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Energy Efficient Building-Planning and Designing a Green and Cost-Effective House and Working Space for Farmer

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Abstract: ***Agriculture in India is livelihood for a majority of the population and hence it stands great importance in Indian culture. Increasing population, increasing average income and globalization effects in India also increased the demand for quantity, quality and nutritious food, and variety of food. Therefore, pressure on decreasing available cultivable land to produce more quantity, variety and quality of food will keep on increasing. Farmers are still not able to earn respect a blearing. Therefore it is necessary to reduce this problem of them. The basic aim of this project is to plan, design a green and cost effective house and working space for farmer his family, shelter for his animals, proper grains to rage facilities and ware house for his tools and machineries. This project also provides an insight to overcome the water scarcity.***

Keywords: Agriculture as a livelihood, cost effective house, water scarcity

I. INTRODUCTION

Indian farmers are facing biggest challenge in agricultural field and economy due to lack of technology and access to facilities in terms of electricity, water supply, proper management and workmanship. Even after over decades of planning since the independence, majority of the farmers are facing problems of poor production and/or poor returns. Major constraints in Indian agriculture are:

1) Shelter problems for farmer and his family and isolation of farm from his house causing in convenience for the farmer.
2) Unorganized farming ways with very in efficient management.
3) Poorly organized barns and shelter for animals reducing rearing and dairy business and hence lowering his economy.
4) Less use of technology, mechanization and poor productivity for which first two points are of major concern.
5) Electricity and water supply problems (especially in waters clarity region).
6) Very less value addition as compared to developed countries and negligible primary-level process in farmer's level.
7) Poor infrastructure for farming making more dependence on weather, marketing and supply chain suitable for high value crops.

An energy-efficient home is one that is able to utilize natural resources such as heat, light, water, and energy, etc. well and create a healthy and liveable environment along with preserving energy consumption. Providing cost effective and energy efficient house will reduce his dependence on other conventional sources for electricity, light etc. Also, the farmer will be able to in ease the output from farming as the working area of the farmer and his shelter will be adjoining to each other. Hence he can pay 24 hours attention on farming.

II. OBJECTIVE

Following are the objectives of this project:

1) To plan an energy efficient shelter for farmer and his working staff.
2) To build proper shelter for animals having proper sanitary arrangement and ventilation
3) To provide excellent storage units for food grains, fruits and vegetables.
4) To provide sufficient drinking water facilities

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III. REQUIREMENTS FOR THE PROJECT

A. Housing for Dairy Cattle

An efficient management of cattle will be incomplete without a well-planned and adequate housing of cattle. Improper planning in the arrangement of animal housing may result in additional labour charges and that curtail the profit of the owner. During erection of a house for dairy cattle, care should be taken to provide Man sanitation, durability and arrangements for the production of clean milk under convenient and economic conditions etc.

1) Location of dairy buildings
2) Topography and Drainage
3) Soil Type
4) Accessibility
5) Marketing
6) Electricity

IV. PLANNING AND DESIGNING OF FARMER'S HOUSE

In this project we have designed the floor plans for the following elements-
Location of farm: Boris village, District Dhule, Maharashtra.
Area of farm: 8 acres
Crops grown: Cotton and Onions
Number of person in farmer's family: 6
Number of labours going to stay on the farm: 2

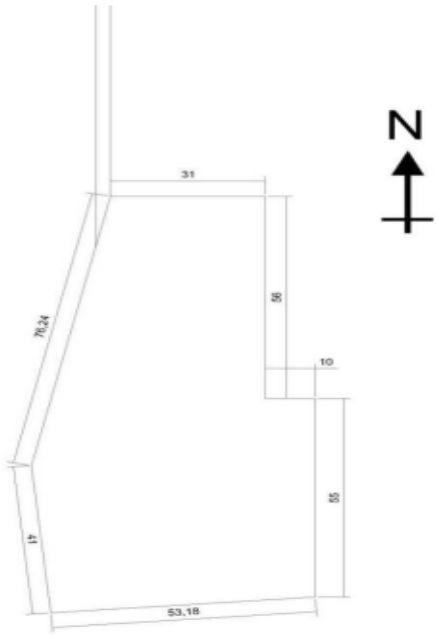


Fig No. 1 Layout of the farm

A. Design of House for farmer and labours-

Type of structure: load bearing
No. of rooms Farmers house: 3 BHK (3bedrooms,1 hall,1 kitchen)
No. of rooms for labours house: 1 room and Kitchen
Planning is done according to the principles of planning.
Materials assigned for:
• Bricks: Timbercrete blocks
• Roofing: Bamboo

- Windows: bamboo windows with bamboo frame
- Door bamboo doors with bamboo frame.

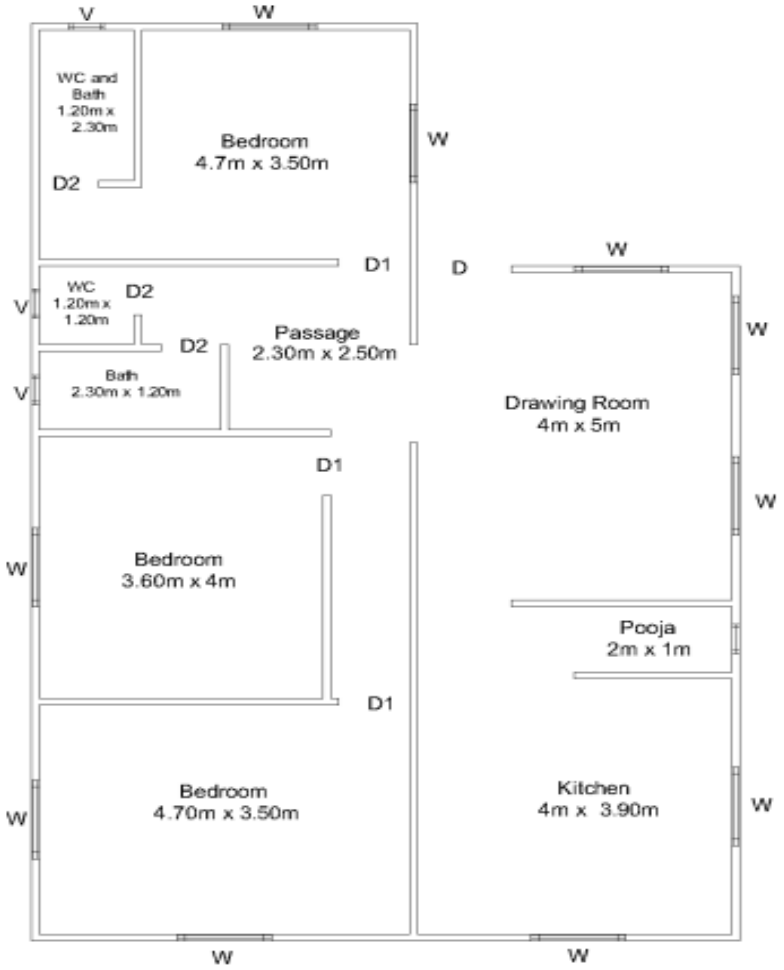


Fig No. 2 Plan for Farmer's house

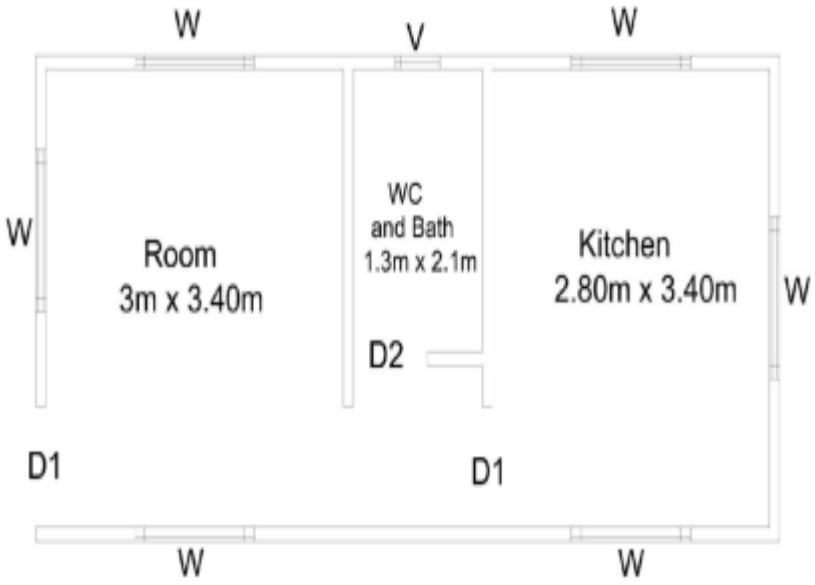


Fig No. 3 Plan for Labour's house

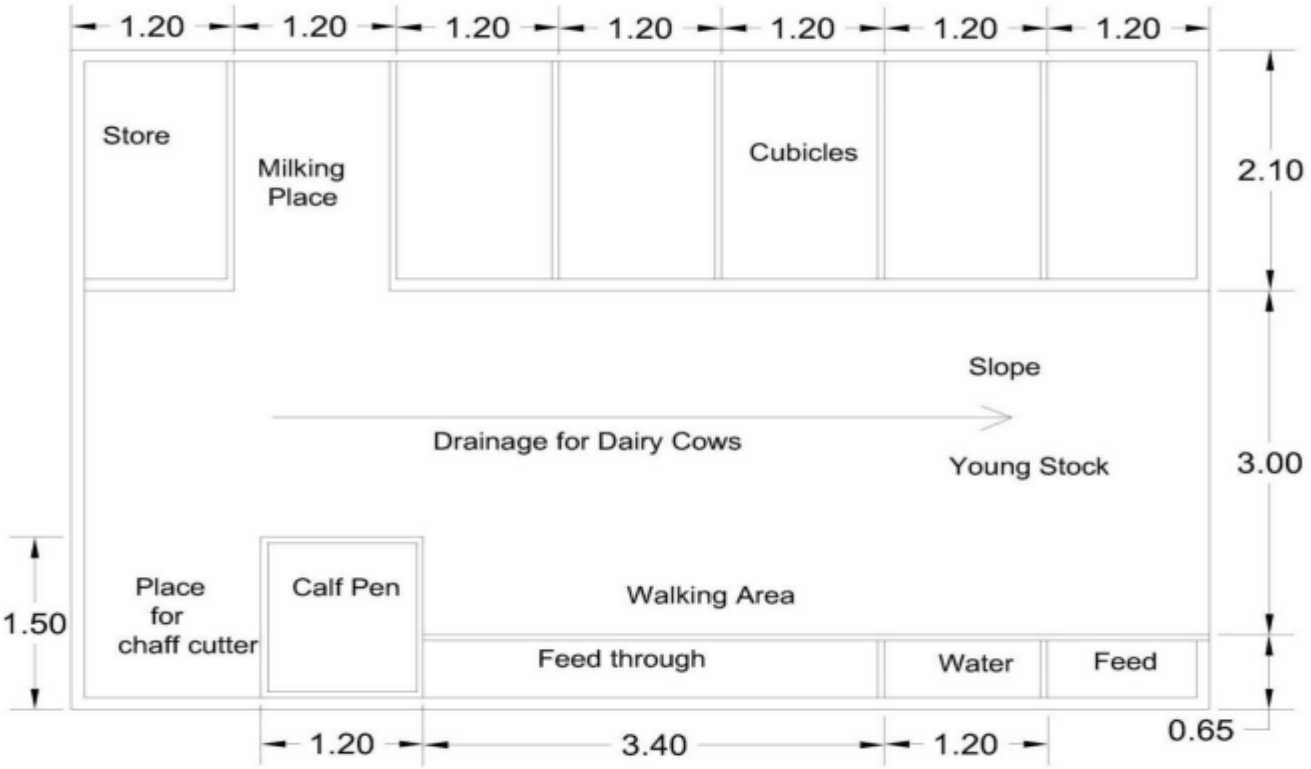


Fig No.4 Floor plan for Cow Shed



Fig No.5 Floor plan for Goat Shed

B. Design of solar for pumping and electrification

Solar Pumping System: This pump will be able to irrigate the total farm area of 8acres.The cost of this pump will be around 14to 15 thousands

- Pump set: Submersible
- Irrigation: Alternate day
- Discharge: 429840 litres/day
- Total head: 26.73 feet
- Motor rating: 5HP
- Solar PV Module: 3600Watts peak
- Solarpanels:15
- Delivery pipe: 4.5inches



Fig No.6 Plan for crop storage

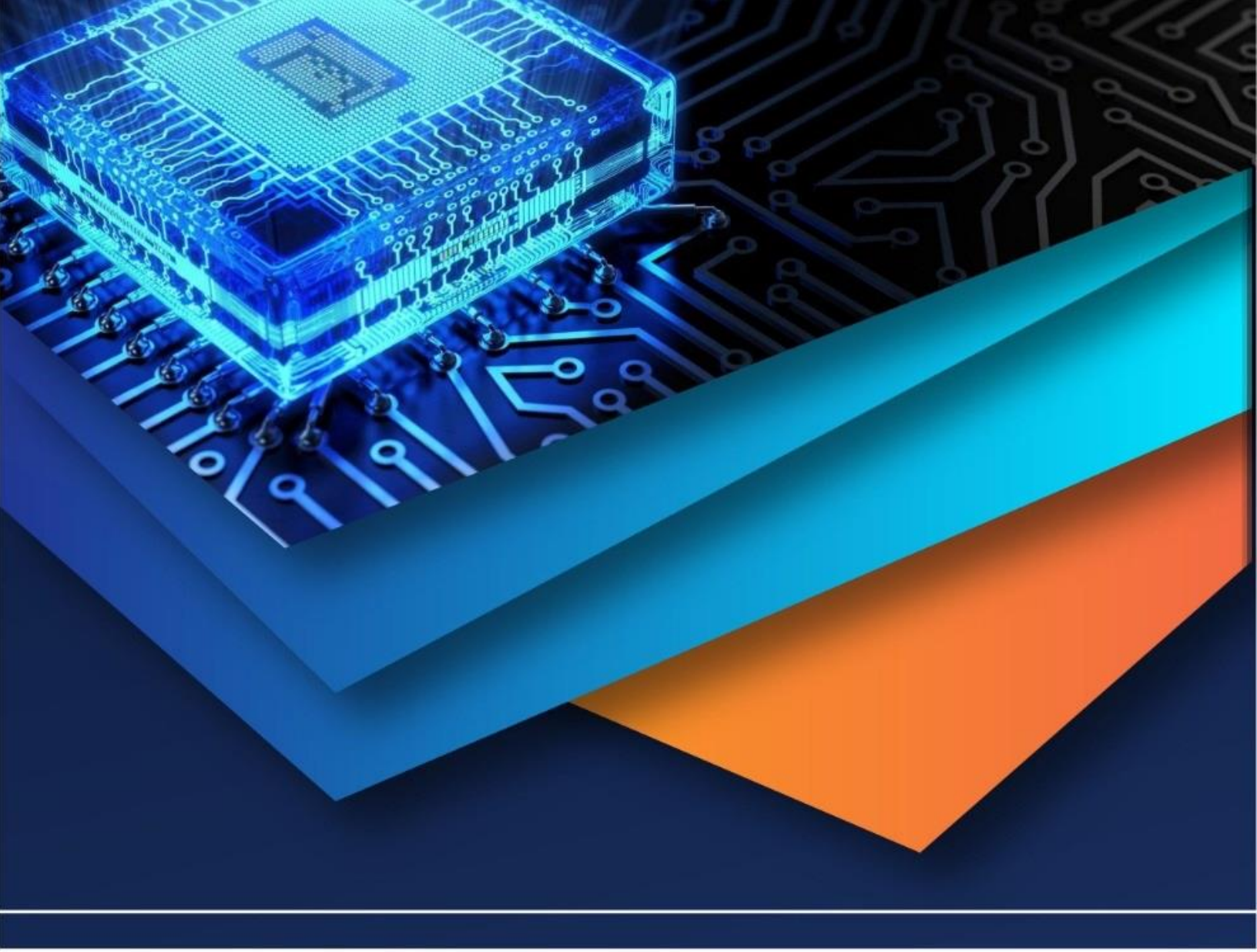
V. RESULT AND EXPECTED OUTCOMES

So, we have located different elements of the farmhouse given above in such a way that they provide ease for carrying out various activities at farm as design of house for farmer, labours and design of sheds for cows and goats and also design of solar for pumping and electrification. It is expected that pressure on farmers will decrease by providing them these basic facilities.

REFERENCES

[1] Akshay Chaudhary, Payal Sachdeva, Maninderpal Singh, Design and Estimation of Reinforced Building; A Case study". IOSR Journal of Mechanical and Civil Engineering (April 2014).
[2] David Pratt, "Fundamentals of Construction Estimating" 1995 Delmar publishing Inc. ISBN 0-8273-6135-1

[3] ECBC 2007 User guide published by Bureau of Energy Efficiency
[4] The Energy Conservation Act-2001
[5] https://www.fbfs.com/learning-center/energy-efficient-farming-tips
[6] https://www.buildofy.com/home-design/best-eco-friendly-home-designs-in-india
[7] https://www.nobroker.in/blog/eco-friendly-house-designs
[8] https://www.linkedin.com/pulse/8-easy-wdays
[9] https://www.sciencedirect.com/topics/engineering/energy-efficient-building



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