



## Review Paper

# Permaculture: An approach to sustainability in urban and rural context

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## Abstract

*Increasing urbanization is leading to an alarming rate of unsustainable human activities. It is more crucial now than at any other time given the scenario of degradation of resources currently reached, that development occurs whilst making sustainable societies that can harmonize agreeably with the indigenous habitat. This paper aims to establish that there are rational closer-to-nature urban practices that can lead to a sustainable development without compromise on the existing conditions. This study investigates natural processes used by permaculture practitioners, and also introduces the basic idea of permaculture: a new field which integrates landscape and society in providing their food, shelter, and energy in a sustainable way. The paper explores the ecological design principles, which are delineated through a range of indicators such as sub urban/rural context, gardening and cost-effective systems. The conclusion tries to recognize ways in which individuals can start to carry out improvements in their way of life to move towards a sustainable framework by incorporating permaculture philosophy in their daily life.*

**Keywords:** Permaculture, eco-village, sustainability,

## Introduction

Urbanization is increasing with each passing year with more than 60% of the world's population expected to be residing in the urban areas. This increasing pressure to sustain the masses, eventually leads to rampant usage of environmental resources, leading to their dearth and an introduction to a whole new set of newer risks and threats such as pollution, loss of diversity, species extinction & food insecurity. Owing to this jeopardy, scientists and thinkers have immersed themselves into developing frameworks and ideologies to resort to, to restraint the world order from depleting itself. Ideas and philosophies have been put forth, argued, debated, scraped, renewed and reinvented for this cause. Embarked upon many such thoughts, conceived the philosophy of "Permaculture" put forth by Bill Mollison<sup>1</sup>, an Australian ecologist and University of Tasmania professor and David Holmgren<sup>2</sup>, his student in the year 1970. It has since grown into an international grass root movement. Permaculture is the unique combination of traditional practices & scientific knowledge of innovative ideas and useful information from around the world.

The main aim of Permaculture is to minimize the basic necessary inputs in the form of natural resources; energy and any other fundamental material so as to uphold the system. This is a policy used for sustainability of urban and rural areas with the main concept behind permaculture being to know the type of natural resource or energy and the surroundings or the environment and thereafter interconnecting them so as to attain sustainability. It is a well-coordinated system of living beings including humans and their natural landscape along with the

basic amenities required by them like food, energy, shelter and various other materialistic and non-materialistic requirements, all in a very sustainable manner. The focal point of permaculture is in working with the nature rather than working against it. This system has been established on every scale, starting from individuals, communities to cities.

Permaculture, in its inherent mechanism, helps in achieving the goals of sustainability. Understanding the concepts of permaculture and sustainability, and applying it to a small community so as to make it self-sustainable, eventually the small community is said to be an eco-village. Basic elements that require strengthening in an eco-village are economic well-being, ecological balance and socio-cultural health. Attention to each is essential for holistic and healthy community development. Eco-villages are basically small group of citizens intending to lower their ecological footprints and hence increasing their sense of belonging and purpose in doing so. Therefore it is within human capacity and knowledge to consciously enhance and improve the quality of environment in which the society lives in.

## Permaculture

*"Permaculture is the aware design and maintenance of agriculturally dynamic systems which have the variety, stability, and elasticity of natural ecosystems".*

Bill Mollison<sup>1</sup> along with his student David Holmgren<sup>2</sup> coined the term permaculture in 1970s, as response to new design science which derived from the systems of nature like forests.

Their ideology revolves around design and redesign of human systems. Placing simply permaculture targets leaving the human environment in a better condition that it was in earlier, without compromising on human needs. Permaculture is a process of living which teaches us how to get the most from our resources by minimizing waste and maximizing its output potential. Living in harmony with ecology doesn't mean giving everything up, rather it means realizing the importance of nature & understanding new ways of being physically fit, mentally sound, resourcefully sound and socially well-up. It is a conscious design of a routine which is highly productive and does not cause environmental damage while still meets the basic requirements and leaves the earth resourcefully wealthier than was found<sup>3</sup>.

This definition of permaculture expresses a basic idea about following nature's patterns. Permaculture advocates for development of day to day habits so that human life systems are based on natural ecosystems. The term permaculture constitutes of 3 fundamental words - "permanent," "agriculture," and "culture." The scope of this technology has expanded over time to include economic and social systems. It is an active movement that is continuously evolving. True permaculture, is not simply natural cultivating but the philosophy in practice implies agreeable integration of environment and individuals — providing their food, shelter, and energy in a sustainable way.

### Ethics of permaculture design

While discussing permaculture, ethics are of importance, in light of the fact that permaculture is a ethical configuration framework. The ethics are at the center of permaculture. They characterize how one ought to carry on around the earth and one another.

**Earth care:** - consideration of the earth implies that our number one need is dealing with the earth, verifying we don't harm its characteristic frameworks.

**People care** - consideration of the individuals means helping so that individuals' lives can be managed and have a decent personal satisfaction too however without harming the earth.

**Fair share** (or insert limits on consumption) - ensuring that the available natural resources are utilized in ways that are reasonable, sensible and the process of spending is optimized.

These basic ethics form a solid foundation on which humans can build a stable and sustainable future. The ethics of caring for people can thus help farmers transform an uncertain marketing situation into a stable economic enterprise and a supportive community<sup>4</sup>.

### Principles of permaculture

Permaculture principles are determined from observing nature. They are things we see happening in characteristic biological

systems that we need to replicate. We observe nature and attempt to copy what it does. The principles can be seen as rules to take after when we apply permaculture. Permaculture professionals have recognized many principles, but we are going to focus on some essential philosophy which will provide an understanding of the capacity and significance of permaculture principles.

- i. Creatively use and respond to change - We can have a positive impact by predictable change by careful observation, and then overriding it at the right time.
- ii. Observe and interact - By connecting with nature, designing solutions to suit a particular condition is possible.
- iii. Catch and store energy - By using systems that collect resources when they are abundant, using them in the time of emergency is possible.
- iv. Obtain a yield - Ensuring that people are receiving truly useful rewards as part of the work that they are doing.
- v. Apply self-regulation and accept feedback - Inappropriate activity can be put off to ensure that systems can continue to function well.
- vi. Use and value renewable resources and services - Making the best use of natures in large quantities to reduce the consumptive activities and dependence on non-renewable resources for humans.
- vii. Produce no waste - By valuing and making use of every resource that is available to mankind, nothing is wasted.
- viii. Design from patterns to details - By taking a step back, we get to know the patterns of nature and society. These can form the strength of the character of the designs with the details filled in.
- ix. Integrate rather than segregate - By an arrangement of the right things in the right place, relationships develop among those things and they begin to work together and to support each other.
- x. Use small and slow solutions - Smaller and slower systems are the easiest to sustain as compared to bigger ones, as they make better use of local property/resources and produce more sustainable outcomes.
- xi. Use and value diversity - Diversity takes advantage of the unique nature of environment it resides in by reducing the weakness to a variety of threats.
- xii. Use edges and value the marginal - The boundary between entities is where the most amazing of events take place. These are often the most valuable, diverse and productive elements in the system.

The basic design principles which are the calculated establishment of permaculture were derived from the exploration of environmental structure and through investigation of economical area utilization. Permaculture has been connected most normally to the configuration of housing and landscaping, incorporating methods, for example, agro- forestry, natural building, and rainwater harvesting inside the connection of permaculture outline principles and hypothesis.

Besides people who revise and learn about permaculture and intentionally use permaculture to live in a more sustainable way, there are many people who unconsciously perform or apply permaculture without realizing it – concerned environmentalists, organic gardeners, conservationists, land use planners, urban activists, recyclers, indigenous peoples and anyone working toward creating a sustainable earth. This depicts that permaculture is not a rocket science rather it is a part of life that

is a essential part of human subconscious and its explanation is that the viewpoint of permaculture draws on a lot of ideas and practices that have been around for a long time.

Permaculture is not limited - its principles and practice can be used by anyone, anywhere and anytime. Applying the concept of permaculture is by selecting a spot where you need to consolidate permaculture rehearses such as your home, a field, or your yard. The physical space may be urban or rural, may contain structures, and may be populated.

### Characteristics of a permaculture system

By using permaculture one will have a very simple lifestyle with less demand of funds and time. For this explanation Whitefield<sup>5</sup> made the following statement which are important in the permaculture units design and planning. i. Permaculture is very simple and useful design methodologies, integrated systems analysis and most holistic philosophy found in the world. ii. Permaculture can be used to make fruitful ecosystems from a human utilization perspective or to help degraded natural systems recover. Its philosophy can be used in any ecosystem, no issue how degraded. iii. Permaculture values and approves traditional information and experience. It also incorporates sustainable farming techniques and land utilization strategies from the world. iv. Small scale area utilization. By utilization of slightest potential zone, minor area is protected, and consequently come back to the natural ecosystems. v. Use of the regular methods for plants, creatures and their dealings with the qualities of scene to make naturally protected and supportable agro-based configuration. This implies energy and organic resources including water and soil, are protected, recovered, self-controlled and toward oneself repaired. vi. Long-term sustainability. Permaculture systems can be designed to self-adjust and withstand environmental changes.

The characteristics of permaculture are the essential establishment to empower a proper configuration usage by the incorporation of the permaculture principles. Permaculture is not an illogical arrangement. This is because of the capacity to apply thoughts and get them going on a little scale. It guarantees that option methods for deduction and living just get to be conceivable on the off chance that they are followed up on in our regular presence. The progressive part of these thoughts is that 'little is delightful' and that the gathering of a lot of people little activities goes towards changing the entirety. These thoughts would not be forced from above by legislators, however ordered by people attempting to enhance their own particular ranges. A procedure of self -acknowledgment is energized through the completing of examples in nature, not through following a ready-made plan of how to live<sup>6</sup>.

**Advantages of Permaculture:** i. Reduced expenditure – A lot of money can be saved by using all the natural components of the ecosystem like composting the waste into useful organic matter and manure. ii. Less Waste - In Permaculture, the waste

products are recycled and converted into manure and thus given back to the earth. Continuing this process eventually, the waste material is later used as a natural fertilizer. iii. Chemical Resistance – In Permaculture, natural fertilizers and manures are used for farming and gardening which helps in protecting our produce from harmful chemicals that are used in pesticides. iv. Less Pollution – By using the permaculture design techniques, pollution is minimized. In fact, the zone where permaculture is practiced will be pollution free. v. Develops Neighborhood Values – By applying the permaculture system, the user automatically develops values like creating pollution free environment, helping other fellow beings socially, and using only how much you need. vi. Zoning – An important part of permaculture is zoning. Zoning is an arrangement of the produce depending on what comes first and what needs more attention. vii. Self Dependence and Diversity – A diverse range of produce can be grown at any land. Permaculture is a theory of bringing about the sense of self-reliance in people's mind, as one grows whatever he needs and consume it. If there is any surplus, there are ways of preserving them and using them later. viii. Promotes Green Living – One anyways uses natural fertilizers, natural pesticides, and freshwater reserves in permaculture. It definitely promotes green living of the backyard style. ix. Helpful in Improving Environmental Conditions – Permaculture enlightens us with various ways of attaining satisfactory, eco-friendly and sustainable agro based design which are valuable for the environment. x. Can be Applied in Already Functioning Systems – Permaculture is being used in different systems. Though, it is necessary that the natural scenarios are suitable for it. Permaculture can be applied and easily extend in those areas where traditional methods is already being practiced<sup>7</sup>.

The concept of permaculture seems very hopeful in maintaining the ecological system in a balanced way and also in bringing self-reliance for the users<sup>8</sup>. It is mainly about taking a back-foot and returning back to the traditional technique of design, incorporating the features of organic farming, agro-forestry, sustainable growth, and applied ecology.

**Disadvantages of applying principles of permaculture:** There are some of the following disadvantages could be distinguished by the use of permaculture: i. Permaculture can possibly spread intrusive plants in community garden and agricultural land. For example, weeds. ii. Permaculture is unacceptable for cold atmosphere countries. iii. The absence of information on permaculture design and techniques brings about minimum application of permaculture projects<sup>9</sup>.

**Strategies and techniques applying in permaculture design:** Strategies can be considered objectives that we can use to prioritize and center our deliberations in making and actualizing our outline. Techniques are cement methods for finishing those objectives. We will now look at strategies and techniques we can use to consolidate permaculture practice in making shelter.

Strategies: i. Place structures to minimize natural effect and transportation prerequisites. ii. Renovate older structures. That way we don't need to fabricate new ones utilizing new materials. iii. Use common and recyclable materials. The materials utilized as a part of building development influence the soundness of a building's inhabitants. Therefore, right choice of building materials is important. Numerous customary building materials, for example, weight treated wood, are dangerous and ought to be dodged. Regular materials, for example, untreated wood, stone, block, straw, and earth, are better for the soundness of tenants and the earth. These materials can likewise be reused when the building is demolished<sup>9</sup>. iv. Outline structures to incorporate sustainable energy, water, food production, and waste management systems. Structures are an extraordinary spot to incorporate the greater part of the components in a sustainable system.

Techniques: i. Cobb - Cobb is a building material produced using mud and earth combined with straw. ii. Straw parcel - Straw bunch is an extraordinary building material in light of the fact that its frequently a waste item and in a few territories they really burn it, making air contamination. At the same time it can be baled together and made into an extremely tough building material and has great protecting properties<sup>10</sup>.

**Interrelationship of Sustainability and Permaculture:** The green policy is utilized to replace most of the direct energy inputs with indirect inputs beyond the initial design and completion phase by use of permaculture philosophy. Few examples below give a basic idea of how exact inputs help people to live sustainably.

For example, Pest control is carried using carefully selected plants and domestic animals, as well as wildlife in permaculture. Taking an exalt, provision of thorny hedges we can keep wild animals away out of a particular area along with providing habitat for birds of prey who keep rodents away. It is impossible to control pests completely but through this method their impact can be minimized. The thorny hedges act as a boundary but also act as a habitat for birds. The waste of one species is useful product to the other. For example, a bear defecates in the woods, the feces is decomposed by microbial bacteria which in turn act as manure to the plants in the forest. Those plants may produce fruit and the bears eat the fruit. The bears then defecate and the cycle repeats<sup>11</sup>.

Sustainability demands that the communities reduce usage of products that cannot be reused by our environment. For this reason it is very important to increase closed material lifecycles. Current system of using and putting the waste in landfills must be discouraged with a method where least amount of waste reach the landfill and maximum is reused. This requires a system where the output of one system becomes the input of other. Recycling and reusing is a way this could happen, but a more strategic system is required where the waste is valued as an asset. The privatization of sewage treatment system from

waste disposal system to fertilizer and cooking gas industry is a good example.

**Challenges:** The biggest challenge in the realm of sustainability and it's connect of the permaculture is lack of manpower and education. Now it is possible for a farmer to farm in larger areas by the use of modern fossil fuel powered machines and only season helps<sup>10</sup>. Permaculture requires more people to be working in food production. Also it needs sustainable choices to be made in terms of food consumption for example grain is less eco-friendly than chestnut similarly wheat is less sustainable over rice. More people involved in farming will lead to less people involved with engineering developing eco-friendly solutions and alternatives. Manpower is certainly a significant concern as completion rises. Permaculture is very close to achieving sustainability though its effects both direct and indirect it is the best method to achieve sustainability in a general perspective. But in this fast moving, people are crazy for modern technology which is totally dependent on non-conventional energy and assets<sup>11</sup>.

## Conclusion

Permaculture can be seen as a pathway towards a sustainable living. Little activities can go about as the catalysts that trigger components for enormous outcomes. As data increments all through the framework and feasible outline techniques are encoded in the physical world, more advanced mechanisms can be developed through technology. A standout amongst the most imperative purposes of permaculture is the need to make positive move. Permaculture offers a positive route forward. Issues are seen as being the driving force for innovative approaches. Individuals can create great thoughts and have to potential to contribute to the methodology. Permaculture is about characterizing a stronger vision for the future, then authorizing it from the middle. As more individuals do along these lines, differences of arrangements and thoughts will develop. permaculture could give the force to a change of state to a considerably more natural and maintainable future.

Confidence and neighborhood production are made feasible through a thought of exceptional quality adding to crude materials in the region where they are created, and would have numerous advantages for the group. One advantage of this would be a potential increment in personal satisfaction, as great quality art items, good quality water and healthy organic food turn into the standard.

Occupations are made in a region by increasing utilization of assets and space. There is potential livelihood in reusing and figuring out how to make use of assets through waste. There is a potential for local and field work to be produced. Illustrations of quality adding include: turning and weaving of fiber, paper production, saving sustenance and making fantastic items, for example, brew, wine, sticks and bread.

value adding to crude materials would likewise realize ecological change. The idea of contamination and waste is supplanted by that of recycling and reuse<sup>12</sup>. An expanded measure of understanding of diverse methodology permits the by-product of one procedure to become basic material for an alternate. This is produced in the thought of mechanical nature and living machines underneath. Air, water and soil are cleaned and kept up in a fundamental, solid state through the working of the group<sup>13</sup>.

The twelve key principles towards which methodologies should be intended to empower to attain sustainable development. Sustainable development should include individuals focused on guaranteeing a long term system that could be useful to the poor and the distraught. Methodologies need to be extensive and incorporated where financial, social and environmental objectives may be accomplished.

Sustainable development should not be seen as something new to create but rather focus upon what as of now exist. For sustainable development, an individual needs to improve independently. Independent improvement can also be said as self reliant development. Self reliant development means being mindful regarding expected obligations. The main way that one will attain this obligation is to place individuals at the most reduced financial level that they can take part at. Community participation in urban and sub urban regional levels will likewise be valuable and would increase the awareness of other's expectations. Independent improvement additionally goes for giving individuals control over their own particular surroundings. In a urban setting one should look at what fulfillment one would have by supplying and instructing individuals in essential human needs, for example, food production, food mining, water supply and overcoming social issues.

On the off chance that a community assumes liability for their activities they would be related to coordinated improvement in the economy and getting particular social and cultural perspectives in that particular region. All the community should attempt to cooperate and support each other in creating their own particular regime for the better, for example, promoting food/community gardens in the urban cities. Permaculture might be fruitful when all gatherings are eagerly included; however,

people with the support of local groups can make smaller sustainable environments especially in devastated regions.

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