



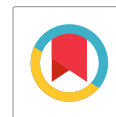
Inclusion of Eco Sanitation in Rural Housing in Hills be a Better Deal

Ashutosh Pratap Pande*

Department of Chemistry, L.S.M. Government. P.G. College, Pithoragarh, UT, India

Received: 30.02.2017 Accepted: 09.04.2017 Published: 30-06-2017

*ashutosh1chem@gmail.com



ABSTRACT

The world in which we are living is still confronting to the three major issues viz. poverty and hunger, quality primary education and environmental sustainability of development programs. The realization of the fact about the planning of rural housing is clearly evident in the statement of LAURIE BAKER “Rural housing is more complex than urban housing as it usually has to cope not only with human beings but with livestock as well”. Most of the surveys and their reports regarding sanitation in rural areas have revealed the poor quality of toilets even those which come under TSC (Total Sanitation Campaign) sometimes due to inadequacy of funds. As the variation in geo-climatic conditions, availability or non-availability of different building materials in the region, living habits of people in different parts of the country and sometimes hazard scenario influence the typology of buildings in rural areas, therefore the study of local typology becomes an important part of any planning for rural development in terms of environmental sustainability in rural housing. This paper finds the inclusion of eco sanitation in rural housing in hills be a better deal as scarcity of water in the hills is a very common phenomenon and eco-san which is a part of ecological life style seems to be a solution for the conservation of water and improvement of soil health in hills.

Keywords: Eco-Sanitation; Environmental sustainability; Rural housing; Hills; Ecological life style; Recycle.

1. INTRODUCTION

The agricultural revolution is one of the most controversial events in history. Some partisans proclaim that it set humankind on the road of prosperity and progress. Others insist that it led to perdition. This was the turning point, they say, where Sapiens cast off its intimate symbiosis with nature and sprinted towards greed and alienation. Whichever direction the road led, there was no going back (Harari, Y. N., Sapiens A Brief History of Humankind) .In history of development of human beings hunter-gatherers finally reached to the state of settlement. In general the term settlement is been understood as a process of grouping of people and acquiring of some land to build houses for their economic support, as well. Almost all natural processes are cyclic in nature but the linear production of every product used by human beings finally resulted in the scrap and requires a vast dump yard and of course opens the new research fields for waste management. Finally, society has not learnt to live in harmony with nature or to adopt a caring stewardship role rather than its current relatively careless role as extractor of resources (Ring, *et al.* 2010). Recycling is a natural process and inherently one that must be adhered to by living beings and societies that hope to survive. It has become a main principle in modern sustainable waste handling strategies. For example, in planning the first manned mission to planet Mars, NASA is relying on biology and advanced recycling solutions of

water and plant nutrients (Ecological Sanitation – for mankind and nature). Hence the symbiosis with nature is the best option for sustainable developments.

2. METHOD

Available text related to eco-sanitation, rural housing, reports and the developments in recent researches in the field of sanitation have been used as Secondary data which were compared and analyzed for the environmental suitability of eco sanitation in hills.

3. RESULTS & DISCUSSION

Building a house requires a proper planning in any settlement with two measures of consideration are cost and durability. When it comes to rural housing the realization of the fact about the planning of rural housing is clearly evident in the statement of LAURIE BAKER “Rural housing is more complex than urban housing as it usually has to cope not only with human beings but with livestock as well”. Planning must be not only of a house, but of its services and its land and it must take into full consideration possible occupations including the keeping of livestock. We should also keep in mind, as planners, the very long traditions and patterns of rural living. In particular the use and planning of the space surrounding a house that is the compound, however small, is of more important and value to the occupants than the few rooms of the house. Many occupations providing preparation of

food, utensils and tools, farming, live-stock and so on are done outside, not inside the house (Gupta A., Rural Houses Plans, pdf) As the variation in geo-climatic conditions, availability or non-availability of different building materials in the region, living habits of people in different parts of the country and sometimes hazard scenario influence the typology of buildings in rural areas, therefore the study of local typology becomes an important part of any planning for rural development in terms of environmental sustainability in rural housing. A reasonably close picture of hills in India can be understood by the fact that the hill states provide a range of mountain ecosystem services, which build up at different levels from local to international level via regional and national levels. Here the main concern is India; therefore, the hill states of it are viz. Arunachal , Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Tripura, Sikkim, Jammu and Kashmir Uttarakhand and Himachal Pradesh which have almost 100% of their geographical area under a hilly terrain are of main concern. These states have a low resource base and cannot mobilize resources for development due to which they are also on infrastructural basis and economically backward, they have a hilly and difficult terrain with a low population density or a sizable tribal population, are strategically located along borders with neighbouring countries and their state finances are non-viable (PRS Legislative Research Blog). In present scenario of rural housing all kind of building materials are available in nearby surroundings markets of rural areas but the wise use of available material within the region certainly reduce the cost factor. Again inclusion of self-reliant available design or techniques would further be a better deal to reduce the cost. This is the time where everybody needs to reconnect with nature and can cultivate the habits to consume less energy, water and other natural resources and sense of responsibility towards earth which can be achieved by adopting more ecological life style.

Specifically, in the state Uttarakhand the major materials used for construction in rural areas were stone, mud and wood available to the residents in there nearby locations and further bricks, cement and iron been used frequently. The material used for roof was mainly slate (a signature of houses in hills) which is gradually been in the process of replacement by either tin or concrete. Bhasker Majumder's book – Housing on the hills in India can be refer to the comparative study with other hills in India. Traditional houses in kumaun region of the state Uttarakhand are generally called *bakhali* (Plate 1) and it is distinctly seen that the lower part of the structure known as *goth* is used for livestock and are made-up of conventional available materials. New constructions are usually made-up of modern material and in general adjacent to the old ones as an extension (Plate 2). Usually in the hills fields are adjoining to the dwellings, therefore, it is relatively easy to transport the compost formed from faeces and sanitized urine to use.

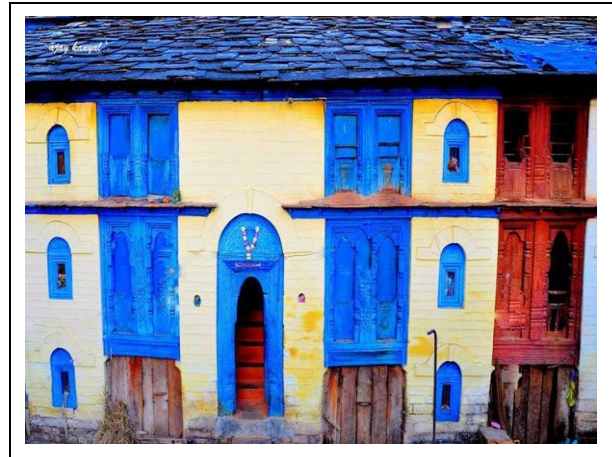


Fig. 1: Plate 1 (Photograph by Ajay Kanyal).



Fig. 2: Plate 2 (Photograph by Ashutosh Pratap Pande).

Eco-san concept showing a separation of flow streams, treatment and reuse Ecological sanitation, commonly abbreviated to eco-san (also spelled eco-san or Eco-San), is an approach which is characterized by a desire to safely "close the loop" (mainly for the nutrients and organic matter) between sanitation and agriculture. Eco-san systems safely recycle excreta resources (plant nutrients and organic matter) to crop production in such a way that the use of non-renewable resources is minimized. When properly designed and operated, eco-san systems can strive to provide a hygienically safe, economical, and closed-loop system to convert human excreta into nutrients to be returned to the soil, and water to be returned to the land. (Wikipedia, the free encyclopedia). In this paper the term eco sanitation has been used for Urine Diversion Dehydration Toilet (UDDT). The basic concept of Urine Diversion Dehydration Toilet (UDDT) is to keep the faeces as dry as possible. This is achieved by diverting all liquids i.e. urine and anal cleansing water (if applicable) from the faeces and thus keeping the processing chamber dry. They make use of desiccation (dehydration) process for the hygienically safe on-site treatment of human excreta.

Adding wood ash, saw-dust, etc. after each defecation, helps in lowering moisture content and raises the pH. The system thus creates conditions of dryness and pathogen die-off due to raised pH and time (Urine Diversion Dehydration Toilet (UDDT) Construction Manual). A composting toilet is an aerobic processing system that treats excreta with no water or small volumes of flush water, via composting or managed aerobic decomposition. Composting toilets eliminates the need for flushing water. No water supply (no expensive installation for infrastructure like water supply line and sewerage) is necessary (Ecological Sanitation – A step towards better future). Concerning to the adaptability of the concept- very often it is the simplicity, low cost and ease of construction which may appeal at first to the beneficiary. And upgrading from one system to another is always possible over time. The direct link to agriculture and forestry is also an important element in this new initiative (Morgan P., Toilets That Make Compost).

The inclusion of the concept of eco sanitation to the rural housing be a better deal in the sense that the collected separate sanitized urine in a specific dilution be an eco friendly replacement of nitrogen containing fertilizers and the compost formed from faeces supposed to be the phosphorus containing organic substitute for the conditioning of soil. As it is a reuse of waste therefore a basic understanding of the concept and a skillful adaptability is highly recommended. This concept suits to the hills as the scarcity of water is a common phenomenon in the hills. The construction costs of UDDTs can be reduced by applying the available materials in the hills of different regions in India but the priority is the leak and damp proof processing chambers. In rural areas UDDTs can be established either on their compounds or in their houses. With some pilot projects in hills different models can be developed which would be suitable and viable in terms of proper sanitation, eco-friendly approach and economically sustainable.

4. CONCLUSION

The inclusion of eco sanitation in the new plans for rural housing in hills be a better deal as scarcity of water in the hills is a very common phenomenon and eco-san which is a part of ecological life style seems to be a solution for the conservation of water and improvement of soil health in hills with incorporating the findings of basic researches at every local area would be a suitable solution in rural housing development programs. In rural development programs, Government should encourage this kind of eco-friendly approaches and the decision can be made at the political macro-level. Public participation can be increased by the involvement of NGOs working in the field of ecological development.

As it is a concept of sanitation with profit could be the part of The *Swachh Bharat Mission* which aims to ensure access to sanitation facilities (including toilets, solid and liquid waste disposal systems and village cleanliness) and safe and adequate drinking water supply to every person by 2019 in the hills as well. Present status of study opens the access to innovations in this field of sanitation in context to hills.

FUNDING

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest.

COPYRIGHT

This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC-BY) license (<http://creativecommons.org/licenses/by/4.0/>).



REFERENCES

- Alsen and Jenssen, Sustainable Sanitation for Mankind and Nature, Ecosan Norway, 05(2004).
- Ecological Sanitation – A step towards better future, ESF, 14, Pune, India. www.ecosanservices.org
- Gupta, A., Rural Houses Plans, pdf.
- Harari, Y. N., Sapiens A Brief History of Humankind, Vintage Books, London, 110 (2016).
- Morgan P., Toilets That Make Compost, EcoSanRes Programme Stockholm Environment Institute, Stockholm, Sweden, 96(2007).
- PRS Legislative Research Blog <http://www.prsindia.org/theprsblog/?p=2593>
- Ring I., Hansjürgens B., Elmqvist T., Wittmer H. And Sukhdev P., Challenges in framing the economics of ecosystems and biodiversity: the TEEB initiative, *Current Opinion in Environmental Sustainability*, 2, 15–26(2010). <https://doi.org/10.1016/j.cosust.2010.03.005>
- Urine Diversion Dehydration Toilet (UDDT) Construction Manual, ESF, Pune, India, 05, www.ecosanservices.org
- Wikipedia, the free encyclopedia (accessed on 1 January 2017).