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Permaculture - A Sustainable Farming Approach

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Abstract - Permaculture, a combination of permanent and agricultural concepts, is a unique approach to sustainable agriculture, livestock, gardening, and life. Permaculture considers the movement of the natural system important. This knowledge can be applied to designing ecosystems that meet human needs without deteriorating natural habitats. Plants, landscapes, animals, humans and structures are integrated into cooperative systems where one element's benefits benefit others. Permaculture can be easily maintained with minimal labour, energy and materials once implemented. Recycle waste reduces pollution. It uses useful and highly profitable species that meet human needs. Permaculture is stable and resistant, and because the system is designed to be varied, even if an element fails, the system is still viable.

Key Words: sustainability, energy consumption, ecology, patterns, habitats, renewable resources, diversity, natural systems

1.INTRODUCTION

In the late 1970s, Bill Millson and David Holmgren developed permaculture. Since then, permaculture has expanded across all aspects of agriculture, from agriculture to housing, from agriculture to suburbs, cities, schools, gardens and communities. The system is suitable for all climates, including deserts, tropical, coastal and mountainous areas.

2.PERMACULTURE THEORY

Permaculture experts should first observe patterns and characteristics of the habitat of the chosen site. The site has to be visited at different time of the day, various seasons and weather conditions and observe the site before designing.

3.SUSTAINABILITY

Sustainability is value laden, and achieving sustainability requires problem solving (Tainter, 2003). Permaculture combines the aspect of human values by approaching the problems through ecology, systems thinking, and holistic inquiry. Ethics and considerations ingrained within those overarching approaches, taken from Holmgren (2007) include:

- Land and nature stewardship
- The built environment
- Tools and technology
- Culture and education
- Health and spiritual well-being
- Finances and economics

4.PERMACULTURE PRINCIPLES

Permaculture concept usually has set principles. Most of the principles have core similarities among various authors and experts. The ethics and principles of Permaculture are as follows:

4.1 Vision and Morals

Nature is always interested in the Earth, the people and invests in the future. These basic ethical principles form a concrete system that allows mankind to create a stable and sustainable future.

The goal, value and intention are derived from the ethics of permaculture, which creates a clear system of specifications. Market gardens have been transformed into agricultural projects supported by the community to promote the care of the people. The local families pay part of the annual production costs in exchange for a weekly harvest of community-funded agricultural farms. The risks and profits are shared between the families involved, as well as additional labour when necessary and ensure that a market is produced for this. Families have the opportunity to be involved in nature and other families. The ethics of care for people creates a community of support and a secure economic enterprise.

4.2 Observe and Interact

The various seasons, times of day and cultures has to be considered while designing. The different existing patterns in nature have to be taken into consideration and work along with it. By observing the patterns of nature, we learn to cooperate with the natural environment, which helps us increase productivity.

Consideration of orientation, slope, and sectors holds significant importance in the process of site design. The slope's gravity is used to transport materials and water. The choice of plant selection on the slope depends upon the orientation of the sun. Analysing the natural factors impacting the site, helps one to design efficiently and work productively.

4.3 Relative Placement

In the natural environment, living organisms establish mutually beneficial relationships, with each entity's placement catering to the needs of the other.

The elements must be placed so that they can take care of each other, which promotes good relations. This placement reduces external inputs, including work needed to maintain the system, and reduces unused output, which can lead to pollution.

4.4 Diverse Components for Each Function

The essential functions are supported by multiple components. When a component fails, a backup component gives the system the elasticity to survive.

Heating plays a crucial function in the greenhouse. circulating warm air beneath cultivation spaces, transforming beds into thermal mass, insulating the northern wall with a composting pile and sauna, and preserving night temperatures with insulated curtains and flexible doors. all these elements add to the complete functioning of a greenhouse.

4.5 Use and Value Renewable Resources and Services

Sustainable ways of capturing and utilizing energy should be a priority. Energy, which gives us the facility to work, should not be wasted. Infrastructure improvements, retrofitting, passive design, and alternative storage techniques should be important. The varied use of renewable resources and appropriate use of it aids in restricting the level of consumption**.**

4.6 Obtain a Yield and produce no waste

For continuity and independent working, production of agricultural yield is required. The principles of self-sustenance should be focused while designing. New ways should be found to incorporate waste into a useful input in the system. Recycling, composting, and reducing waste are increasingly important as population increases.

4.7 Apply Self-Regulation and Acceptance of Feedback

The systems can be made more self-regulating, reducing the work involved in a trial and error management by understanding how the positive and negative feedbacks toil in nature.

4.8 Design from Patterns to Details

Observation of patterns in nature is very crucial. These patterns should serve as the foundation during the design phase, addressing problems at their source and the details to be filled in as the design evolves.

4.9 Integrate Rather than Segregate

Interactions and acknowledgment of complex relationships in nature should be actively applied and utilized.

4.10 Use and Value Diversity

Diversity promotes pliability. Permaculture seeks to comprehend the past, present and potential biological and cultural diversity.

The diversity of nature is influenced by the quantity of symbiotic relationships between them. Life forms are nurtured by these multiple relationships, which enhances the overall consistency and resilience of the entire system. The boundary between the area where the two ecosystems meet is a particularly diverse region. For example, wetland promotes relationships among terrestrial species, aquatic organisms, and specialized wetland species.

4.11 Use Edges and Value the Marginal

The stability and productivity of a system can be identified within the place where two system meets and one should look for ways to make use of its diversity and productivity.

4.12 Layering in Space and over Time

Within this diversified system, life thrives in every crevice and expanse of the available space. Insects burrow into the soil and vegetation blankets the ground, birds create their homes in the branches of trees, plants thrive from the crevices in rocks, and moss dangles from various surfaces, molds stick to rocks, animals flourish in small invertebrates, and nature accumulates life forms at different times and in any movement at its peak potential, producing a substantial amount of valuable products annually.

4.13 Implementing Relevant Technology

Natural systems operate effectively without the intervention of human technology. There is often involving of intensive energy inputs and harmful pollution when it is boosting the efficiency of a system, transportation, continuing maintenance and manufacturing processes. A net energy loss occurs when considering all these factors and there is increase in work production. easy, clean technologies that depend upon gravity and renewable power, readily accessible natural materials, worms and micro-organisms are solid investments for a sustainable future.

In regions where traditional construction materials are not accessible, houses and buildings can be built from straw and protected by adobe and stucco. These indigenous natural materials are cheaper, easier to use, non-toxic and excessively expensive.

5.ADAPTION OF PERMACULTURE

Permaculture is very important to achieve the best results when converting farms, ranches or houses into sustainable systems. A design intended for gradual implementation over several years must be designed with careful observation, methodical analysis, clear vision and creativity. An in-depth inspection can ascertain the amount of energy and nutrients extracted from the site and identify external resources introduced.

The collection of waste resources that can generate income and fertility and biological activities in the system, such as fertilizers and straw, are involved in the first stage of the system. Basic measures like abstaining from continuous crop cultivation, adopting crop rotation, incorporating crop waste into the soil, and utilizing decomposed hay as mulch can minimize the reliance on external inputs and operating costs.

A project such as the construction of a solar greenhouse can be carried out after initial comprehensible changes to initiate the conversion process. The heating of a home, increasing self-sufficiency of food, and the support of garden beds are the many advantages of solar greenhouses. It also serves as a nursery for plant seeds and stores an orchard to provide additional income.

By adapting these changes to the home or other external activity centres, the system can be implemented at a convenient time. When each area is secured, the conversion area can be moved further away from the site. When the conversion process expands, it is easier to start small and build on each achievement to maintain operational confidence and financial stability.

6.PERMACULTURE IN UTAH

An example for permaculture can be seen with Community rebuilds in Moab, Utah which is a non- profit building, energy efficient straw bale housing for income passing families. A environment centered housing design taking into consideration the water systems with a focus on rain water harvesting, sun cycles, material supplying is followed by the community rebuilds. Agricultural bi-products and recycled products are used in each builds.

The earth removed for excavation of the home site is applied back onto the walls as a component in their earthen plasters. Straw bales are brought locally within 100 miles which is an agricultural co-product that was previously a bi-product by the community rebuilds. Houses are also constructed with pine-bark beetle-killed wood by the organization which is available within 100 miles.

The landscapes of the houses are carpeted native plant species and rain gardens. The constructions are completed by the student interns creating a succession prototype of systems for sustainable builders.

7.CONCLUSIONS

Permaculture is more a design process that can be utilized for housing, landscapes and organizations than just food production. The paper emphasizes the theoretical and applied components of permaculture. The three ethics briefly offers the roots that hold together all that has been presented: Care for the earth, Care for the people, There are limits to growth (Holmgren, 2007). It helps us to realize our requirement for rejuvenation. Regeneration of landscapes is a indispensable order for environmental renewability and applied permaculture.

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