MODIFICATION OF THE STRUCTURE BASED ON CASE STUDY ON LARGE SCALE POULTRY LAYER UNIT FOR 8500 BIRDS

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Abstract— **Generally, Chicken welfare has been characterized by the nonappearance of negative states, for example, infection, appetite and thirst. In any case, a move in chicken welfare has prompted the arrangement that great creature government assistance can't be accomplished without the experience of positive states. Unequivocally, the lodging climate impactly affects creature government assistance. This survey sums up the specifications and components needed in the confine framework poultry cultivating in layer unit for 8500 hens that is considered as a huge scope poultry arrangement. Also,the assessment for setting up this poultry confine ranch is finished with the evaluation of materials embraced, sorts of bracket to be utilized and other basic cum dividing subtleties moreover. The design of the structure is done using STAADPRO thereby estimating the minimal amount of cost required for rearing 8500 birds.**

Keywords— **Poultry, Layer unit, cage system, spacing cum structural details, Estimation**.

I. INTRODUCTION

Chickens are social creatures and live in a little gathering in nature. They invest a great deal of energy scratching and rummaging for food on the ground and perform heritable practices, for example, dustbathing and prelaying settling. In the business poultry industry, layers are principally housed in battery confines (likewise called customary pens) **Hossary M.A. et al**. Around the world, battery confine frameworks evoke a lot of discussion relating to the general impact of the training on winged creature prosperity .The gave benefits are of keeping up a little gathering size, with a low degree of social pressure, bringing about low hostility and savagery, high egg creation, and expanded cleanliness, which may in fact support improved prosperity in confined fowls **Sing V.P et al**. Furthermore, financially, battery confines are exceptionally productive on the grounds that huge quantities of flying creatures can be housed in severe restriction with profoundly motorized feed and water frameworks, with fertilizer and eggs gathered consequently . For this situation, battery confines advantage both the feathered creatures and makers.

Nonetheless, there is impressive morphological, physiological, and conduct proof exhibiting pressure responses in chickens raised in the battery confine frameworks in light of the fact that there are no critical changes in feathered creatures' natural and social qualities through specifically rearing for egg profitability **Tufail M et al** . Homegrown feathered creatures may at present like to play out certain common practices; in any case, inside the battery confines, the fowls' conduct collection is limited and bone quality is diminished by the congestion and fruitless climate **Słupczyńsk M et al**.Because of those impacts, there is developing weight from creature prosperity and buyer bunches upholding the restricting of battery confine frameworks in the poultrybusiness.

Presently, specialists are inspecting different lodging frameworks, for example, profound littered lodging, aviaries, floor pens, move away pens, unfenced, and outfitted confines and evaluating the impact on the government assistance of flying creatures housed in those conditions . Among the other options, outfitted (additionally called advanced) confine frameworks may offer a more appropriate lodging framework for both improving prosperity for winged animals and keeping up profile for makers Maharjan P et al. Outfitted enclosures endeavor to give advancement to feathered creatures while as yet exploiting the advantages of a little gathering size. Past examinations have indicated that winged creatures housed in the outfitted confines likewise improve prosperity by decreasing trepidation, hostility, and quill pecking and expanding bone mineral thickness Although outfitted enclosure frameworks appear to be a potential path for improving fledgling prosperity, its persuasions have been demonstrated to be strain-, age-, and office subordinate. Prior to suggesting its far and wide use inside the egg business, a full assessment should be done to contrast it and regular broad lodging framework.

Merino L et al., A profound litter sheet material can develop to profundities of 1–2 meters. The typical technique for developed floor litter is to begin with around 4 creeps of

fine litter material with augmentations of 1 to 2 inches later varying without expulsion of the old. A profundity of 6 to 12 inches is kept up by fractional expulsions every once in a while so their excreta will be cleaned at proper time. The goal of this examination is to decide the powerful determination of sorts of enclosure frameworks, floor space required and its absolute assessed cost.

II. PROPOSED ALGORITHM

A. Materials and Methods–

Floor Space Required(Cage System)

- Chick – 0.3 sq.ft
- Grower – 0.5 sq.ft
- Layer – 1 sq.ft

Bottom of the cage is provided with the slope of 1.5'' per running feet (ie.12'') , so as to make the eggs to roll over and collect on the egg tray.

Specification of a Cage

L= 16 inches = 1.33 ft

B=18inches = 1.5 ft

Therefore, Floor area of each cage = 1.33 x 1.5 = 1.995 sq.ft (App 2sq.ft) H=18inches= 1.5ft.

Therefore ,in a single standard cage we can accommodate two birds in layer unit.

Based on the arrangement of cages, the cage systems is classified into following types-Single deck cage, Double-deck Cage, Triple –deck Cage, Four –deck Cage. Among this, the double deck cages are widely used because of ease in operation and maintenance. All poultry structure using cage system will be elevated to a height of 6ft from ground level(One man can walk under this and can collect the manures easily).Such type of elevated structure is called as California Housing.

B. Floor space and configuration –

Total Height of the structure

Total Height- 6ft(elevated Column)+ 8ft (upto bottom chord of the truss) + 6ft (from bottom chord to ridge point of the truss)= 20ft.Eave Height = 14ft. Ridge Height = 20ft

Ridge Ventilation is adopted mostly, since it is economical than mechanical ventilation in poultry farms.For an economical design, the width of the structure is maintained between 30ft to 35ft and the length is changed based on number of birds to be reared and the plot size.

Calculation of Structural floor space required for 8500 birds—

Floor Space required for one bird(in layer cage) – 1sq.ft.Hence, for 8500 birds, the floor space required =8500sq.ft.

Floor space required for footpath

Number of rows (bird cage) = 3, separated by a footpath of width 3.5ft.
Width required for one footpath=3.5ft.

Length of one footpath=500ft(length of the structure).

Number of footpaths(along length-wise)=4 (for three row cages)(Because of egg collection and feed supply on either sides).Total footpath area required(along length-wise)= 3.5 x 500 x 4 = 7000 sq.ft –(i) Footpath perpendicular to door-(6x6)=36ft. Number of cage rows = 3.

Total footpath area required(along width-wise)= 36 x 3 = 108 sq.ft. Number of divisions(along width-wise) -3(one from center and the two extreme ends)

Therefore, 108 x 3=324 sq.ft

Therefore, the total footpath area required = 7000+324 = 7324 sq.ft. For Stairs and other miscellaneous work like water tub, sweeping equipment etc, additional 100sq.ft is provided approximately.

Therefore total floor area required for 8500 birds = (8500+7324+100)

=15924 sq.ft

For 8500 birds(out of which 10% are male), the structure floor space required is 32ft x 500 ft (in double deck cage system)-including water supply system.

Fogger is used to maintain the humidity of the poultry farm thereby controlling the temperature. Distance between two foggers is 2.66 ft. Drippers(or Nipple Watering System) can be placed at a spacing between 1ft to 1.5ft,so as to provide required quantity of water supply. In cage system, Stainless Steel Corrugated roofing sheet, asbestos roofings or concrete roofings are used, whereas in conventional deep litter system thatched roofing can be adopted. Roof Slope depends on the width of the building.

III.   EXPERIMENT AND RESULT

The detailed estimate for cage system for 8500 birds are as follows:

Table -1 Estimation

S.No	Description	Nos	L	B	D	QTY	Rate	Per	Amount
GROUND FLOOR									
1	Earth Work								
	Column(C1)	50	5.50	4.00	6.00	6600.00			
						6600.00	15.00	cft	99000.00
	Column(C2)	100	4.00	4.00	6.00	9600.00			
						9600.00	15.00	cft	144000.00
2	P.C.C.1:5:10 Mixing								
	Column(C1)	50	5.50	4.00	0.50	550.00			
						550.00	100.00	cft	55000.00
	Column(C2)	100	4.00	4.00	0.50	800.00			
						800.00	100.00	cft	80000.00
3	Footing								
	Column(C1)	50	5.50	4.00	1.50	1650.00			
						1650.00	150.00	cft	247500.00
	Column(C2)	100	4.00	4.00	1.25	2000.00			
						2000.00	150.00	cft	300000.00
4	Plinth beam								
	Lengthwise	1	1000.00	0.75	1.50	1125.00			
	Widthwise	1	64.00	0.75	1.00	48.00			
						1173.00	150.00	cft	175950.00
5	Columns								
	Column 1(1.5ftx0.75ft)	50	1.50	0.75	15.00	843.75			
						843.75	150.00	cft	126562.50
	Column 2(0.75ftx0.75ft)	100	0.75	0.75	9.00	506.25			
						506.25	150.00	cft	75937.50
6	Roof beam								
	Roof beam for Column C1	1	1000.00	0.75	1.50	1125.00			
	Roof beam for Column C2	1	1064.00	0.75	1.00	798.00			
						1923.00	150.00	cft	288450.00
7	Roof Slab	1	500.00	32.00	0.42	6672.00			
	Deducted area	-1	487.00	18.00	0.42	-3681.72			
						2990.28	150.00	cft	448542.00

8.Truss (ISLB125)-Weight per metre =11.9kg.Material length needed of single truss= 36.82m.Total number of trusses = 25 Total length needed =920.5m

weight = 11.9 x 920.5 =10954kg.

Cost of Stainless steel hot rolled roof truss = Rs.85/kg. Therefore, Total cost for truss =Rs.931090/-Purlins (ISMC 125)-Weight per metre =12.7 kg, Material length needed of single purlin =500 ft =152.44 m, Total Number of purlins=7, Total weight= 1067Kg.

Cost of mild steel ISMC 125 purlin =Rs.35/kg.

Therefore total cost for purlins =Rs.37345/-

Stainless steel corrugated roofing sheet-Rs.320/Sq.m

Total area of roofing sheet=1766 Sq.m

Total Cost for roofing sheet = Rs.565120/-

Sintex Tank-750litres, Quantities required -2

Cost of each one=Rs.5900/-

Total cost for water tank –Rs.11800/-

Plastic pipes(1/2 inch diameter)

Total length required =2500m(app)

Total cost for pipes = Rs.250000

Total cost for nipple drinker=Rs.46000

Curtains-Polyethylene laminated sheets

Total cost for curtains = Rs.51072/-

Total cost for poultry fogger = Rs.38700/-

Table 1 show the estimation for poultry setup for 8500 birds including all necessary amenities. The total estimated cost is Rs.39,72,068/-

IV.   CONCLUSION

Each method of poultry rearing will exhibit different pros and cons with respect to space requirement, growth of the bird, egg laying capacity, lifespan of the bird. The space required for poultry in extensive method of rearing is twice as that of intensive method of farming(Cage system). In cage system, double deck floor cage system is highly adopted because of its operation feasibility. The cost required for rearing 8500 birds is Rs.39,72,068/- as per Indian price. The selection of site, house orientation , optimum dimensions of the structure based on number of birds reared are estimated.

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