Ecological Design of Urban Forest Park Case Study: Shahid Beshti Forest Park in Brojerd

Darabi Hasan, Saeedi Iman

Introduction

Urban landscape is experiencing rapid changes which put all urban domains under pressures. These processes revolutionize urban landscape into spaces without ecologic values. The sustainability of green patches and corridors has been scathed by lack of ecological approaches in planning and design. Therefore, urban green spaces structures and functions have been damaged. Green spaces have been changed into isolated, fragile and unsustainable areas. Controlling green spaces changes process, decrease fragility and improvement of sustainability are vital for green spaces in urban contexts. Utilizing and wide use of ecological frameworks in planning and design is compulsory and inevitable in these conditions. A framework to establish protective and conservative principles in urban context is required. Ecological approach establishment in urban forest parks planning and design will improve green spaces function and will have positive impact on green patches and urban ecology overall. Urban forests are main green patches in cities in which trees are main vegetation cover. Normally Green patches are form main part of ecological system and matrix. They are formed different systems of green spaces that may be called parks, green fringe, urban forest etc. Among green spaces, ecological urban forest functions are totally obvious. The functions are related to the definition of urban forests. Any country has its own definition of urban forest, but in a quite simple way, urban forest parks could be defined as: compressed tree and shrub planted areas combined with open spaces, open and semi open woodlands. It may contain some water bodies and is located in urban or pre-urban areas. The ecological and sustainability issues are immensely considered in the design and management of forest parks in the world. International organizations such as FAO and the USFS (Organization of American plantations) studied extensive research on forest areas. Landscape designers have been considered as forest ecological issues. Existence of forest park samples in different countries such as England, United State and China shows the attention paid to urban forest and forest parks ecological issues. The pattern of ecological planting design, checking up the parks ecological design challenges, paying attention to the tourism and tourism issues in the design of forest parks and the impact of tourism development on the extinction of native species and development of ecological forest parks in order to attract tourists, are among the studies carried out about forest parks and ecological forest parks development. In Iran, the construction of forest parks was developed after the movement of forests and pastures nationalization. These spaces were constructed mainly in the suburban cities of Iran, with the goal of improving ecological and environmental status of the city, and also recreational requirements of citizens. Today, these spaces not only do not meet environmental and ecological requirements due to lack of proper planning and design, but also their social and leisure functions decrease daily due to poor management. Therefore, planning is necessary to:

- Create ecosystem balance in these large patches,
- Prevent fragmentation,
- Establish connection to the city,
- Give the characteristics of recreation and tourism spaces,
- And finally preserve urban environment quality and sustainability.

We could strengthen forest parks by proper environmental design, by emphasis on natural and environmental values conservation and preparing suitable context for appropriate use. In addition, these efforts will motivate tourists to use forest parks, encourage local community to preserve the natural resources of parks for future generations. Proper design along with great emphasis on forest park context to natural based recreation will provide suitable conditions for the protection of natural resources and functions associated with tourism and other healthy and environmental usages. Indeed we could decrease forest parks damages by changing people’s perception of environmental values of forest parks.
and encouraging them to respect environmental wealth and assets provided by urban forest ecosystems. Formation of rich ecosystems makes them as tourist attractions. Local community activities will be developed by tourists’ presence. Tourists’ interest in environmental values, simultaneously communities dependent on forest parks, provide an appropriate environment for the protection of these spaces. Ecological functions of forest parks offer healthier environment for urban community. Ecological forest parks design could act as a solution, leading to the strengthening and restoration of parks ecological processes and help them to recover their natural complex structure, in connection with other urban green spaces. It also enhances the urban ecological networks in natural and artificial corridors. Ecological design aim is to prepare a support system for urban sustainability.

Materials and methods

In this article, analysis and design has been carried out based on ecological design framework. Ecological design is an approach based on a comprehensive understanding of environmental layers, their interaction and design based on minimal destructive effects on the environment in ecological interaction framework. Different principles of ecological design have been presented by researchers. But the emphasis here is on four design principles that have been presented by Ryn and Cowan (1996). Design principles could be stated as:
1-Solution grows from place
2-Ecological accounting informs design
3-Design by nature
4-Everyone is a designer

Based on these principles, Shahid Beheshti forest park of Brojerd has been analyzed and designed. At the beginning, a basic analysis of resources has been presented. Information layers and ecological features have formed the basis of analysis to clarify the ecological characteristics of the urban park and its functions. Thereafter, guidelines of forest park improvement have been developed based on the analysis of framework. Activity locations are selected according to the principles. Finally, master plan of forest park is designed in the context of ecological design.

Results and discussion

City of Brojerd is located in the north of Silakhor fertile plain, in the broad valleys of the central Zagros ranges. Shahid Beheshti forest park is situated on the north of Brojerd city. The Forest Park altitude varies between 1609 to 1649 meters. The park slope varies between zeros to three percent. The park has a medium clay soil, with no salt restriction. Based on the ecological structure of landscape ecology, this area could be divided into four parts as follows:
A. Irreconcilable and incompatible patch that require strengthening,
B. Weak patches that require to be improved,
C. patches that require design and rehabilitation,
D. patches that are capable to develop.

According to the ecological and geomorphologic structures and processes around and within the Shahid Beheshti forest park, it could be described as an area with a combination of natural and non-native planted tree species.

This space is going to be changed by the urban development pressure and processes. These conditions make ecological planning and design obligatory. Master plan of ecological park development based on all conditions and practical implementation of this plan has been presented.

Conclusion

Using ecological design pattern and combining its integration with the aesthetics aspects, while maintaining the ecological function of landscape, respond to different needs of the community. Futurism that lies in the heart of this pattern, first of all will create a suitable relationship between man and environment, secure health of community and viable environmental and ecological conditions that is necessary for future generations. Sustainable urban development will be achievable in ecological framework. For this purpose, the following principles are recommended for the design of ecological forest park:
- Considering ecological aspects of sustainable design with an emphasis on natural, social and economical aspects and at the same time, paying attention to the ecological patches, corridor and footprints
- protecting natural environment
- Emphasizing on the sequence, maintenance and enhancement of existing plant and animal species
- Utilizing natural and morphological features for ecological integrity,
- Creating buffer zones around the edges,
- Preventing people from entering the fragile formed ecosystems,
- Protecting natural passage and
- Designing a rich ecosystem, rather than an environment for human leisure.

Keywords: Ecological Design, Forest park, Ecological Structure, sustainability, Brojerd