

Review Article

Efficacy of controlled environment for poultry farming in Pakistan-A review

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Abstract

The poultry sector is an important and vibrant segment of agriculture in Pakistan with a significant contribution to the national GDP (1.3%). The main role of poultry consumption in improving per capita nutrients level is well documented. Further improvement would be possible by lowering the prices at the consumer level and by improving the profitability of producers. Poultry production raises, chickens, ducks, turkeys and geese to provide meat and eggs. In controlled sheds chickens are grown in extraordinary numbers. Chickens raised for eggs are known as layers, while chickens raised for meat are called grills. Commercial poultry production in Pakistan started in the 1960's and has been providing a significant portion of daily proteins to the Pakistani population ever since. Despite its important role in the country's economy, not a single scientific study is available on its evolutionary history. The data available in this regard are scattered and lack reliability. This review is an effort to encompass on the poultry and shed engineering system for overall growth of the poultry industry present and future directions and challenges. It will also guide poultry experts and policy makers for developing strategic planning for further growth of the industry.

Keywords: Chickens; Eggs; Poultry

Introduction

Poultry production

Poultry production in most creating work in the tropics depends primarily on rummaging frameworks, and it has been assessed that more than 80 % of the complete poultry is kept in customary family-based production frameworks. According to [1] in tropical countries like Pakistan village poultry in fact play very important roles for the communities. They can be used to support family income, to support local economy, provide village family with protein diet; eggs and meat and serve other purposes within the

communities. Furthermore, most of local communities' village chicken meat and eggs are more expensive compare to broiler and commercial chicken egg. There is an argument in a local community that local chickens have specific texture and taste, contain lower fat therefore they are preferred compare to the broiler. In term of marketing aspect, the indication above shows local chicken can be easily delivered to the local consumers. Although, local chicken plays a very significant role in almost all tropical areas and most importantly for rural communities. However, it is constrained by

many factors including: high mortality rate especially chicks age between 0-6 weeks and low productivity besides these the condition become even worse because the used of traditional management systems but it is believed that with better management productivity can be improved.

As indicated by [2] searching chickens additionally fill in as a proficient waste transfer framework, changing over extra grains and human nourishments and creepy crawlies into important protein food sources, for example, eggs and meat. They are likewise valuable for bug and weed control and providing natural manure for crops. Typically, four poultry management systems can be distinguished namely the free-range system or traditional village system, the back yard or subsistence system, the semi intensive system and the small scale intensive system. However, free range and back yard management system are the most popular managements used compare to the intensive and semi intensive. The free range management system is characterized by scavenging, no regular water or feed, poor night shelter and no vaccination program. In contrast, small scale intensive system work under improvements in overall husbandry conditions such as: balanced diets, vaccination against Newcastle disease, providing regular water and proper shelter.

Poultry production frameworks are anyway affected by certain variables which are; Types of Poultry (Birds), Housing, Socio-monetary foundation of the respondent, Health and illness, Feed source and nourishing, Sales and Disposal [3].

Where essential, meat feathered creatures and layers are given brilliant warming from the get-go in their lives, to keep up internal heat level. Hens might be saved in business wire confines in open sheds, or in sheds with wire sides to avoid wild feathered creatures, searching poultry and predators [4].

Poultry farming

Housing materials

Covers are produced in farm houses using different tools. Feathered creatures in the family rush are normally housed medium-term in sanctuary, and are let out toward the beginning of the day to scavenge during the day. On the off chance that no exceptional structure is given, the feathered creatures now and then having medium-term under the rancher's home. Where given, the normally simple house involves posts, a cover or scrap iron rooftop, and cover or scrap wire netting dividers. Feeders, roosts, consumers and home boxes produced using neighborhood materials are some of the time gave, and exceptional asylums of a wide assortment of plans and developments are once in a while used to house broody hens with chickens [5]. In business tasks, least ventilation is frequently rehearsed in colder atmospheres, yet not for the most part in tropical ones. In enormous scale computerized tasks, right air conveyance can be accomplished utilizing a negative weight ventilation framework. With more established winged creatures and in hotter temperatures, the approaching air is coordinated down towards the flying creatures, and keeps them cool. Evaporative cooling cushions can be set noticeable all around deltas to keep winged creatures cool in sweltering climate. Passage ventilation is the best ventilation framework for enormous houses in sweltering climate [6].

The point of the executives is to give the conditions that guarantee ideal execution of the winged creatures. Given sensible conditions, broody hens are extremely effective at bring forth their chicks, yet great hatchability utilizing fake brooding (both enormous and little) depends on cautious administration of temperature and moistness. The pace of water misfortune relies upon both the shell structure and the moistness of the air encompassing the egg. The nature of the bring forth likewise relies upon the age

and strength of the reproducer rush, and on the uniformity and neatness of the eggs set [7].

Poultry have regular and every day organic rhythms, two of which are interceded by light, especially day length. For day length to apply its controlling impact, there should be a dull stage (night) when light levels ought to be under 0.5 lux. Day length and light force during the raiser fowl's life have a significant job being developed of the regenerative framework. The distinction in day lengths and light forces between the raising and the laying stages is the chief factor answerable for controlling and animating ovarian and testicular improvement. The reaction to increments in day length and lighting power relies upon the body weight profile during raising, which thusly rely upon the nourishing system. The impacts of light are prevalently on the pace of sexual development and egg production [8].

Great administration rehearses that permit the recognizable proof and arrangement of issues. At the point when an issue is recognized, the following stage is to endeavor to fix it. Recognizing the reason for and fixing an issue is a significant piece of the rancher's information base, and is probably going to help with averting a repeat of the issue [9].

Free range poultry production

There has been a resurgence of enthusiasm for unfenced poultry farming as of late in created nations. Two additional criteria ought to be added to the above rundown; the common habitat be improved or ensured and item quality be kept up or upgraded. In view of these welfare criteria, the unfenced framework is viewed as the most adequate lodging framework for chick. In unfenced environments, the flying creatures display high energy, a firm and solid quill inclusion, warm red brushes and wattles. Fowls give regular indications of tranquility and solace, for example, dust and sunlight based

washing, extending wings and snout cleaning and trimming. Portable sheds are utilized in certain districts of Victoria. Wire floors empower droppings to treat the territory. These shelters are commonly utilized through grain ranchers between yields. Extra light is by and large not giving [9].

Flying creatures for unfenced assembly ought to have a superior feed change, solid fluff and not vulnerable to push. The choice against safety to pressure and plume pecking are a piece of a rearing system, requiring information recording and determination to be done in a situation that looks like the production condition as intently as conceivable to limit the danger of choice mistakes because of genotype and condition associations. To increase egg number, case shading and quality, the demonstrated testing strategies built up for every single business line are utilized all through and executed in the determination procedure. Improving feed admission and egg quantity yield in the primary third of the creation cycle is most basic quality blend in choosing winged creatures for natural agriculture [10].

Temperature effect in poultry houses

Vacillation in temperature frequently influences egg assembly of covers. As encompassing temperature decays, feed admission increments as the unfenced layer expends more vitality to keep up internal heat level [11]. This counteracts pressure brought about by any degree of hotness and empowers the winged creature to accomplish most extreme creation. Be that as it may, under unfenced conditions, fowls are presented to any temperatures, that impacts the presentation of winged creatures as well as the welfare.

Temperature of drinking water

During heat waves flying creatures will most likely be unable to have cool in asylum. To conquer this issue fogger can be utilized in concealed zones or under trees. Different alternatives in shelters remember the

utilization of protection for rooftops, irrigators on rooftops and utilization of fans to build air development around the winged creatures.

The Australian Code of Practice reported that the unfenced lodging office must be intended to guarantee satisfactory wind current and hotness controller at most extreme concentrations if fowls bunch or roost around evening time or during extraordinary climate conditions. Direction and dividing of structures is another significant thought to decrease the general warmth load. Planting trees around the office additionally gives conceal on structures and lessens the warmth load.

Removing flying creatures from confines builds human flesh consumption [12]. Albeit unfenced frameworks empower more noteworthy opportunity to express normal conduct, indecencies, for example, plume pecking, human flesh consumption and lost eggs keep on being an issue in unfenced [12]. A study of Dutch natural homesteads along with chickens indicated that half of the groups have extreme issues with human flesh consumption, 30% with reasonable issues and just 30% have no or scarcely any issues with quill tapping [12].

The utilization of soft supports in the house decreases the danger of plume pecking. The Blade winged creature has a little penchant to utilize the outdoor collection territory. Ranchers are commonly hesitant to attempt to build extend use, in spite of the fact that they are open to other administration alterations, similar to litter situation, food and diminishing the utilization of ringer kind consumers [13].

The measure of food essential changes with time and running circumstances, for example, the vitality price for keeping up internal heat level in winter. Expanding supplement thickness in valuable food can build the supplement consumption [14].

The measure of feed accessible for rummaging in connection to the conveying limit of the land zones and group elements over the various periods and agro-ecologies has not been evaluated [15]. The vitality and protein provided from the search assets, as decided from investigations of yield substance, were 12 MJ/kg and 9%, separately [15].

Disease control

Impermanence is great for unfenced hens in correlation by seriously stored flying creatures particularly during the initial to about two months of lifetime [16]. The significant purposes behind great impermanence is illness. Unfenced eggs are bound to be tainted by diseases than confined fowls and their eggs. These hens are vulnerable to the equivalent metabolic ailments influencing seriously kept flying creatures, however the earth can impact their seriousness and make the winged creatures helpless to disorders seldom found in confined layers [17].

There is a distinction in the commonness of ecto-, endo and haemo parasites between genders/periods of unfenced chickens [18]. This is additionally certain that the sex of the hens can impact the weights of *Heterakisbrevispiculum*.

Scientist reported a connection impact with the end goal that developing guys and grown-up females had measurably greater ($p < 0.05$) weights. Practically speaking, lopsided light force in the house will bring about flying creatures gathering in specific regions [19]. This will in general lead to the advancement of indecencies and sickness, especially breathing infection [20].

Meat

The presence and shade of meat is an essential value characteristic considered by buyers if settling on buy decisions. It has been understood that there is significant variety in shade of bosom filets of business

grills. Be that as it may, there is little data on shade of unfenced chicken meat [21].

Behavior of free range chickens

Scientists evaluated the lodging states of 65 hen houses utilizing this list framework. He reported that the profound litter framework accomplished least focuses, trailed by aviaries and unfenced frameworks. Ranches with both a secured run and unfenced scored most focuses.

Ongoing investigations display a progressive relationship among plume nibbling and egg assembly [22], demonstrating that a nonstop choice for higher efficiency brings about winged creatures having an expanding inclination to perform quill pecking except if safety measure is full to decrease it [23].

Scientist detailed a preliminary wherever little trees gave chickens a haven tie and assortment of nourishment counting foods grown from the ground trees. The spread in the external region brought about chickens investing extra energy outdoor [24]. In preliminaries with 15 breeds more human flesh consumption was noted in the home boxes with inclining floors contrasted with bunches with level spoiled homes. Apparently human flesh consumption was started because of the more fretful conduct of hens utilizing slanting homes [25].

Environment control

Climate regulation can accomplish through totally removing environmental interaction with building that can be improved by enshrining non-climate conditions from outside. Both poultry buildings require some method of ventilation to provide sufficient oxygen amount and removing carbon dioxide [6].

Transitional ventilation is used on a thermostat or temperature sensor and it is not necessary or desirable to remove heat while cooling by wind (tunnel). Tunnel ventilation use high-performance engines; the fresh air is "pulled" by the house in longitudinal path.

This is a low energy consumption displacement ventilation. The fresh air enters the house without mixing the stale air with it on a large surface.

There are four major parts of mechanical ventilation. For mechanical ventilation systems, fans are used to supply the energy needed in a poultry house each minute to exchange the desired air. For households of naturally ventilated farmers, additional heat is typically required during cold weather to maintain optimal indoor temperatures. To provide sufficient heat in the household's heaters are used. When heat rises overhead 850F (30°C), it is necessary to provide the birds cooling system with a comfortable environment. In the poultry houses there are four methods of cooling.

In the building, exhaust fans draw inbound air through a wet pad where surface moisture evaporation reduces inbound air. Fog in systems are often used to lower the shelter's heat. This converts the liquid stream into a mist. The change has an important effect of cooling on the contact skin. The unit removes moisture pads and works. Feeding in controlled house needs some information about while feeders should be turned on and off. In environmentally controlled houses, feeding normally takes place 7-8 times a day. For accurate lighting lighting arrangement in controlled house are used, it is particularly important breeding facilities. A system that can pre-program the flock's lifetime lighting schedules is very beneficial.

Conclusion

To increase poultry production proper design of shed and appropriate site is essential. Poultry birds require specific humidity, light, ventilation and air circulation. Usually purchased land is recommended for controlled environment poultry farm. Rural areas around the major cities of the country are the suitable areas for setting up a poultry farm. Nearness of the farm to the city make easy access to market for the purchase of Day

Old Chicks, farm inputs (feed, etc.), and selling of broilers. All the management functions should be performed tactically, right from the selection of the site to the final stage when the birds are sold. The farmer should make sure the availability of electricity connection and supply, quality of drinking water and proper engineering system of shed to keep uniform shed environment. Present review paper suggests that poultry production can be increased by proper control shed environment. Future research should be planned to evaluate shed design at their economic feasibility under different agro climatic condition.

Authors' contributions

Conceived and designed the experiments: MK Shafi & ZU Haq

Performed the experiments: MK Shafi

Analyzed the data: T Mehmood & HM Asam

Contributed materials/ analysis/ tools: SR Haidree, A Qadeer

Wrote the paper: MK Shafi

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