Development and Evaluation of Low-Cost Deep Litter Type Poultry House

DR. S. D. VIKHE[1], D.D. TEKALE[2], V.M BHOSLE[3], DR. S. S. DESHMUKH[4]
[1] *Assistant Professor of Civil Engineering, CAET, VNMKV, India, Parbhani.*
[2] *Assistant Agril. Engineer, AICRP on Utilization of Animal Energy, VNMKV, Parbhani, India*
[3] *Associate Professor, BSCT Department, VNMKV, Parbhani, India*
[4] *Veternary Officer, CCBP, VNMKV, Parbhani, India*

Abstract- ***For the study the low-cost deep litter poultry house structure was constructed at Department of Animal Husbandry and Dairy Science, M.K.V., Parbhani having size 3.15 x 3.65 x 2.50 m. The material used for construction is less costlier as compared to the commercial large size poultry houses. The material used are concrete, rough Shahabad stones, welded mesh, M.S. pipe, M.S. angle, G.I. sheet etc. This poultry house is designed for 100 birds considering the 1 sq.ft. area for each bird. Developed deep litter type poultry houses given to the farmers in Aurangabad district of Maharashtra From study was observed that M.K.V. developed deep litter poultry house for 100 birds found in good condition, durable, profitable and suitable for all type climate. Market value of developed poultry house was found to be Rs. 53417/- Cost of developed poultry house can be repayment in 4-5 turns of poultry. Developed poultry house is suitable for landless, marginal and small land holding farmer as a supplementary income.***

Indexed Terms- ***Deep litter, Foundation, Cost estimation, Flooring, Shahabad stone.***

I. INTRODUCTION

Small scale poultry production systems either in the form of small, semi or fully scavenging household flocks or a slightly larger more intensity unit have developed in a large number of developing countries around the world as a source of livelihood support for the rural poor in the recent years. There has been growing recognition among the development community of the role of small-scale commercial poultry production in accelerating the pace of poverty reduction and reaching out to the poorest of the poor. Developed deep litter type poultry houses given to the poor farmers in Aurangabad district of Maharashtra and evaluation was carried out.

II. CONSTRUCTION DETAILS POULTRY HOUSE

As like other building poultry house involve construction of foundation with plinth floor, wall ventilators, roof, doors, but with some specialization convenient for efficient management of poultry birds. For the study the low-cost deep litter poultry house structure was constructed at Department of Animal Husbandry and Dairy Science, M.K.V., Parbhani having size 3.15 x 3.65 x 2.50 m. The material used for construction is less costlier as compared to the commercial large size poultry houses. The material used are concrete, rough Shahabad stones, welded mesh, M.S. pipe, M.S. angle, G.I. sheet etc. This poultry house is designed for 100 birds considering the 1 sq.ft. area for each bird.

- Foundation: A solid quality foundation should support building with adequate (0.6 to 0.9 m) height of plinth to avoid dampness and to keep out surface water during rainy season. For the low-cost poultry house 50 mm diameter M.S. poles have been used for super structure. These poles are fitted in cement concrete blocks 1:3:6 in proportion of 0.45 x 0.45 x 0.45 m size pits and keep the top of foundation at the floor level.
- Floor: The floor of poultry houses must be moisture proof, plain, free from cracks and crevices and easy to clean. It should be termite proof, rat proof, pucca, durable and easy to disinfect. By considering these points instead of concrete floor 25 mm to 30 mm thick rough

Shahabad stone were used for flooring which are fully sanitary, dry and durable. To protect the rate entry in house 0.60 cm height rough Shahabad stones are used. Below flooring near about 0.75 cm murum filling was done for leveling the land portion. Such types of floors are warmer by 4 to 6 degree centigrade than the atmosphere low temperature and vice-versa in high atmospheric temperature. Such type of flooring is easy for cleaning the deep litter material and droppings of hens. The size of floor is 3.65 x 3.05 m i.e., 11.135 sq.m. This is suitable for 100 birds.

- Walls: For the poultry house the walls may be solid enough for the support of roof and with stand heavy winds. Bricks cement and sand are the common material used for construction of walls. But for reducing the cost of construction instead of brick walls rough Shahabad stone wall had been constructed having 0.60 m height which is suitable for deep litter poultry house as shown in plate no. 4 and above Shahabad stone welded mesh of size 75 mm x 25 mm and 2.54 mm thick (12 gauge) is fitted for open air ventilation. The height of wall with Shahabad stone and welded mesh is about 2.5 m at side and 2.91 m at centre of the shed.
- Roof: The poultry house roof should be moisture proof, easy to install and relatively less expensive valuable shape roof with corrugated galvanised iron sheet of 0.63 mm thickness is used. Below G. I. sheet two M.S. pipe are provided and for centre support 35 x 35 x 5 mm thick purlines are used which are durable and less expensive as compared to A.C. sheet. Also, there is provided sufficient 60 cm long over hang to the roofing on all sides to avoid entry of rainwater inside the poultry house.
- Doors: The door is fabricated in 30 x 30 x 4 m size angle frame with welded mesh. The size of door is 0.90 m wide and 1.8 m in height which is fitted in North side wall of the poultry house.
- Width: The width of poultry house should range between 6.20 to 9 m have effective cross – ventilation. In any circumstances, width should not exceed 9 m because wider houses get too hot in summer and the birds in center of house are severely deprived of adequate ventilation leading to adverse effects on performance. To avoid these drawbacks in this low-cost poultry house width of shed taken is 3.15 m.
- Length: Length of house can be constructed as per need depending on strength of birds for 100 birds length of shed taken is 3.65 m.

Table.1: Measurement details of deep litter poultry house

Item No.	Item	No	L	B	D	Quantity (LxBxD)
1	Excavation in soft soil	9	0.45	0.45	0.45	0.820125
		1	17.3	0.45	0.45	3.50325
						4.3233
2.	PCC 1:3:6 in foundation	9	0.45	0.45	0.45	0.820125
3.	Murum filling in plinth for flooring	1	3.65	3.05	0.3	3.33975
	50% for unevenness 3.33975 x 0.15 =					1.669875
	Add surrounding	1	15	0.3	0.2	0.9
						5.909625
4	Providing rough Shahabad for	13.65+	3.65 3.65+	3.05 3.05=	13.4	11.1325
	flooring perimeter for side	1	13.4	0.6		8.04
						19.1725
5.	G.I. Sheet for top	1	4.6	4.5	--	20.7
	Ridges	1	4.6	0.75	--	3.45
						24.15

6.	Welder mesh	1	13.4	1.9	--	25.46
	Triangular	1	2	3.05	0.5	1.525
						2.985
7.	Structural steel					
	Pipe vertical corr	4	2.95=	11.8m	3.15=	37.17 kg
	Pipe verticals	4	2.35=	9.4m	3.15=	293.61 kg
	Cen	4	4.65=	18.6m	3.15=	58.59 kg
	Purlin	2	6.75=	13.5m	3.15=	42.525 kg
	Trusses	2	13.4=	26.8	5.07=	135.876 kg
	Angle 35x35x6		12.4=	12.4m	5.07=	62.868 kg
	Angle for mesh fitting width			6.0 m	1.8=	10.8 kg
	Angle for door frame 30x30x4					12.6 kg
	Angle for bracing	2	1.4=	2.8m	1.8=	5.04kg
	Cleat angles 35x35x6	8	0.1=	0.8m	5.07=	4.056kg
						399.135
8.	Hinges, handles, aldrops, tower bolt	--	--	--	--	L.S. job work

III. COST ESTIMATION

Table.2: Abstract of Estimate (As per market rate)

Sr. No.	Quantity	Particulars	Rate	Unit	Amount
1	4.32	Excavation for foundation in earth, soils of all types sand, gravel and soft murum including removing the excavated material up to a distance of 50m beyond the building area stacking and spreding as directed, dewatering, preparing the bed for the foundation and necessary back filling, ramming watering etc. completed	70.00	Cum	304.00
2	0.820	Providing and laying in suit cement concrete in 1:3:6 of trap/granite / quartzite/gensis metal for foundation and beeding including bailing out water, from work, compacting finishing if required and curing etc.	2324	Cum	1906.00
3	5.90	Filling in plinth and floors with contractors soil, and or murum in 15cm to 20cm layers including watering and compaction etc.	278.18	Cum	1644.00
4	19.17	Providing and laying rough Shahabad stone flooring 25 mm to 30 mm thick and of required width in plain/diamond pattern on a bed of 1:6 cement mortar including cement float, striking joints, pointing in cement mortar 1:3 curing and cleaning etc.	180.00	Sqm	3451.00
5	24.15	Providing and fixing corrugated galvanized iron sheets of 0.63, thickness 922 SWG for	274.00	Sqm	6603.00

		roofing without wind tiles including faterning with galvanized iron screw and bolts and lead and bitumen washers as per drawing complete.			
6	26.985	Providing and fixing welded mesh or 75 mm x 25 mm and 2.54 mm thick (12 gauge) to teak wood frame work as per detailed drawing or as directed iron faterning with one coat of primer scaffolding etc. complete including frame work of 50 mm x 25mm and covering batterns of 45 mm x 10 mm complete.	440	Sqm	11874.00
7	0.399	Providing structural steel work in rolled sections like joints, channels, angles, tees etc. as per the detailed designs and drawing including fixing in position without connection plates braces etc. and painting complete.	45000.00	MT	17955.00
8	Job	Hinges, handles, Aldrops, towor bolt	500.00	--	500.00
				Total	44237.00
9	--	Labour charges	15% on total	--	6636.00
10	--	Contingents Charges	5% on total	--	2544.00
				Total	53417.00

Table 3.: No. of beneficiary in Project Area

Sr. No.	Village	No. of beneficiary	No. of unit
1	Karmad	18	18
2	Tongaon	07	07
3	Bhambarda	08	08
4	Dudhad	20	20
5	Satana	09	09
6	Jadgaon	11	11
7	Hiwra	08	08
		Total	81

Table 4: Net profit from poultry house

Sr. no.	Name of farmer	Village	Unit	Turns of poultry	No. of birds	Mortality	Avg. wt. of bird(kg)	Market rate(Rs/Kg)	Amount (Rs)	Expend-iture	Net profit
1	Hasan Ba latif Shaha	Satana	01	04	400	20	1.80	145	99180	47600	51580
2	Bashir shaha Rajak shaha	Satana	01	03	300	15	1.60	150	68400	35700	32700
3	Gautam Sitaram Jagdhane	Satana	01	03	300	25	1.65	140	63525	35700	27800
4	Munnabai Dadabhai	Satana	01	03	300	30	1.72	145	67338	35700	31638
5	Ajit Akbar shaha	Satana	01	03	300	15	1.55	145	64054	35700	28354

6	Usha Prabhakar Phofle	Bhambarda	01	03	300	24	1.60	150	66240	35700	30540
7	Gangadhar Ram harne	Bhambarda	01	02	200	12	1.75	145	47705	23800	23905
8	Bhagvan Sarjirao dahade	Hiwra	01	03	300	21	1.70	140	66402	35700	30702
9	Sanjay Janarchan dongre	Hiwra	01	02	200	10	1.55	150	44175	23800	20375
10	Dashrath narayan Garje	Jadgaon	01	03	300	21	1.70	140	66402	35700	30702
11	Shaikh ayub shaikh hasan	Jadgaon	01	03	300	18	1.65	145	67469	35700	31769
12	Subhash gangadhar Belkar	Jadgaon	01	03	300	21	1.75	150	73238	35700	37538
13	Pandit laxman natkar	Tongaon	01	03	300	24	1.80	145	72036	35700	36336
14	Kaka Shankar shejul	Tongaon	01	03	300	27	1.65	145	65316	35700	29615
15	Vishwanath bhatpude	Tongaon	01	03	300	30	1.80	150	72900	35700	37200
16	Shaikh abdul shaik fatu	Karmad	01	03	300	24	1.60	140	61824	35700	26124
17	Keshav shankar kulkarni	Karmad	01	03	300	27	1.80	145	71253	35700	35553
18	Nana Jiaram ahire	Dudhad	01	03	300	24	1.75	150	72450	35700	36750
19	Ramesh tatyarao Rajale	Dudhad	01	03	300	18	1.60	150	67680	35700	31980
20	Ramesh keshav Shinde	Dudhad	01	02	200	12	1.70	145	46342	23800	22542

RESULTS AND DISCUSSION

From the study it was observed that

- The direction of poultry house was east- west direction which protect birds from adverse effects of sun light.
- Location of poultry house was not to near or not to far away from house.
- Almost all poultry houses faces south or east direction for getting more sun light.
- The location of poultry house was on sloping land.
- Foundation of poultry house after three year also in good condition.
- Floor of these poultry house was good, comfartable,durable and long life.
- The wall made from shahabadi stone and welded mesh also height observed was 2.5 m at side and 2.91 m at center of the shed.
- Width and length was observed was satisfactary for 100 birds in poultry house.
- From above table no 4 ,it is observed that number of turns ranges 2-4 per year; mortality of bird was found tobe 5-10 %; average weight of bird ranges from 1.55-1.80 kilogram per bird and market rate was found to be range from Rs.140-150 per kilogram.

CONCLUSION

From study work it was observed that M.K.V. developed deep litter poultry house for 100 birds found in good condition, durable, profitable and suitable for all type climate. Market value of developed poultry house was found to be Rs. 53417/- .Cost of developed poultry house can be repayment in 4-5 turns of poultry. Developed poultry house is suitable for landless, marginal and small land holding farmer as a supplementary income.

LITERATURE CITED

[1] Alchalabi, Dhia. (2013). Poultry Housing Design. 10.13140/2.1.2729.7280.

[2] Bailey, B.B. and Quissenberry J.H. (1959). A comparison of performance of layers in cage and floor housing. Poultry Sci. 38(3): 565-568.

[3] Bolton W., W.A. Dewar (1972). Effect of stocking density on performance of broiler chicks. British Poultry Sci. 13 (2): 157-162.

[4] Fairbanks, F.L. and Goodman, A.M. (1951). The ventilation of poultry house for laying and breeding hens. British Poultry Sci. (3): 257-259.

[5] Hoffman, E. and Tomhave, A.E. (1965). A relationship of sq. ft. of floor space per bird and egg production Poultry Sci. 44:89-90.

[6] Jadhav, N.V. and Siddiqui M.F. (2007). Poultry house and layout of plans. Hand book of poultry production and management pp. 87-89.

[7] King, D.F. and Christopher R.C. (1958). Types of houses for laying eggs. Poultry Science 37: 115-117.

[8] Kumararswami, K. and Ratnasabapathy, V. (1965). Floor space requirement for white leghorn strain brooder chicks. Indian Journal of Vet. Sci. 42 (8): 601-610.

[9] Mc Carthey, M.G. (1971). Effect of type of housing and litter on production of broiler. British Poultry Science 27 (3): 359-367.

[10] Siegal, P.B. and Coles, R.H. (1958). Effect of floor space on broiler performance. Poultry Science, 37: 1243.

[11] White, J.W. and Holbe, I.J. (1965). Production, composition and value of poultry manure. Poultry Science, 43: 1-42.