

Life Cycle Analysis

Ar. Raina Garg¹, Ar. Pallavi Sharma²

¹School of Architecture IPS Academy, Indore, Madhya Pradesh, India

²Amity School of Architecture and Planning, Amity University, Haryana, India

ABSTRACT

The human race in the prehistoric times made the environment adapt to achieve comfort and convenience as per his needs. Need is the mother of invention. Man has continuously progressed as per the want of one's desires. Man's needs made him discover and invent new belongings. After industrial revolution, progress progressed at a high speed. The rural people migrated immensely to the urban lands. This further led to population increase and pollution. The cities designed for a particular density could not suffice to the congestion it suffered and lack of infrastructure perturbed into the prevalence of slums. Environmental degradation enhanced with the above mentioned factors of population increase and pollution. The need criteria gradually changed to the greed criteria which eventually caused drastic climatic changes. Climatic changes are alarm striking to everyone's heads now. The environment looks toward sustainable development and improved urban environmental management. Environmental Quality Index is a tool for assessing change in fundamental elements of our environment. It has been found that the residential and other non – residential sector are found to have the highest environmental, economic, and social impacts. The need of the hour is to perform appropriate tasks and fulfill roles effectively, efficiently and sustainably. Community based adaptation would gain momentum to resolve the present day circumstances. Recycled materials are made by reprocessing materials that have already been used. They are a boon to ecological economy for the existing material has been reused and finally it also prevents the negative ecological impact evolved in the creation or extraction of the materials in its original state. There are several benefits in using recycled materials. The paper is an attempt to bring forward the idea of promoting in achieving Environmental Quality Index and be conscious enough in the selection of materials such that they promote adaptability and recycling.

Keywords: *environmental degradation, recycling of materials, adaptability, environmental quality index.*

1. INTRODUCTION

“Earth provides enough to satisfy everybody's needs, but not every man's greed.” – Mahatma Gandhi.

Development of human settlements through the ages and their impact on natural resources has been a continuous journey for mankind. Scientists presume that the Earth is four and a half billion years old. The agricultural revolution probably enabled an expansion of total human population to about 200 million by the time of Christ and to 500 million by AD1650. The growth of human population on earth is in itself a highly important cause of the transformation of nature.

Modern Industrial and Urban man – The modern era, especially since the late seventeenth century has witnessed another major transformation of revolution in culture and technology. This like the adoption of domestication, has reduced the scale required for sustaining each individual and has increased the utilization of resources. Therefore the number of ways in which man is affecting his environment is proliferating. Environment problems have reached its optimum to a global level.

Human race is facing the uncontrollable crises of global warming and drastic climatic changes. The crisis needs to be resolved. Hence the transformation of the human settlements to necessitate the sound concepts of Adaptability, Environmental Quality Index and recycling of materials becomes the need of the hour. Life cycle analysis is into consideration since 1960 and has proved its potential to govern the management of the environment to meet the needs of sustainable development in the 21st century.

The environmental effects of a material or building from extraction from the earth or its evolution on Earth till disposal and throughout its existence is called Life Cycle analysis, (LCA). The design process influenced by reuse, reduce and recycle of building materials becomes the major concern and an important criteria for architects. The circulation of materials is considered as one of the principle laws of general ecology.

The principal states that:

1. The rate of cycling of materials is a more important indicator in determining productivity than the amount present at any one place at any one time.
2. Material cycles becomes more closed as a system matures (i. e. fewer materials are lost or wasted); and
3. The role of waste products in the overall health of the system increases.

2. RECYCLING OF MATERIALS

A craftsperson's tool is instrumental in realizing great art – craft, without really destroying the surroundings but rather recycling it most sensibly and creatively.

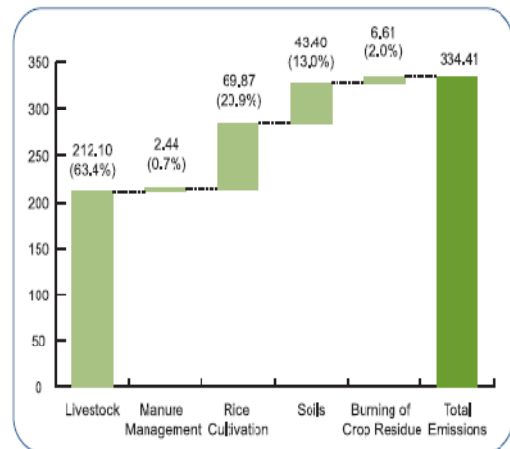
Observations for recycling:

1. Differentiate among recycling materials that cannot be further used or rather reused.
2. Use separate bin collectors for organic waste such as vegetable and food waste and avoid disposing paper and cardboard wastes.
3. Facilities provided to recycle glass bottle and jars, plastic bottles, containers made of PET (polyethylene ere phthalate), aluminum cans, foils, metallic items such as steel cans, scrap such as old pipes and appliances made of steel, copper and brass.

In the Chimes Building at Gurgaon recycling waste and water bring forward an exemplary depiction of the whole process. Waste water, heat, organics and waste water is to be harvested and recycled on a day to day basis.

CO₂ equivalent emissions from Agriculture sector (million tons)

	CH ₄	N ₂ O	CO ₂ eq.
	13767.80	146.07	334405.50
Enteric fermentation	10099.80		212095.80
Manure management	115.00	0.07	2436.70
Rice cultivation	3327.00		69867.00
Soils		140.00	43400.00
Crop residue	226.00	6.00	6606.00



Waste leaves are used as compost in the landscape; fountains and irrigation water demands are fulfilled by treated water and the reuse of water reduces the waste of water. Exhaust air heat is recovered and is utilized to temper fresh air temperature.

Certain materials which are easily available are straw and clay.

Straw is considered to be an inconvenient waste product of agriculture. It can be converted to building boards and utilized into partitions and interior linings.

There are numerous advantages of clay houses. They are cheaper than any other building techniques. The material is easily available, hence transportation cost diminishes. It renders comfort at climatic level as it is warm when it is cold and it is cold when it is warm. It also provides good sound insulation and is not damaged by fire and neither attacked by pests. It can be rapidly constructed and can be built by people themselves.

3. ADAPTABILITY

The demands of human use on an eco – system are cumulative. New proposals must take into consideration the prior usage of resources such that the present activities, proposed development and future demands do not go beyond the ecosystem's capability. The development of a certain scale and type should be equivalent to the capacity and resilient character of the ecosystem. At this point the physical capacity of the site should not be borne in mind.

Over 60% of green house gas emission is created in and by cities. Over 50% of world population lives in cities; this is expected to grow more than 60% by 2030.

As early people struggled to survive, they developed structures that naturally provided thermal comfort, whether they were living in the arctic areas or near the equator. They selectively refined the shelter's basic form and materials to trap heat from the sun when it was advantageous, to keep the sun's heat out when it was detrimental, or to store the heat until it was needed later at night. In urban areas the criteria's of thermal comfort vary in accordance to space and time and due to physical adaptation in order to adjust to the changing environment.

Adaptation is preparing for and coping with climatic impacts. Adaptation is a concept that refers to the adjustments made in the natural or human systems in response to actual or expected threats.

Planning considerations which can be applied to adaptation are as follows.

1. In context of Energy: Strengthening of infrastructure with improved energy efficiency and increased use of renewable resources.
2. In context of water: Rainwater harvesting becomes essential to every nook and corner. Water shortage and conservation techniques. Desalination to be promoted and increased irrigation efficiency to all and sundry.
3. In context of Agriculture: Crop relocation to be made available. Improved land management (such as erosion control and soil protection through tree planting. Adjustment of planting dates and crop variety.

4. In context of Infrastructure and Settlement: Relocation, Improved Sea wells and storm water barriers. Creation of wetlands as buffer against sea level rise and flooding.
5. In context of Human Health and control: Improved climate – sensitive disease surveillance. Improved water supply and sanitation services.
6. In context of Tourism Transport – Diversification of tourism attractions and revenues. Realignment and relocation of transportation routes. Improved standards and planning for infrastructure to cope with warming and damage.

4. ENVIRONMENTAL QUALITY INDEX

The Environmental Quality Index (EQI) was developed by Altarum IMTRI under the co – operative agreement as an index – based approach for quantifying change in environmental quality based on a variety of statewide data inputs.

EQI is a tool for assessing change in fundamental elements of our environment. The EQI is an objective, integrated and scientifically grounded mechanism for answering the question “Is environmental quality improving or not.”

The EQI is an important tool for measuring trends in environmental quality for the commonwealth and provide the public with the information to make meaningful comparison among geographic regions and across years. One of the important elements of EQI is Air quality which is based on measurement of pollutant including ozone, lead, carbon monoxide and particulates. Surface water quality is another important element of EQI based on the suitability of adequate habitat for living resources. The EQI describes the input to surface waters of nutrients, such as, nitrogen and phosphorus. EQI assess the trend of population - whether increasing or decreasing, which suggest the potential for continued stress on the environment from human activity.

The EQI is not a policy analysis. It is based on raw data, air and water quality monitoring data and toxic release inventories form the backbone of EQI. The variables governing the EQI are greenhouse emissions (Co₂ equivalent), Water Pollution (Kg per day), Land without forest (Km. square). Normalizing the pollution created by the above mentioned variables to achieve a healthy environment which would secure life for our generations to come.

5. CONCLUSION

The policy makers should join hands with researchers to evaluate EQI to promote effective environmental policies. The EQI comprising of Air, Water, Land, Built Environment and Social determinants can be utilized to diagnose the prevalence of environmental factors that may be

hazardous to health. For a better and healthy tomorrow a fast track record of the above mentioned domains needs to be maintained. There improvised impact to be rendered positive on the human race and the concerned environmental envelope. Reduce, reuse and *recycling of materials* promoted and some benefits incurred to people following the dictum.

The implementations exercised and proposed needs to be adaptable. The evaluation of the building sector not only from the environment viewpoint but it should be envisaged to provide a positive, social, cultural, economic benefit to the local community.

REFERENCE

- [1] Ahmed Fouad, *Conference Proceedings (ASES)*, SOLAR 2007.
- [2] Dengre Narendra (2010), Indulgence v/s The Art of Architecture in IIA Maharashtra, Pg.17
- [3] H. F. French Nancy and Koziol and Brooks and Powell and Wieneet Inputs to the Environmental
- [4] quality Index(May 2008), (*Reports on data sets investigated and used for calculation of the EQI*), Pg. 1.
- [5] INCCA report, India: Greenhouse Gas Emission 2007.
- [6] Kalode Aashish and Kara, (OCT 2013), Green to its core in *Architecture Time Space & People*. Pg.25.
- [7] Nisar Zebaand Ashraf, (SEP2013), Climate Responsive Architecture in *Architecture Time Space & People*, Pg. 19.
- [8] Odum Eugene (1963), (New York: Holt, Rinehart and Winston), Pg.38.