poultry farm enterprise
- 1.3 The farm should be fenced with barbed wire/ concrete boundary wall upto height of 8 feet with appropriately secured entrance and outlet.
- 1.4 The farm shall raise green belt all round with minimum of two rows spaced apart of not more than 3 meters.
- 1.5 Proper drainage / outlet for collection and discharge shall be provided for storm runoff / waste discharges (possibly explore the tenet of rain water harvesting).
- 1.6 No obstruction shall be created for any water course within the farm or outside the farm boundary.

2. Basic tenets of Poultry housing

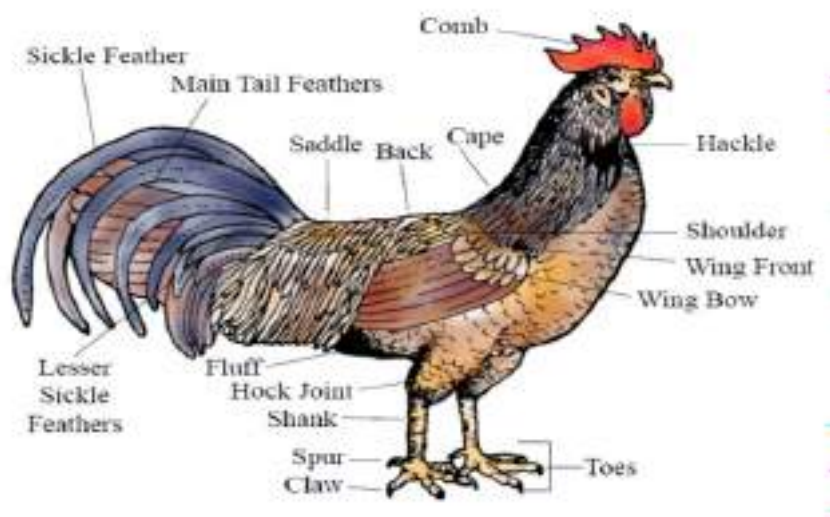
- 2.1 Shall be located on a fairly raised and properly drained site not liable to flooding.
- 2.2 The long axis of the house faced east-west direction, to avoid direct sunlight in areas which experience heat and draught in most part of the year. The long axis to be North-South if the farm is located in cold region
- 2.3 Length depends on number, type of birds and system of rearing. Width not to exceed 9m or 30ft) to avoid ammonia accumulation in the shed.

SECTION - 3

GENERAL MANAGEMENT

Poultry production is highly dynamic in terms of structural and management changes. In today's business environment, faster the ability to adapt to the changing system requirement, faster is the growth. However sustainability often requires dependence on other sectors like feed/ingredient inputs and processing facilities. In India, poultry sector growth may be attributed to many factors like rising incomes and a rapidly expanding middle class, together with the emergence of vertically integrated poultry producers that have reduced consumer prices by lowering production and marketing costs. Integrated production, market transition from live birds to chilled and frozen products, and policies that ensure supplies of competitively priced corn and soyabean are keys to future poultry industry growth in India. Further, disease surveillance, monitoring and control will also decide the fate of this sector. Concurrently, India's unorganised and backyard poultry sector is also one of the potent tools for subsidiary income generation for many landless/ marginal farmers and also provides nutritional security to the rural poor.

PARTS OF A ROOSTER



1. PREPARATION OF SHED BEFORE BROODING

- 1.1 Spray an insecticide just after the old birds have been removed.
- 1.2 Remove all the non-stationary equipment and residual feed from troughs and bins.
- 1.3 Eliminate all rodents and wild birds if any.
- 1.4 Remove all the manure, litter, feathers, cobwebs, dust, and any other organic materials by scrapping with hard brush.
- 1.5 Remove all weeds and rubbish from the area outside the house, burn feathers, etc.
- 1.6 Remove dust/ feathers from wire mesh, crevices, cracks, cages and floor using flame gun.



SECTION - 4 BREEDS

Definition of breeds vary and has been debated extensively. Largely we adopt the following version:

Breeds are either

- (a) *a sub-specific group of domestic livestock or birds with definable and identifiable external characteristics that enable it to be separated by visual appraisal from other similarly-defined groups within same species; or*
- (b) *a group for which geographical and/or cultural separation from phenotypically similar groups has led to acceptance of its separate identity.*

1. INDIGENOUS CHICKEN

| Breed | Habitat | Characteristics |
|---|----------------|---|
| Aseel  | Andhra Pradesh | <p>A game bird known for its pugnacity, high stamina, majestic gait and dogged fighting qualities. Small but firmly set pea comb. Bright red wattles and ear lobes. Long and slender face devoid of feathers.</p> <p>Comb type: Pea Plumage colour: Red/ Black Skin colour: Yellow Egg shell colour: Brown Avg Annual production: 92 Avg Body wt.: Male 4 kg Female 2.59 kg</p> |
| Ankaleshwar  | Gujarat | <p>Small single combed bird well known for its hardiness but is poor in productivity</p> <p>Comb type: Single & Rose Plumage colour: Yellow with black strips Skin colour: Yellow Egg shell colour: Light Brown Avg Annual production: 81 Avg Body wt.: Male 1.8 kg Female 1.58kg</p> |

SECTION - 5

BREEDING MANAGEMENT

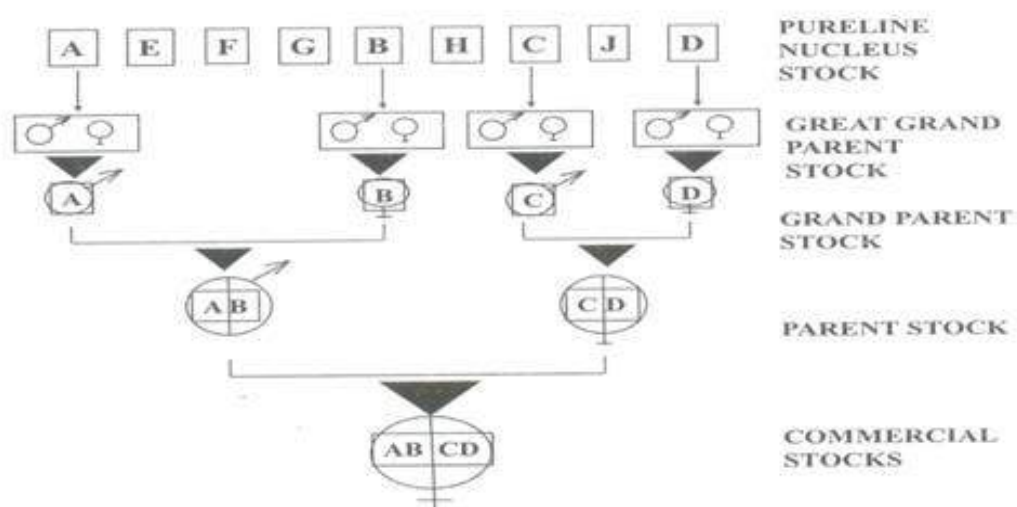
1. BREEDING SCHEMES

The production of commercial chicks does not happen by chance, but is the outcome of systematic and time consuming scientific breeding. Breeding is a never-ending search for perfection. Success in any breeding programme depends on the way a breeder exploits the natural variation in birds for making a proper selection of stock chosen for crossing. It takes approximately eight years to breed, select and develop a new genetic line, to rigorously test it under different condition and to launch it as a new commercial product.

2. GLOSSARY OF BREEDING

- 2.1 **PURELINE** is basic stock which produces hybrid, when crossed with other line or breed. Pure line and also produce multiplication of stock, grandparent and parent when mated according to a scheme.
- 2.2 **GRAND PARENT** are the pure line bird basically, but cannot be utilized either to produce pure line or grand parents, they can only produce parents.
- 2.3 **PARENT** can produce only commercial hybrid in specific combination with another line or breed.
- 2.4 **COMMERCIALS** are final hybrid reared either to produce egg or chicken.
- 2.5 **NONE** of the stock can physically recognized, the utility of grand parent, parent, commercial, is limited by the economical age of the birds and have to be produced from predecessor generation stock.

Flow Diagram Showing the Set Up of a Breeding Organization



SECTION - 6

NUTRITION AND FEEDING

Poultry convert feed into food products quickly and efficiently. Their high rate of productivity results in relatively high nutrient needs. Poultry require the presence of at least 38 nutrients in their diets in appropriate concentrations and balance. The minimal nutrient needs for poultry are derived from experimentally determined levels after an extensive review of data. Criteria used to determine the requirement for a given nutrient include growth, feed efficiency, egg production, prevention of deficiency symptoms, and quality of poultry product. These requirements assume that the nutrients are in a highly bioavailable form, and they do not include a margin of safety. Consequently, adjustments should be made based on bioavailability of nutrients in various feedstuffs. A margin of safety should be added based on changes in rates of feed intake due to environmental temperature or dietary energy content, genetic strain, husbandry conditions (especially the level of sanitation), and the presence of stressors including diseases and mycotoxins....



... Merck's Veterinary Manual

1 Forms of feed

- 1.1 Mash feed: Obtained by grinding and mixing of the raw materials. It is most commonly used feed, easy to prepare and economical
- 1.2 Pellet feed : Prepared by exposing the mash feed to heat treatment under pressure. The heat destroys the micro organisms and anti-nutritional factors in raw materials enabling the feed for better digestibility. This system of feed minimises the feed wastage.
- 1.3 Crumbles: the pellets are broken into granules. The feed preparation is little expensive compared to mash and pellets.

2. Feed ingredients used for Poultry

2.1 Energy Sources

| Ingredient | Quality for check | Adulterants | Toxins |
|---|--|------------------------------|--|
| Maize  | Moisture max. 10% Freshness, Colour, size, weevils, moldy odour. Thiaram pesticide | Cobs, cob dust, sand, silica | Citrinin, Aflatoxin  |

SECTION - 7

SAMPLING AND NUTRIENT ANALYSIS

Importance of nutrient analysis....

A nutritional deficiency may be due to a nutrient being omitted from the diet, adverse interaction between nutrients, or interaction between nutrients and specific anti-nutrients. The latter situations are difficult to diagnose, because on analysis the diet is found to contain a normal level of the nutrient under study. Micronutrients are often added to diets in the form of premixes, so it is rare to see classic individual deficiency symptoms—the effect is more commonly a compilation of many individual metabolic conditions. In many instances, a correct diagnosis can be made only by obtaining complete information about diet and management, clinical signs in the affected living birds, necropsies, and tissue analyses.

A diet that, by analysis, appears to contain just enough of one or more nutrients may actually be deficient to some degree in those nutrients. Stress (bacterial, parasitic, or viral infection, high or low temperature, etc) may either interfere with absorption of a nutrient or increase the quantity required. Thus, a toxin or microorganism, for example, may destroy or render unavailable to the bird a particular nutrient that is present in the diet at apparently adequate levels.

... Merck's Veterinary Manual

1. Sampling Procedures

1.1. General Requirement of Sampling

- a) In drawing preparing, storing and handling samples, care should be taken that the properties are not affected. The following precautions and directions shall be observed.
- b) Take samples in a protected place not exposed to damp air dust or soot.
- c) The sampling instrument shall be clean and dry when used.
- d) Protect the samples, the material being sampled, the sampling instrument and containers for samples from adventitious contamination.
- e) The samples shall be placed in clean and dry glass containers. The sample containers shall be of such a size that they are almost completely filled by the sample.
- f) Each container shall be sealed air-tight with a stopper or a suitable closer after filling in such a way that it is not possible to open and reseal it without detection, and marked with full details of sampling, date of sampling, batch or code number, name of the manufacturer and other imported particulars of the consignment.
- g) Sampling shall be stored in such a manner that there is no deterioration of the material.

SECTION - 8

GENERAL GUIDELINES FOR BIOSECURITY

(Basic Tenets can be applied to State Poultry Farms and Private Poultry Farms)

Biosecurity is an integrated approach encompassing policy and regulatory frameworks to analyze and manage risks in the areas of food safety, animal health, and plant health, including associated environmental risk. The liberalization of global trade in agriculture has brought in many challenges apart from opening up new avenues for growth and diversification of agriculture. Pests do not recognize geographical boundaries and liberalization of trade has opened new routes for entry of plant and animal diseases and pests through import of seeds/ planting material/ animal (livestock, poultry and aquatic) and animal products. Many of the pests have a potential to establish and to cause serious economic losses. Also, the invasions of ecosystems by invasive alien species, as well as the potential for bioterrorism demands that countries foster policies and develop technological capabilities to prevent, detect, and respond to incidents involving such acts.

1. Executive Summary

- 1.1. Biosecurity is an integrated approach encompassing policy and regulatory frameworks to analyze and manage risks in the areas of animal health and food safety, including associated environmental risk. The liberalization of global trade in agriculture since 90's has brought in many challenges apart from opening up new avenues for growth and diversification. Pests do not recognize geographical boundaries and liberalization of trade has opened new routes for animal diseases and pests through import of animal (livestock, poultry) and animal products. Many of the pests have a potential to establish and to cause serious economic losses.
- 1.2. An integrated biosecurity programme is an application on logical and sound principles specific to an enterprise, monitoring of disease status, evaluation of ongoing poultry farm operations on continuous basis with an objective to contain the diseases at bare minimum level.
- 1.3. The farms should strive to maximise the benefits achievable through effective biosecurity and to be consistent with HACCP (Hazard Analysis, Critical Control Points) principles which can be developed easily. For this, the CPDO&TI(SR), Hessarghatta may even design training modules and hold workshops based on demand from the States.
- 1.4. After lessons from Avian Influenza outbreaks at CPDO(ER), Bhubaneswar and CPDO&TI(SR), Hessarghatta and many other outbreaks across the country both in public and private farms, we must implement, as far as possible, an impeccable biosecurity plan to prevent any future disasters. These guidelines are proposed to

SECTION - 9

POULTRY HEALTH & DIAGNOSTICS

Animal health and human health are closely interlinked – more than sixty percent of the pathogens that cause diseases in humans originate from domestic or wild animals. In addition, both animals and humans are affected by, and affect, the environment in which they exist. Zoonotic pathogens may be transmitted to humans via food, through direct contact between animals and humans, or by other routes.

Further an unprecedented increase of movement of people and commodities worldwide, the increasing interactions of humans with the environment, deforestation, climate change and variability, urbanisation, the intensification of animal production in response to growing global demands for proteins of animal origin such as milk, eggs and meat, economic development, and the international trade in exotic pets are just some of the factors that have provided greater opportunity for transmission of pathogens between animal species and human .

The OIE seeks to strengthen activities aimed at consolidating the “One health” concept: it works in partnership with other world organisations to prevent, control and eradicate diseases existing at the interface between animals, humans and environment. It is therefore important to have a strategy which focuses on eradication at the animal source through the following key actions: early detection; early warning; rapid confirmation of suspects; rapid response; and rapid and transparent notification. It is therefore necessary to have a manual which outlines a harmonized approach to disease diagnosis by describing internationally agreed laboratory diagnostic techniques.

Poultry vaccines are widely applied to prevent and control contagious poultry diseases. Their use in poultry production is aimed at avoiding or minimising the emergence of clinical disease at farm level, thus increasing production. Vaccines and vaccination programmes vary broadly in regard to several local factors (e.g. type of production, local pattern of disease, costs and potential losses) and are generally managed by the poultry industry. In the last decade, the financial losses caused by the major epidemic diseases of poultry (avian influenza and Newcastle disease) have been enormous for both the commercial and the public sectors. Thus, vaccination should also be applied in the framework of poultry disease eradication programmes at national or regional levels under the official supervision of public Veterinary Services.

Various documents of OIE...

1. VACCINATION IN POULTRY

Vaccination is the inoculation of specific biological substance (antigen) to stimulate resistance or immunity to the birds against diseases







1.1. Types of vaccine

1.1.1. Live vaccines

- 1.1.1.1 Naturally occurring strains of micro organisms with low pathogenicity or attenuated strains.


SECTION - 10 POULTRY DISEASES VISUAL GUIDE

1. BACTERIAL DISEASES

| Name and etiology | Gross lesions | Post-Mortem lesions | Treatment & Control |
|---|---|---|---|
| <p>Fowl cholera</p> <p><i>Pasterulla multocida</i></p> <p>Common in adult laying flock</p> <p>Spread through contaminated feed and water</p> |   <p>Swelling of ear lobe/sinus</p> <p>Swollen wattles with cheesy exudate</p> <p>Ruffled feathers, bluish comb & wattle</p> <p>Difficulty in breathing</p> |     <p>Multiple necrotic areas in liver.</p> <p>Caseous exudates in sinus, wattles</p> <p>Intestinal haemorrhages, peritonitis</p> | <p>Enrofloxacin in water.</p> <p>Inj. Gentamycin in severe cases.</p> <p>Strict biosecurity, rodent control.</p> <p>Vaccination</p> |

SECTION - 11

ZONOTIC DISEASES OF POULTRY

| Diseases | Mode of Transmission to Human being | Signs in Human being | Risk control |
|--------------------------------|--|--|--|
| <p>Avian In-fluenza</p> | <p>Direct contact with infected birds, contact with surfaces contaminated with feces, oral or nasal discharge from infected birds.</p> <p>Contaminated litter and surfaces such as egg collection containers</p> <p>Eating raw or undercooked poultry and poultry products.</p>  | <p>Clinical signs — include fever, sore throat, cough, muscle aches, eye infections and pneumonia and severe respiratory infections.</p> <p>Diagnosis — Laboratory confirmation of the virus in patient samples</p> <p>Treatment — antiviral drugs and supportive care</p> | <p>Wear gloves, mask and protective clothing, disinfect well.</p> <p>In suspected or confirmed cases personal protective equipment should be worn, including a fit tested FFP3 respirator, protective coveralls, gloves, boots and eye protection.</p> <p>Contaminated equipment should be disinfected with an appropriate disinfectant.</p> <p>Antivirals can be given to reduce the risk of infection for people who have been exposed to avian influenza.</p> <p>Good occupational hygiene practices should be followed, especially washing with warm water and soap.</p> <p>Cuts and abrasions should be covered with waterproof plasters.</p> <p>Ensure high hygienic standards (at farm and in public)</p> <p>If the authorities proclaim a state of alert, follow all official warnings and indications – as a precautionary measure, avoid crowded places and unnecessary human contact such as shaking hands. Cover your mouth and nose when coughing or sneezing</p> |

SECTION 12

HATCHERY MANAGEMENT

There are certain basic tenets, which if followed, like frequent collection of eggs, point-down setting of egg, candling, setting eggs of same weight, shell thickness and quality monitoring, fumigation etc. which improve hatchability immensely. The indicators of sanitation and hygiene are also reflected in improved hatchability and quality of Day-Old-Chicks.

... observations of Shri. Sanjay Bhoosreddy, Joint Secretary (ANLM)

The design of the hatchery should take account of work flow and air circulation needs, with 'one way flow' movement of eggs and day-old birds and one way air flow in the same direction. The hatchery buildings should include physical separation of areas used for personnel changing, showering and sanitary facilities; receipt, storage and transfer of eggs; incubation; hatching; sorting, sexing and other handling of day-old birds; storage of egg boxes and boxes for day-old birds, egg flats, chick box liners, chemicals and other items; equipment washing; waste disposal; dining facilities for personnel; office space.

...Additional measures for hatcheriesOIE Terrestrial Animal Health Standards Commission / September 2011

The tables and figures in this section are indicative and local conditions and experience may require adoption of measures to achieve optimum hatchability / livability etc. This is broadly based on chickens (fowls) and necessary alterations are needed for other species. The micro-environment control in hatchery needs to be monitored closely.

1. Methods of hatching chicken eggs

1.1. Natural Incubation

1.1.2. Natural brooding by chicken

1.1.3. By using a natural heating source (e.g the sun)

1.2. Artificial Incubation

1.2.1. In an incubator (Setter and Hatcher)

1.3. The process of Artificial Incubation utilizes the principles of standard hatchery practices by all means to produce good quality and cost efficient chicks

2. HATCHERY OPERATIONS

2.1 The Standard Hatchery operations includes the following steps

2.1.1. HATCHING EGGS RECEIVING

2.1.2. FUMIGATION

2.1.3. GRADING, SELECTION AND TRAYING

2.1.4. STORAGE OF HATCHING EGGS IN COLD ROOM

2.1.5. LOADING IN SETTERS (SETTER ROOM MANAGEMENT)

2.1.6. TRANSFER TO HATCHERS (HATCHER ROOM MANAGEMENT)

2.1.7. CHICKS PULLOUT AND CHICKS ROOM

SECTION - 13

BIOWASTE MANAGEMENT

...Future of Bio-Wastes...

...The rapid expansion of poultry production has caused an increased production of poultry biowaste, i.e. (mainly) chicken manure. Improper use of chicken manure can result in pollution of air, soil and groundwater.

...Biowastes are eco-friendly to produce typical nanoparticles with well-defined chemical composition, size, and morphology. There are recent developments in the production of nanoparticles from biowastes e.g. eggs and shrimp peels etc.... Bioprocessing of nanoparticles from such resources with microbes such as bacteria, fungi and yeasts are being increasingly explored to meet the twin objectives of resource recycling and pollution mitigation.

... Nanoparticles from biowastes and microbes: Focus on role in water purification and food preservation...

by Mahgoub S. and Samaras P.

1.1 Poultry Farm Wastes

The wastes generated in Poultry farm are

- 1.1.1 Litter waste – Shed cleanout with poultry manure and bedding materials
- 1.1.2 Dead birds
- 1.1.3 Hatchery waste
- 1.1.4 Bio mass wastes like fallen tree leaves, twigs etc
- 1.1.5 Bio Medical wastes like syringe, needle, empty vials and other used chemical containers.

1.2. Management of Hatchery Waste

The waste from the hatchery can be classified as

- 1.2.1. Solid waste - Dead chicks, infertile whole eggs and shells from hatched eggs.
- 1.2.2. Liquid waste – Water used to wash down incubators, hatcher and chick room.

1.3. Separation of wastes

1.3.1 Solid wastes

- 1.3.1.1. Dry, very light shells in the hatcher can be removed by powerful suction vacuum.

SECTION - 14

DISASTER MANAGEMENT

Disaster management (or emergency management) is the effort of communities or businesses to plan for and coordinate all personnel and materials required to either mitigate the effects of, or recover from, natural or man-made disasters, or acts of terrorism. Disaster management does not avert or eliminate the threats, although their study is an important part of the field. Events covered by disaster management include acts of terrorism, industrial sabotage, fire, natural disasters (such as earthquakes, hurricanes, etc.), public disorder, industrial accidents, and communication failures.

1. Phases of disaster management



SECTION - 15

JAPANESE (DOMESTICATED) QUAIL MANAGEMENT

*Japanese quail (**Coturnix coturnix var japonica**) are the domesticated farm bred variety of quails. These are the smallest avian species farmed for meat and egg production. Quail probably the smallest avian species used for production of table eggs and meat. Because of prolific egg production and meat yield, it attains the status of viable commercial poultry enterprises. Quail has unique qualities of hardiness and adaptability to diversified agro-climatic condition. Several attributes of this species making it ideal for rural poultry production for creation of rural employment for solving gender issue in employment and to provide supplemental income and protein requirement to rural farmers.*

Quails are ground loving birds with little homing instincts, but also highly susceptible to predation. Therefore these need confinement rearing in enclosures or deep litter pens. Under the scheme of Government of India 'Assistance to State Poultry Farms' (ASPF) some farms have been assisted for Japanese quail stock production in the country. Central Poultry Development Organization (Western Region), Mumbai also maintains Japanese quails. First raised by CARI, Izatnagar as experimental poultry birds and subsequently improved germplasm and technical knowhow was supplied to a franchise for commercial exploitation in the country.



1. Quail probably the smallest avian species used for production of table eggs and meat. Because of prolific egg production and meat yield, it attains the status of viable commercial poultry enterprises. Quail has unique qualities of hardiness and adaptability to diversified agro-climatic condition. Several attributes of this species making it ideal for rural poultry production for creation of rural employment for solving gender issue in employment and to provide supplemental income and protein requirement to rural farmers.

1.1. SALIENT FEATURES OF JAPANESE QUAIL:

- 1.1.1 Low space requirement (5 – 6 adult quails can be reared in one sq. ft.)
- 1.1.2 Short generation interval (3 – 4 generations in a year)
- 1.1.3 Fast growth (170 – 190 gm body weight at 5th week)
- 1.1.4 Low feed consumption (550 – 600 gm of feed / bird up to 5th week)
- 1.1.5 Early maturity (egg production starts at 6 – 7 weeks of age)
- 1.1.6 High rate of egg laying (280 eggs in a year / bird)

SECTION - 16

DUCKS MANAGEMENT

*Domestic ducks (**Platyrrhynchos domesticus**) are decedents of wild mallard ducks. These are the first major component of the alternate poultry segment. Duck production in India is largely traditional enterprise among farming community. Free range and backyard duck keeping is normal practice. Night shelter is provided in the household and ducks are allowed to scavenge for themselves in the open, especially paddy fields. This is the reason while undertaking vulnerability mapping for Avian Influenza, paddy growing areas were juxtaposed with duck density data.*

Duck farming in the Central Poultry Development Organization (Southern Region) at Hessarghatta, Bangaluru is under closed high biosecurity system. This farm was developed in collaboration with United Kingdom in 1987 and is re-starting duck breeding program with new stock after complete de-population of the stocks in 2012.

1. Advantages of Duck farming

- 1.1 Ducks lay more eggs per bird per year than chicken.
- 1.2 The size of the duck egg is larger than hen egg by about 15 to 20 gms.
- 1.3 Ducks require lesser attention and thrive well in scavenging conditions.
- 1.4 Ducks supplement their feed by foraging. They eat fallen grains in paddy fields, insects, snails, earthworms, small fishes and other aquatic materials.
- 1.5 From commercial point of view, ducks have a longer profitable life. They lay well even in second year.
- 1.6 Ducks do not require any elaborate houses like chicken
- 1.7 Ducks are quite hardy, more easily brooded and more resistant to common avian diseases.
- 1.8 Marshy river side, wetland and barren moors upon which chicken or no other type of stock will flourish, are excellent quarters for duck farming.
- 1.9 Ducks lay 95–98% of their eggs in the morning before 9.00AM., thus saving lot of time and labour.
- 1.10 Ducks are suitable for integrated farming systems such as duck-cum-fish farming, duck farming with rice cultivation. In duck-cum-fish farming the droppings of ducks serve as feed for the fishes and no other feed or manuring of the pond is necessary for fishes (200-300 ducks per hectare of waste area). Under integrated duck farming with rice cultivation, the ducks perform four essential functions viz., inter tillage as they search for food, their bills loosen up the soil around the rice plants-weeding, insect control and manure application.

SECTION - 17

TURKEY MANAGEMENT

*Domestic turkeys (**Melegris gallopavo**), the descendants of Central and South American regions were introduced in the country possibly by Christian Missionaries. This a species introduced with specific market demand wherein they are catered mostly during Thanksgiving and Christmas seasons. However the scope is increasing over the years.*

Exotic germplasm viz. Beltsville – mini, medium and large are raised at research institutes, universities and government farms and some private organizations. Others like Bronze, White Holland, Bourbon Red, Narragansett, Black and Slate are also present but commercial production of broad-breasted white and Bronze alongwith Beltsville is more popular. Commonly raised stocks are non-descript native germplasm. Mainly raised for meat turkeys production is mostly carried in Tamil Nadu and Andhra Pradesh. In Uttar Pradesh turkey production is popular around Allahabad, Bareilly and Mirzapur regions. Earlier Turkey production failed to generate market demand but now it is no longer a festive food. Several states have well organized turkey production units e.g. Punjab, West Bengal, Tripura, Mizoram.

Evolved truly tropical regions, the locally available varieties have retained it ruggedness, self reliance and adaptability to harsh local environmental conditions. Turkeys are natural foragers and scavengers. These thrive past where they can roam about freely and generally do well with less management inputs. Turkeys walk swiftly rather than fly but successfully avoid predators.

1. Advantages of Turkey farming

- 1.1 Turkey can be produced round the year.
- 1.2 There is no religious taboo and consumed by all society.
- 1.3 Reared mainly for meat purpose and meat is leanest among other domestic avian species.
- 1.4 Turkey grows faster and marketed at 16-20 weeks of age.
- 1.5 As an alternate farming to chicken broiler and layer and a prospective micro entrepreneurial avenue.

2. Breeds of turkeys in India & CPDOs

Turkeys are not classified into breeds, however seven standard varieties are available, Bronze, White Holland, Bourbon red, Narragansett, Black, Slate, Beltsville small white. There are three varieties of turkey commonly available in India. White turkeys seem to be more suitable for Indian conditions.

SECTION - 18

GUINEA FOWL MANAGEMENT

*Guinea fowl or helmeted guinea fowl (*Numida meleagris galeata*) is an important and economic alternate poultry species. One of the most ancient birds, the guinea fowl is considered to have originated from South Africa from where it spread all over the continent, excluding desert regions, up to the Mediterranean sea. For a long period of time, the guinea fowl, and its eggs, was one of the main dish of the Africans. It can explain why this bird is more resistant to hot weather than the chicken. Guinea fowl were possibly introduced into the Indian sub-continent during the mediaeval centuries. Preliminary survey of guinea fowl showed its distinct popularity with marginal farmers and other vulnerable groups as small-scale poultry enterprise. The indigenous germplasm seems well adapted to the diversified agro-climatic conditions prevailing in semi-arid regions. In a natural environment, the guinea fowl is monogamous. Guinea fowl as per literature establishes its distinct popularity with marginal farmers, tribes and pastoralists, which may be attributed to its inherent hardiness and excellent foraging potentials to go as animal component of biomass-based polycultural systems. In recent years this alternate poultry species witnessed increasing emphasis for low-input grain-saving aviculture (LISA). It is hard to distinguish between the male and the female since they both have the same plumage. Majority of guinea fowl are raised in semi-arid pockets of Punjab, Uttar Pradesh, Bihar, Rajasthan, Madhya Pradesh, Maharashtra, Saurashtra, Karnataka, Andhra Pradesh, Orissa and Tamil Nadu.*

1. Advantages of Guinea Fowl farming



As a diversified variety, guinea fowl has the potential for landless labourers and marginal farmers of arid and semi arid region due to its hardy nature as a tool to lift their socio-economic status.

Possess excellent foraging capabilities with unique ornamental value. They act as bioinsecticides and bioweedicides. Guinea fowls are used as a watch dog in protecting the farm flock from intruders and predators by its loud, harsh, cry and its pugnacious disposition. Guinea fowls are extremely good runners which help them to escape from predators. Hard egg shell provides minimum breakage and long keeping quality. Hard and are disease- resistant.

Tolerate weather extremes fairly well after they are fully feathered and can be suitable to any agro- climatic conditions. Input requirements are low. Consumes all non- conventional feed stuffs. Has natural tolerance to Aflatoxin.

Guinea fowl meat is rich in vitamin and low in cholesterol.

SECTION - 19

POULTRY PERFORMANCE TESTING

The idea of random sample testing (RST) in animal breeding was first proposed by Hagedoorn (1927), who advised its use for laying competitions in Holland as an alternative to entering group of pullets pre-selected for higher egg production by the breeders. Hagedoorn's proposal incorporated all essential aspects of random sample testing collection of a representative sample of the breeders' stock in the form of hatching eggs by an independent person on the breeder's premises. Hatching and rearing of all entries at the testing station, drawing the required number of pullets for the laying competition randomly from each breeder's entry and uniform treatment of all entries throughout the test. It was another twenty years before Hagedoorn's idea was put into practice when the first random sample egg laying test was established in California in 1947. The following 15 years showed a rapid increase in the number of testing stations both for egg laying and broiler stocks in United States and Canada.

.....W. Hartmann (1985). Random Sample Poultry Tests—Their Development and Present Status in European Countries. World's Poultry Science Journal, 41, pp 153-159. doi:10.1079/WPS19850014.

1. Objective

- 1.1. To assess the potentiality of performance of egg and broiler production of the genetic stocks of chicken developed by public and private sectors for commercial purpose.
- 1.2. This is being achieved by conducting Random Sample Test under uniform environmental conditions, standard management practices and scientific randomization techniques.

2. Mission

- 2.1 To provide necessary information about the performance of various Layer, Broiler and Low Input stocks available in the country.
- 2.2 To provide guidance to poultry breeders regarding relative merits of various economic traits of the stocks in different agro climatic conditions.
- 2.3 To help in establishing norms regarding various production traits.

3. Usefulness

The tests thus serve the farmers, entrepreneurs and scientists by providing information about the production potentiality of various stocks available, the relative economic advantages to enable them to choose the stock, evaluate the merits of stock developed by them, assessing thereby the comparative success of the poultry breeding technique followed by them.

SECTION - 20 MACHINERY & EQUIPMENT

1. WATERING SYSTEMS



Manual drinker



Automatic drinker



Nipple drinker (in deep litter)



Nipple pipeline (in enclosures)

2. FEEDING SYSTEMS



Manual feeder pans



Automatic pans

(as shared by Indian Poultry Equipment Manufacturer's Association-IPEMA)

SECTION - 21

TRAINING & EXTENSION

Extension and Training plays a pivotal role in disseminating new technologies and development pertaining to Livestock Sectors including Poultry. It is imperative to capacitate the Target group viz, farmers/unemployed Youth/SGHs and NGOs before they are given any developmental programmes related to sustainable livelihood options in order to uplift their economic condition. In addition the said target groups need to be exposed to the new ideas about the Livestock Sector as a commercial venture. During the process of Capacity Building, attitudinal changes among the farmers is also felt necessary which enable them to become proactive and self esteemed to act as producers of the goods. Given the fact, the Extension and Training Cell creates a platform to have a close interaction with the farmers/educated unemployed youth and expose them to the latest scientific advancement in the field of rearing productive livestock and poultry, thereby increasing their capacity for income generation and self employment opportunity for improving their standard of living. Beside this, the section has been putting its all efforts to build linkages between farmers and different functionaries for adoption of viable technology for their self-reliance through sustainable livestock development by conducting various Capacity/Skill Development Program.

1.1 Poultry farming plays a significant role in the economy of our country, particularly the rural backyard farming and micro entrepreneurial activity which envisages the BPL families to enable them to gain supplementary income and nutritional support. A technology backup and creating awareness through training programmes would empower entrepreneurship with appropriate knowledge and technical skills.

1.2. Mandate of training programme

- 1.2.1. Impart practical training programmes for rural farmers for awareness on poultry development programmes on regional basis.
- 1.2.2. Encouraging women farmers in groups to have hands on knowledge and demonstrations on poultry farming.
- 1.2.3. To promote entrepreneurship activity amongst unemployed youths on recent trends of poultry farming and thereby to create employment and generate revenue.

1.3. Target groups

Rural farmers

Unemployed youth

Micro Entrepreneurs (Marginal farmers)

Each batch of training is advised to have around 16.2% of SC, 8% ST and 30% women beneficiaries

SECTION - 22

RECORDS KEEPING

Record keeping helps keep track of both physical performance and expenses. It can aid in monitoring the progress of your flock. Records are important to the financial and also physical health of a business or operation. Efficient and profitable poultry operations are not guaranteed by good record keeping, but success is unlikely without them. Records are essential tools for management to maintain a successful flock. Record keeping involves keeping, filing, maintaining and categorizing inventory, financial, production and health information for one's flock. This can be accomplished by hand recording or by using computer software.

Record keeping is important. Records tell an owner or manager where the business/operation has been and the direction in which it is going. Records show the strength and weaknesses of the poultry operation. They provide useful insight to financial and physical stability for one's flock. If there are any shortcomings, records will show where adjustments can be made.

...adapted and modified from University of Maryland (Extension) website

1. Standard registers to be kept in Breeding Farms

1.1. Basic Registers

1.1.1. Attendance and Daily wages register

This register will cover the details of the employees, their attendance and wages paid to contract labour.

1.1.2. Building Register

This register will contain details of all the civil structures, its maintenance expenditure, and annual depreciation.

1.1.3. Equipment Register

Various farm equipment and machineries like feed mill, vehicles, cages, incubators, feeders, waterers etc. would be recorded in this register. The details of purchase of the equipment, repairs carried out would be recorded. The annual depreciation and actual post depreciation value for equipment would be taken to the next year's record.

1.1.4. Feed and feed ingredient register

Few pages may be allotted for each feed ingredient. For each feed ingredient the details such as opening balance, receipts, issues, storage loss and closing balance would be entered. The source of purchase, invoice number and date and cost per unit may also be recorded. Remark on the quality of the raw material may also be indicated.

SECTION - 23 APPENDICES

1. POSTMORTEM REPORT FOR POULTRY

Name of the farm

Poultry necropsy No. :

Date & Time of making necropsy:

Reference :

Date, time and place of death :

Particulars of the bird :

Species: Breed: Type of bird: Commercial/ Breeder/
Broiler / Layer

Age: Sex : M / F Identification :Wing /Leg band No:
Colour:

History:

Total stock:

Mortality :

Pattern for last 7 days:
Percentage :

Signs :

NECROPSY FINDINGS

EXTERNAL EXAMINATION FINDINGS

1. Condition of the carcass :
2. Eyes :
3. Beak :
4. Feathers :

SECTION - 24

ADMINISTRATION AND PLANNING

A. ESTABLISHMENT & ACCOUNTS

1. ORGANIZATIONAL SET UP

A Model indicating the man power requirement (Technical and non-technical) to run a poultry breeding farm of about 2000-3000 GGP / GP capacity or to run a poultry farm keeping 50,000/- 1,00,000 commercial birds at a time in different traditional labour intensive, semi-automated and complete automated scenarios is presented below:

| Type of farm | Capacity | Manpower requirement | | | | | | | | |
|--------------|----------|----------------------|-------|-------|----------------|-------|-------|-----------|-------|-------|
| | | Traditional | | | Semi-Automatic | | | Automatic | | |
| | | T | NT | Total | T | NT | Total | T | NT | Total |
| Grand Parent | 2000 | 1 | 3 | 4 | 1 | 2 | 3 | 1 | 1*+0 | 2 |
| Parent | 2000 | 1 | 2 | 3 | 1 | 1 | 2 | 1 | 1*+0 | 2 |
| Grand Parent | 3000 | 1 | 4 | 5 | 1 | 2 | 3 | 1 | 1*+0 | 2 |
| Parent | 3000 | 1 | 3 | 4 | 1 | 1 | 2 | 1 | 1*+0 | 2 |
| Com. Broiler | 50000 | 1 | 10*+4 | 15 | 1 | 8*+4 | 13 | 1 | 6*+4 | 11 |
| Com. Layer | 50000 | 1 | 17*+4 | 22 | 1 | 14*+4 | 19 | 1 | 10*+4 | 15 |
| Com. Broiler | 100000 | 1 | 20*+6 | 27 | 1 | 14*+6 | 21 | 1 | 10*+6 | 17 |
| Com. Layer | 100000 | 1 | 33*+6 | 40 | 1 | 23*+6 | 30 | 1 | 16*+6 | 23 |

Source: Poultry Industry standards

1.1. An ideal manpower and their duties for Poultry Development Organizations (Central/ State) is given below

| S.No. | Post | Name of the Post | Duties / in-charge / manage |
|-------|------|--|---|
| 1 | 1 | Director | Overall in charge of the farm |
| 2 | 1 | Deputy Director / Manager | All farms, Feed plant & lab |
| 3 | 1 | Deputy Director / Manager | Hatchery, Business development and Training |
| 4 | 1 | Assistant Director / Farm Manager / Veterinary Officer | Farm – Chicken units |
| 5 | 1 | Assistant Director / Farm Manager / Veterinary Officer | Farm – Alternate species units |
| 6 | 1 | Assistant Director / Farm Manager / Veterinary Officer | Feed plant & Feed Lab |
| 7 | 1 | Assistant Director / Farm Manager / Veterinary Officer | Hatchery unit |
| 8 | 1 | Assistant Director / Farm Manager / Veterinary Officer | Training and Extension |
| 9 | 1 | Assistant Director / Farm Manager / Veterinary Officer | Business Development |

NOTES



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