



IJRASET

International Journal For Research in
Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 8 Issue: II Month of publication: February 2020

DOI: <http://doi.org/10.22214/ijraset.2020.2096>

www.ijraset.com

Call:  08813907089

E-mail ID: ijraset@gmail.com

Low Cost Housing and Rooftop Rainwater Harvesting: A Review

Pranay Dhopte¹, Dhanshree Gilbile², Sagar Talegaonkar³, Harshal Khandait⁴, Lakshmi Lilhare⁵, Saloni Singh⁶, Nisha Waghmode⁷, Prof. Divyani Harpal⁸

^{1, 2, 3, 4, 5, 6, 7}UG Student, ⁸Assistant professor, Department of civil Engineering, Dr. Babasaheb Ambedkar College of Engineering and Research, Nagpur-441110, Rashtrasant Tukdoji Maharaj University, Nagpur, M.S, India

Abstract: *This paper presents a survey report of development of rural areas in INDIA. Sustainable rural development is vital to the economic, social and environment viability of nations. The technical aspect of this survey is for low cost housing and rooftop rainwater harvesting for future needs. Proper housing is one of the basic need for the millions of people living below poverty level. Housing is the major sector of rural and urban infrastructure. To achieve this goal Government is providing subsidy to the poor people's up to Rs.1.6 lakhs per house for infrastructure development. Provision of low cost house can be solution for these problem the low cost housing offers the use of various low cost material and technique which reduces the overall cost of construction. A large proportion of the world population does not have access to save source of water. As population increases, the demand for drinking water also increases such as surface and ground water resources are being utilized faster than they can be recharge. Water require for various activities in our day to day life. It has been a growing interest, especially in developing country, in rooftop rainwater harvesting as an alternative source of drinking water. All the systematic process which are discuss in paper*

Keywords: *Low Cost Housing Construction, Affordable Housing, Rural Housing For The Poor, Rooftop Rainwater Harvesting, Potable Water Saving, Ground Water Recharge.*

I. INTRODUCTION

One of the basic necessities for a human being is house or shelter. People within a specified income range cannot afford their own house and living on rental basis. Housing availability and various difficulties arising due to it is more critical in rural areas as compare to the urban areas. This can be understood from the data given by NSSO (National Sample Survey Organization) from the 69 round conducted in July 12 to December 12 which revealed that 61.1% of the urban population reside in their own houses and other 35.4% in rented homes whereas in rural areas 93.3% of the population had own houses and near 5.1% where residing on rental basis. The low cost housing can be solution for these problems in low cost housing the use of various low cost material and by replacing conventional technique which reduce the overall construction cost, improved skills and technology without sacrificing the strength performance and the life of the structure.

INDIA has a long tradition of water harvesting. The rainwater harvesting is the activity of direct collection of rainwater, which can be store for direct use or can be recharged into the ground water for increasing ground water table. Water harvesting means collection of rain water from the top of building roof, open spaces surrounding the buildings, farm area, etc. And then storing it for later use. 1.1 billion People do not have access to "improve drinking water sources". It is clear that all possible approaches must be tried to minimize the problem of drinking water. Governmental agencies across the world are now introducing policies to promote increase use of rainwater.

II. LITERATURE REVIEW

- 1) *Mr. Raj, Ms. Panimalar [1]:* In low cost housing construction various technologies have been studied such as Prefabrication, Economical Walling System by using Rat Trap Bond and Filler Slab Technology. The rat trap bond masonry requires approximately 25% less bricks and 40% less mortar bag traditional masonry as compare to c building. And the filler slab consume less concrete and steel due to reduce weight of slab by the introduction of a less heavy, low cost filler materials by replacing the conventional method the product is effective and economical.
- 2) *Ahimbisibwe, A. Ndirwami, et al. [2]:* In this paper they studied that for construction of affordable house they utilize the commonly used materials which are locally available, by adopting some building techniques and proper management in the construction of low cost housing. They highlighted a need to introduce alternative construction methods for the rural residents and the local artisans to achieve more applicable results in rural housing.

- 3) S. Borkar, A. Limje, et al[3]: In their research they replace walls of conventional building by using GFRG (Glass Fiber Reinforce Gypsum) panel. The reason behind this is to overcome the unviability of natural resources like sand, gravel, etc. By using this technology is having possibility to provide low cost house to homeless citizen. The GFRG panel is economic and save up to 30% of construction cost and the construction of rapid wall saves 67% in time of construction as compare with conventional building.
- 4) *J.R.Julius, Dr. Prabhavathy, etall [4]*: In this paper they introduced the methods of rainwater harvesting system and its impact used in all part of the world. Population increases all over the world is causing similar problems of how to supply quality water to all. In India the farmers depend on Monsoon where rainfall is from June to October and the large quantity of rain water is soon lost as surface runoff. To overcome from these problem the rainwater is a technique to save rainwater for future purpose to reduce shortage of water in summer season. Now there is increasing interest in the low cost generally referred to as 'Rain Water Harvesting' (RWH). The water harvesting is the activity of direct collection of rainwater, which can be stored for used or recharged into the groundwater.
- 5) *Anant D. Patel, Asst Prof. Shah [5]*: In this paper they studied that the needs of rainwater harvesting and method of rainwater harvesting. Need of Rainwater Harvesting:-As water scarcity is increases in all over world, the need of water also increases to fulfil the need and to minimize this problem rainwater harvesting is necessary. As water supply system is under huge pressure for supplying water to each and every increasing population.As groundwater is getting reduced and infected. As soil erosion is increase due to free runoff. Health problem increase due to consumption of polluted water.Methods of Rainwater Harvesting:-Roof-top Rainwater harvesting: -Rooftop rain water harvesting is the technique through which rain water is captured from the roof catchments and stored reservoir. By adopting these recharge technique to meet he household needs through stored in sub-surface ground recharge The main objective of rooftop rain water harvesting is use to collect and store water for later use in summer season. It reduce the cost of pumping ground water and provide high quality water i.e soft and low in mineral.Surface Rainwater harvesting: - Surface runoff rainwater harvesting is a method of colleting rainwater flowing along the ground during the rain. It is a process of collecting runoff from catchment area and stored it in to small dams, ponds, tanks, etc. Small dams are constructed in natural channels to store the runoff water up to certain depth in the channel the excess water is allowed to flow over the dam. The stored water slowly infiltrates into the soil and recharges the ground water. Artificially recharge the wells (Ground water recharge):- Ground water recharging is a new concept of rain water harvesting. Generally the structures used for rain water harvesting are: pits, trenches, dug wells, hand pumps, recharge shafts, lateral shaft with bore wells, spreading techniques, underground reservoirs.
- 6) *Dr. Sabale, Prof. S.Yadav, et al [6]*: The technical aspect of this literature review is to collect water from rooftop and store it in to percolation tank for future use to reduce shortage of water. The water is collected from different roof and physical, chemical and biological analysis was done experimentally in laboratory. The aim of this literature review is related to utilize the collected water by providing proper means of filtration. To conserve the most important natural resource on the earth this project is adopted. It is an initiative To preserve the water source it is an initiative “Save Water, Water will save us”.

III.CONCLUSIONS

- A. In low cost housing various technologies such as Prefabrication, Economical Walling System, Rat Trap Bond and Filler Slab Technology can be adopted.
- B. Many researches have suggested to replace the major part of conventional material with a new low cost housing material and each material it has its own advantages and disadvantages. The building construction using RW panel comes under green building categories as after constructing it energy requirement for heat installation, sound insulation, humidity and temperature inside is less than conventional building.
- C. The rat trap requires approximately 25% less bricks and 40% less mortar bag traditional masonry as compare to conventional building. And the filler slab consume less concrete and steel due to reduce weight of slab by the introduction of a less heavy, low cost filler materials.
- D. Rainwater is a comparatively clean and totally free source of water, increasing ground water table and water supply cost is low.
- E. It can supplement other sources of water supply such as a ground water and used in those area which face insufficient water sources.
- F. Rooftop rainwater harvesting uses simple technologies that are inexpensive and easy to maintain.
- G. Efficient management of water sources and education about utilization of water resources along with measures of harnessing, recharging maintaining the quality of water.



REFERENCES

- [1] Mr. I. Michael Raj, Ms. M. Panimalar, International Research Journal of Engineering and Technology (IRJET), e-ISSN: 2395-0056, p-ISSN: 2395-0072.
- [2] Ahimbisibwe, A., Nidibwani, A. and Niwamara, T., issue 2015.
- [3] Shrirang D. Borkar¹, Atul S. Verulkar^{*2}, Anshul Limje^{*2}, Chaitanya K. Raut^{*2}, Kunal V. Wankar^{*2}, Nilayam R. Margamwar^{*2}, Sarang K. Wakharkar^{*2}, National Conference on 'Advances in Engineering, Technology and Applied Sciences' - NCAETAS-2019 (IJSRSET) Volume 5 | Issue 6 | Print ISSN : 2395-1990 | Online ISSN : 2394-4099.
- [4] J.R.Julius¹, Dr.R.Angeline Prabhavathy², Dr. G.Ravikumar³, International Journal of Scientific & Engineering Research (IJSER), Volume 4, Issue 8, August-2013
276 ISSN 2229-5518
- [5] Anant D. Patel¹, Asst. Prof. Pratima K. Shah², National Conference on "Transportation and Water resources Engineering" NCTWE-2015, <https://www.researchgate.net/publication/317379414>
- [6] 1Dr. P.D. Sabale, 2Prof. S.J. Yadav, 3Mr. Chetan Bangale, 4Mr. Ajay Kharat, 5Mr. Chandradeep Patil, 6Mr. Sagar Waghule, International Journal of Engineering Research & Technology (IJERT), ISSN: 2278-0181, Vol. 7 Issue 04, April-2018



10.22214/IJRASET



45.98



IMPACT FACTOR:
7.129



IMPACT FACTOR:
7.429



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089  (24*7 Support on Whatsapp)