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Improving Sustainability Concept in Developing Countries

Sustainable Urban Futures: Environmental Planning For Sustainable Urban Development

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Abstract

Urban Design derived as a separate profession after the determinations of the international conference about the future of cities. City beautification was the fundamental purpose of urban design at the time it was introduced as a separate profession. Over time, the scope and objectives of the urban design have changed. This poses great challenges, but also great opportunities in terms of tackling environmental degradation. In recent years, cities show increasing signs of environmental problems due to the negative impacts of urban activities. The degradation and depletion of natural resources, climate change pressure on green areas have become major concerns for cities. In response to these problems, urban planning policies have shifted to a sustainable focus and cities have begun to develop new strategies for improving the quality of urban ecosystems. An extremely important function of an urban ecosystem is to provide healthy and sustainable environments for both natural systems and communities. Therefore, ecological planning is a functional requirement in the establishment of sustainable built environment. With ecological planning human needs are supplied while natural resources are used in the most effective and sustainable manner. And the maintenance of ecological balance is sustained. Protecting environmental health, having healthy ecosystems, eliminating environmental pollution and providing green spaces are just a few of the many benefits of ecological planning. In this context, the paper presents a short overview of the importance of the implementation of ecological planning into sustainable urban development. Furthermore, the paper defines conceptual framework of a new method for developing sustainable urban ecosystems through ecological planning approach. In the future of the research, this model will be developed as a guideline for the assessment of the ecological sustainability in built environments. An important goal in the new millennium is to make existing and new urban areas more self-sufficient and, sustainable.

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1 . Introduction

In the last few decades, important changes have occurred in the quality of built environment. Due to rapid industrialization and urbanization, there have been serious effects on climate, biodiversity and natural resources. As a result of development pressure on green fields, urban green areas become small, scattered and polluted. Development of transportation networks caused negative impacts such as energy consumption, emission of air pollutants, traffic congestion and noise. On the other hand, the degradation and depletion of urban landscapes threaten health related quality of life of the population. According to the causes of these environmental problems, it becomes necessary to revise the current urban policies and develop new planning models for sustainable urban development.

To achieve sustainable urban development, cities must be planned and managed to form a balance between human being and natural environment by using resources carefully and transferring them to the next generations. In order to protect and enhance environmental conditions of future generations, it is essential to provide the sustainability of urban ecosystems. Therefore, the concept of ecological planning (eco-planning) becomes a functional requirement in achieving sustainable built environment. It is an effective tool that aims to form an urban development in harmony with ecological, social and economic values.

2 . Methodology & Objectives

The research consists of the following steps; literature review and analysis of best practices, development of conceptual framework and the new eco-planning model, case study, scenario testing and policy development. Firstly, a critical review of literature, best practices and case studies on the subject of eco-planning and sustainable development will be conducted. Then, a conceptual framework and the new eco-planning will be developed by synthesizing the information from the literature and best practices review.

3. Sustainable Development

3.1. Development and Sustainability

Sustainability's applicability to three elements of life: nature, people and business, as represented in Figure 1. The interlocking circles show that all three of these categories are highly interdependent. For example, at a global level, business flourishes when water is abundant and raw materials are plentiful. People (and the environment) are Healthy when they have clean air and water. People prosper when their businesses and institutions prosper. The idea of this interaction continuing on indefinitely is central to sustainability.

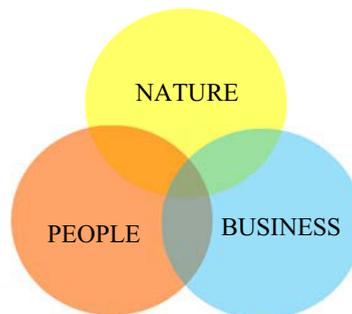


Fig. 1: Three Elements of Sustainability

3.2 .Urban Design & Sustainable Development

This section seeks to identify the connection between urban design & sustainable development. In the context of 90's Cuesta, Sarris, and Signor Etta (1999)state that the issue of sustainable development is the social foundation of urban design today¹.describe urban design as a discipline to create sustainable communities (figure 2) and sustainability is not merely environmental sustainability but embraces economic environmental & social aspects as well. The authors present the EGAN wheel ² as a good framework to create sustainable communities in urban design.



Fig.2: EGAN Wheel, Source Urban Design Compendium⁻¹

A key finding of the Egan (2004) is that sustainable communities do not come by chance and we must work to create them and the report introduces key components of sustainable communities as represented in figure 1. Over the last 10-15 years many other writers, e.g. from Bentevegna et al (2002), to Farr (2012)all discuss that urban design and development is about creating sustainability.

When these and other discussions on urban design and sustainable development are examined the common phase which can be traced is that the Urban Design is all about creating sustainable communities in terms of socioeconomic and environmental aspects.

The three core elements of sustainable development are:

- Environmental considerations must be entrenched in economic policy-making.
 - Sustainable development must incorporate an inescapable commitment to social equity.
 - "Development" must not simply mean "growth". It must imply qualitative as well as quantitative improvement.
- Sustainable development is a continuous improvement of life quality that protects and balances the ecological, social and economic environments. World Commission on Environment and Development in its report *Our Common Future* describes sustainable development as: "Meeting the needs of the present without compromising the needs of future generations."
- In sum sustainable development must be different from economic development of the past. It must be a pro-active strategy to develop sustainability. And its benefits must last well into the next generation, and beyond

3.3. Greening the City

Greening the city refers to strategies and techniques that protect and restore ecology within urban communities. It means "combining urbanism and nature to create healthy, civilizing, and enriching places to live." It means a living area governed more by nature than legislature; and a sustainable human settlement based on "ecological balance, community self-reliance, and participatory democracy."

Urban ecology strives to create, preserve and restore green and open spaces sustainably. It provides many environmental benefits: it reduces the urban heat island effect, minimizes our use of pesticides, conserves energy, cleans urban air, and absorbs carbon dioxide from the atmosphere. But urban ecology also offers a practical day-to-day understanding and linkage between urbanites and nature. Environmental awareness and activism should also be encouraged to focus on issues inside the city.

Creating sustainable green spaces can begin with community parks, as they offer a host of ways to reduce the environmental impact of cities. The restoration and preservation of open spaces is another target for sustainable green initiatives, as is the desire to incorporate greening into private outdoor spaces. Some urban neighbourhoods, with their asphalt roads, concrete sidewalks, and concrete-block property boundaries, need more greenery in their street-level aesthetics; while other neighbourhoods may have adequate green spaces without benefiting from their multi-functional use and realizing their socio-environmental potential. Additionally, sustainability in urban green space is not only desirable, but profitable too.

Another feature of greening the city is the development of urban agriculture. Food, for instance, is a basic human need; and a just and sustainable food system:

- protects the land which produces food,
- supports the local economy through local production,
- empowers communities through self-reliance, and gives them increase food system security
- enhances community well-being through improved health and nutritional conditions;
- increases sense of community; and
- increases environmental health because of reduced transportation of food.

Another greening-the-city circumstance is the presence and use of urban aquatic areas -streams, swamps and beaches - are often neglected or manipulated beyond recognition. Protection and restoration of such aquatic systems can revitalize neighbourhoods and commercial areas. Indeed, there are many examples in North America where seafront, lakefront, and riverfront areas of big cities have become special development zones of shopping and entertainment.

3.3 .1. Local Food Production Urban Dynamics China

This project takes place in the Gaozan Village, China. The economy of the village is based on fishing ponds surrounding the village. The fishing ponds are the dominant element of the landscape. There are plans to develop the surrounding areas with 80% industrial and 20% residential and the existing ecology is in risk of being erased. China has around 20% of the world's population but only 7% of the world's arable

Tadas Jokubauskas Lithuania land, so it is not able to sustain feeding the population. To respond to this problem I propose developing the area with food industries, where food is produced and processed locally. High-tech and low-tech food industries co-exist in close proximity, this way using the urban surfaces efficiently and creating a productive urban landscape



Fig. 3: Local Food Production
Urban Dynamics China

4. Urban Environmental Management Strategies

4.1 Urban Environmental Management

4.1.1. Environmental Problems

The nature and severity of environmental problems as well as the character of potential intervention strategies in any one city will depend on the following factors: ·

The unique natural features of urban areas; whether coastal or inland, mountainous or flat, arid or humid, temperate or tropical, or some combination of these features.

- Population size and rate of growth; which affects the spatial concentration of people, industry, commerce, vehicles, energy consumption, water use, waste generation, ..etc.
- The level of income and economic development; where higher levels suffer from industrial and energy-related pollution while lower levels experience inadequate basic services and depleted forestry resources.
- The diverse spatial dimensions of problems; which determine who is affected and how, the severity of impact, appropriate level of responsibility, ..etc.
- The roles of local actors; whose interactions have an important effect on environmental problems and their solutions.

Not to be underrated is the linkage between poverty, economic development, and the environment; which linkage raises issues of equity, and of the changing nature of environmental Problems and services.

4.1.2. *Policy Messages*

- Mobilizing public support and participation; especially in low income areas where increased awareness can bring about necessary political commitment and the implementation of affordable solutions.
- Improving policy interventions - making strategic choices; which can include such tools as economic and regulatory instruments, property rights, land management instruments, and information/education.
- Building institutional capacity; through upgrading local technical and management capabilities with the accent on operational management.
- Strengthening service delivery; which involves the upgrading of the management of local environmental infrastructure and services (e.g. water supply, sanitation, drainage, solid waste management, ..etc.)
- Closing the knowledge gap; by emphasizing routine collection, assessment, use, and dissemination of critical data.
- Planning strategically; by focusing on essential interventions that can be implemented quickly and effectively, have a high chance of success, pave the way for future environmental control, ..etc.

4.1.3. *Strategies*

The environmental planning approach recommended attempts to blend careful analysis with consensus-building and the participation of a diverse cast of actors. A planning strategy should involve several activities:

- Informed consultation during which rapid assessments are conducted and environmental issues are clarified;
- The formulation of an integrated urban environmental management strategy that embodies issues-oriented strategies and actor-specific action plans.
- Follow-up and consolidation during which agreed programmes and projects are initiated, policy reforms and institutional arrangements are solidified, and monitoring and evaluation procedures are put in place.

To work, any urban environmental strategy must reconcile three overriding tensions in environmental management as follows:

- Integrated versus sector-specific approaches, although agreed actions can only be carried out effectively through designated agencies.
- Analysis versus process, while closing the gap between careful analysis and the interests of various constituencies.
- Decentralized versus centralized approaches, depending on the merits of municipal/regional action or the power of the relevant national agency.

To formulate and implement urban environmental strategies and action plans, cities will need to integrate environmental considerations into urban life and initiate new environmental management programmes which will require stronger institutions, better facilities and equipment, and incentives for improved institutional performance.

4.2 Eco-city Planning

4.2.1. Conventional Planning

Conventional urban planning rests on a faith in growth and utilizes a mechanistic approach. "It assumes that expansion of economic activity, population, infrastructure, ..etc. is inherently beneficial and that any negative aspects can be minimized well enough through marginal adjustments." Many consider that governments' existing decision-making processes for land-use, planning and approvals are too fragmented, expensive, and time consuming; insufficiently sensitive to environmental and social factors; excessively rigid and rule-bound; too slow, reactive, and arbitrary; and apparently unable to ensure, even to promise, attractive, vibrant, and Sustainable settlements.

There are three important ideas that seem to require rediscovery as part of town planning:

- The positive qualities of density in walking-based centres and sub-centres linked by transit;
- The positive qualities of mixed land use, as opposed to rigid and separated zoning; and
- The positive qualities of natural processes and localized community processes in the city.

The paradigm shift from economic development to sustainable development requires that cities be built on a more respectful interrelationship of economic, social and environmental well-being.

Conventional planning is about nudging and accommodating prevailing trends, but ecosystem planning is about choosing and pursuing a desirable future.

4.2.2. Ecosystem Planning

It is clear that a new way of addressing urban problems is needed and that it will have to be more efficiently integrated, more sensitive to ecology and community, more respectful of uncertainties, and more open to citizen involvement than what now prevails. This has led to an ecosystem approach to planning: "an approach that begins with an ecologically-bounded area, stresses the integration of social, economic, and environmental factors, and seeks to involve all the relevant interests and power-holders in identifying desirable futures, evaluating alternative pathways and implementing preferred solutions."

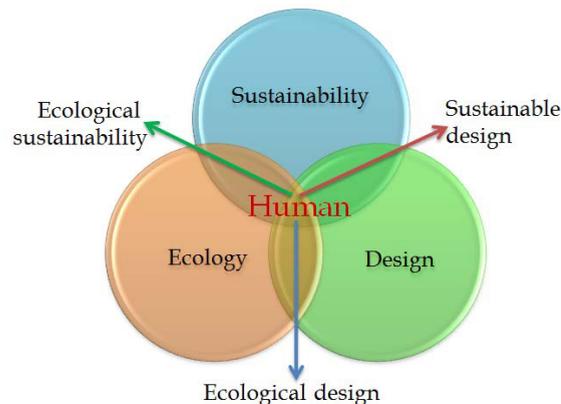


Fig.4. The relationship between ecology, sustainability and design

A number of basic principles reflect the characteristics of ecosystem planning, as follows:

- Base planning units on natural boundaries, reflecting ecological functions while replacing a politically-oriented hierarchy of units.
- Design with nature, and respect human activity and its effect on the environment as well as the limits of resource

availability and ecosystem resilience.

- Consider global and cumulative effects, because a much broader and longer perspective must be considered, like attention to off-site, cross-boundary, inter-generational, and cumulative effects.
- Encourage inter-jurisdictional decision-making, and overcome the present fragmentation and isolation with integrated planning and implementation.
- Ensure consultation and facilitate cooperation and partnering, involving the widest range of stakeholders effectively and openly in the planning process.
- Initiate long term monitoring, feedback, and adaptation of plans, to assess what happens to communities and ecosystems as plan implementation unfolds.
- Adopt an interdisciplinary approach to information, by greater information gathering (e.g. ecological capacity and functions), more integration of information, and greater cooperation among information providers.
- Adopt a precautionary but positive approach to development, that aims not just to avoid further damage but also to reduce stresses and enhance the integrity of ecosystems and communities.
- Ensure that land- use planning integrates environmental, social, and economic objectives, but this depends on the planning body having a firm base of established institutional power to foster multi- interest cooperation and implementation.
- Link ecosystem planning with other aspects of democratic change, social learning, community building, and environmental enlightenment.

4.2.3. *Valuing Urban Environmental Problems*

The challenge of environmental planning is to value the effects of and rank urban environmental problems in terms of health effects, productivity, amenity, ecological values, and other key indicators. By categorizing impacts in this way, emphasis can be placed in the following areas:

- **Health and Safety:** In examining health and safety effects, assessment criteria include health care costs, lost working days, and higher mortality rates.
- **Productivity:** Any assessment should judge the extent of losses in urban productivity, which results from poorly operated infrastructural systems and mismanaged environmental surveillance services.
- **Equity:** Issues of equity are of critical importance because the negative effects of urban environmental degradation fall disproportionately on the poor: A priority in urban improvement programs is increased attention to such low income areas.
- **Ecology:** Ecological effects can be judged on the availability and costs of water and land resources, the vulnerability to natural disasters, and the loss of biological diversity.
- **Amenity:** Effects on amenity include air and water quality, noise levels, scenic beauty, and the presence of parks and clean open-spaces.

Efforts to establish environmental priorities may be by:

- Conducting rapid assessments (and issue-specific action plans) using environmental checklist/profile, and a consultation process;
- Building a typology divided into externalities and impacts including those arising from inadequate environmental health situations, congestion of urban systems, and from degradation of natural support systems.

5-The Importance of Eco-Planning for Sustainable Urban Development

"We are faced with a whole series of global environmental problems which are harming the biosphere and human life in alarming ways that may soon become irreversible. The great challenge of our time is to create sustainable communities; that is, social and cultural environments in which we can satisfy our needs without diminishing the chances of future generations."³

Cities are complex human-dominated ecosystems and human activities make them different from natural ecosystems in several aspects such as climate, soil, hydrology, biodiversity composition, population dynamics and flows of energy and matter⁴. Main human impacts of urban ecosystems are rapid population growth, unplanned urbanisation and inadequate infrastructures. Rapid population growth affects the quality of city services such as housing, public infrastructure, social facilities and causes a crisis in living conditions. Unplanned urbanization provides a threat to the health and safety of human beings, as well as urban productivity, and combined with inadequate infrastructures, it accelerates environmental degradation⁵. This brings us to the main point: to build a sustainable community for future generations, cities need to redesign many of their technologies and functions with ecological principles⁶.

"In terms of urban development, ecologically oriented principles related to sustainability include compact urban form (which saves open space, reduces driving and produces walk able communities), transit-oriented development (which likewise reduces automobile and fossil fuel use), close-loop resource cycles (ensuring that water, metals, wood, paper and other materials are recycled), environmental justice (integrating environmental and equity concerns), pollution prevention and the restoration of ecosystem components within cities and towns. These and other strategies are ways to move towards a radically greener society, one which can coexist with the Earth's limited resources and often fragile ecosystems in the long run."⁷.

In the 1970s, discussions occurred about prevention of environmental problems were followed by intensive debate on sustainable development. However in recent years ecological approaches and planning concepts gained more widespread attention and importance. The increasing concern has enforced the integration of environmental protection into national and local policies. Various international meetings and agreements were established in addressing issues of ecological degradation. In addition, various legislation, plan and programs were constituted in protecting the natural environment. However, countries still carrying on various studies and practices on finding ecological solutions to environmental problems. Consequently, this concern has led to the development of ecological priorities for urban planning process and it has become a necessity to develop new frameworks for preventing the degradation in nature while ensuring the sustainability of resources.

Eco-planning is a fundamentally multi-dimensional concept, providing a wide range of environmental, economic and social benefits to local governments, developers and the community as a whole. Environmentally, it creates ecologically effective green areas, reduces ecological risks, and improves the quality of water, air and soil. Economically, it prevents urban sprawl and traffic congestion, provides better utilisation of existing infrastructure. Socially, it reduces health risks, improves the quality of urban life and city services (e.g. health, education, transportation, recreation)⁸. So with all these benefits, this research will present further opportunities to turn unsustainable urban areas from a problem to a future resource as sustainable environments.

5.1 Stakeholder Participation

In recent years an important strategy in achieving urban environmental management is stakeholder participation which requires the efforts of a wide range of institutions, organizations and individuals. The pace and complexity of change is such that isolated actions cannot suffice.

The reasons for stakeholder participation are:

(a) Strategy

- Governments now face more complex development issues.
- Laws and regulations will only work with willing compliance
- Resource allocation, protection and sustainability are more difficult.
- Community groups must understand each other's interests.
- Social and economic equity in resource management must be evident.

(b) Opportunity

- For information exchange.
- Demanded by interest groups
- Desired by decision-makers

- Generates solutions to problems
- Required by law and/or policy
- Obtains consent or support
- Facilitates implementation
- Joint analysis often resolves conflicts

Additionally, there must be genuine stakeholder participation at all stages of development from Defining the Problem (Stage 1) to Approval and Implementation (Stage 6).

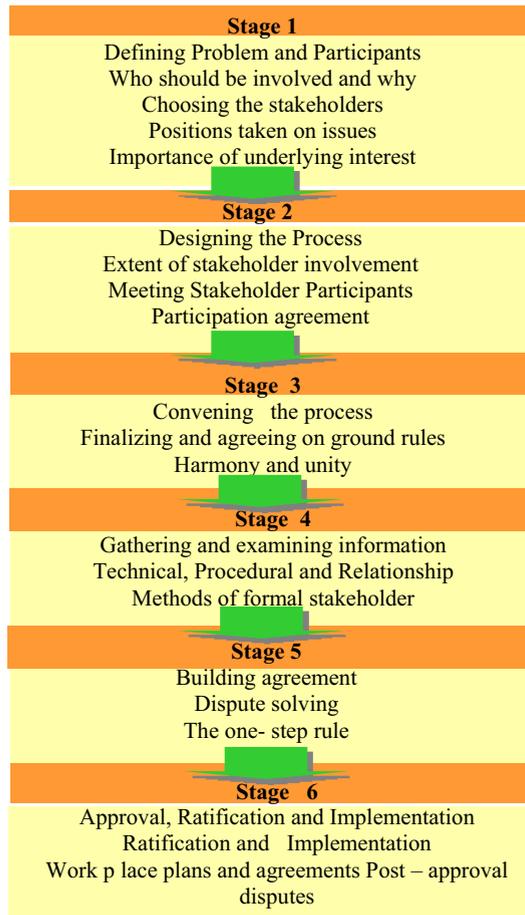


Fig .5. Stages in Stakeholder Participation

Concept of New Urbanism and it's basic principles

New urbanization connect natural environment with human made environment in order to environmental Sustainability (figure 6). Presented traverse section in new urbanism approach, is a system of zoning significant elements in city design which is used to coordinate domain of comprehensive changes in village to city and organizing a advantageous order in this range (village to city). Traverse section, is a natural ordered system as each urban element easily find a place in this chain, this process is discussed as traverse section when divided to smaller parts intellectually, and classified as systematic basic for public zoning⁹.

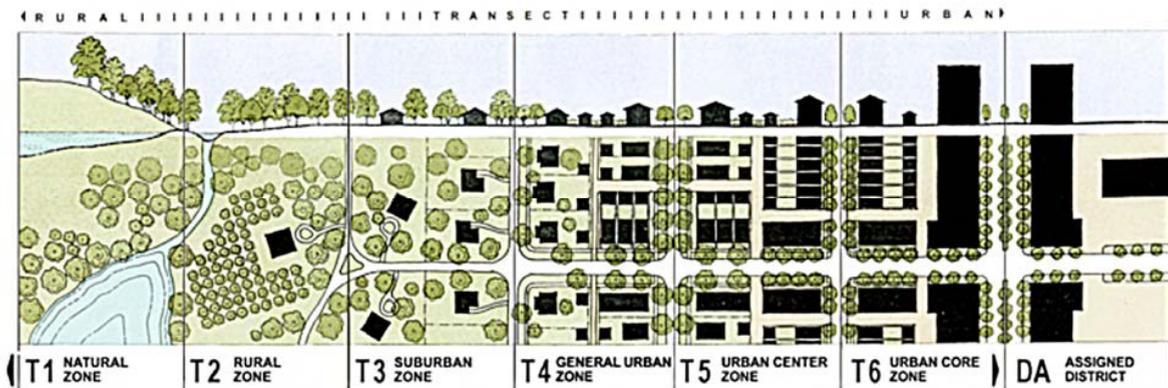


Fig .6. Traverse section of natural environment to human made environment⁹

In another definition, new urbanism or neo traditional design of neighboring units provide set of principles for planning that walking ability and liveable neighboring units and creating friendly atmosphere for pedestrians are its main points. Of course, removing automobile from daily life isn't the purpose but it attempts to make scene of security and comfort, satisfaction and convenience for pedestrians in spite of cars move along city. The necessity for face to face and close interactions of people with each other is generally considered in new urbanism⁻¹⁰. New urbanism movement is designed in neighboring units; it provides various residual uses from apartment to single houses and villa which can support people with different income classes. Its purposes are to support natural and residual units. In new urbanism viewpoint, connection of neighboring units with surround environment is considered and it also supports urban canters and open spaces for all citizens⁻¹¹.

In humanitarian new urbanism, neighboring units should design in a scale that access to bicycle and pedestrian for residents is possible by making neighboring units with walking ability⁻¹².

In the course of introducing new urbanism approach, its main characteristics include as following:

- Criticize modernistic urbanization
- Considering to development in available urban textures against scattered and suburban limitless development
- Attempt to create relatively high congestion, walkable and having mixed use
- Mix subjects such as architecture styles, intelligent growth, disagree with scattered development and sustainable urbanization
- Emphasis and priority on human role in urban design and planning
- Define and use «block, street and building», «neighborhood, district and corridor», «area, metropolitan, city and town», as considerable elements of urbanization in planning design⁻¹³
- Attempt to coordinate with market needs and demands and different needs and views and different income classes
- Emphasis on revitalization and preservation of old textures and cities and recreate internal parts of city
- Slow change from American movement to an international movement⁻¹⁴.
- Attempt to return to art of city construction and traditional planning while being aware of today needs of community⁻¹⁵.
- Support security, safety and health of residues
- Having ability to localized principles of new urbanism in different communities with emphasis on available practices
- Use today technological findings such as new public transportation systems like subway and urban style transportation systems⁻¹⁶.

**Sustainable Urban Future
A Conceptual Framework for the Future Research**

"Strategic decisions about urban infrastructure and growth management are based on our assessment of the past and our expectations for the future. How we think about the future has important consequences for how we define the problems to be addressed and how we searched for solutions. Traditional approaches to planning and management typically rely on predictions of probable futures extrapolated from past trends. Planners and managers need to rely on a much broader and diverse knowledge of the past to build a view of the 'long now'.⁴ Figure 7 illustrates the conceptual framework of this study. Ecological sustainable development is defined as the integration of human activities into natural systems with ensuring the long-term sustainability of these systems. Human activities such as population growth, urbanization, transportation and industry cause pollution and depletion of natural systems. In this context, new planning approaches needed to be developed in order to protect and enhance the environmental conditions for future generations.

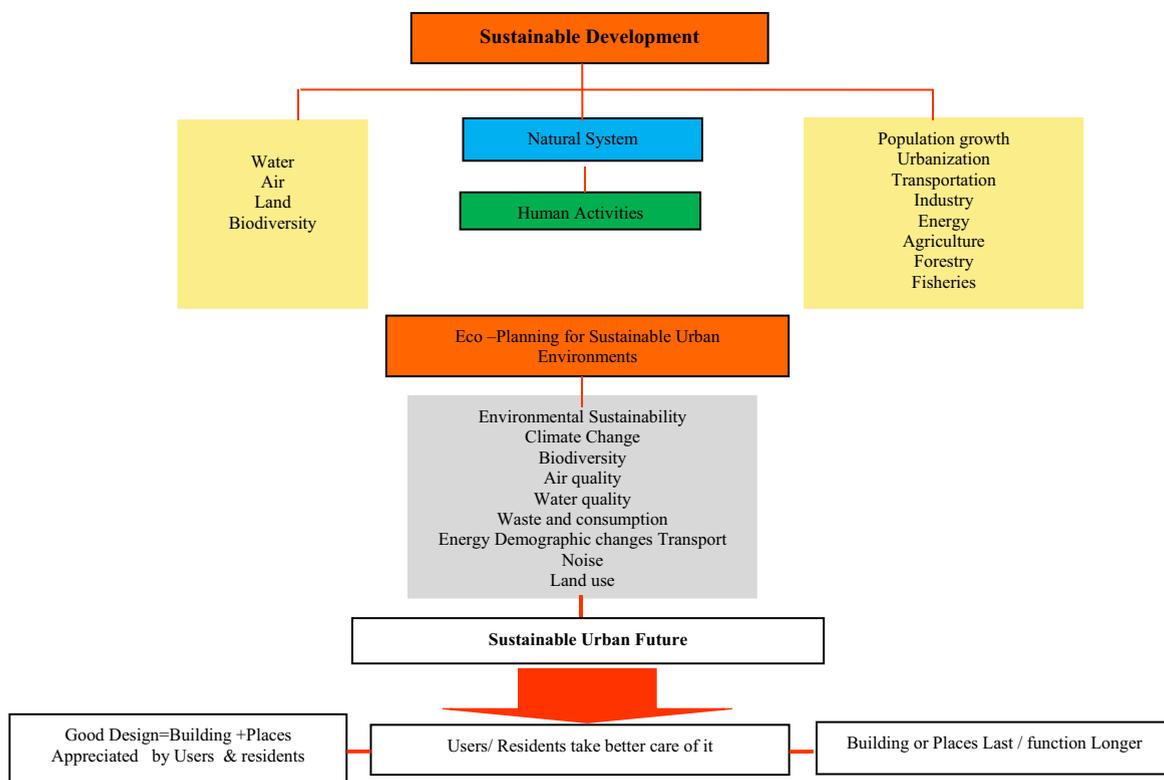


Fig.7: Sustainable Urban Future

6. Conclusion

sustainable urban development refers to a city which its people and businesses continuously endeavour to improve their environments while maintaining the sustainability of ecological systems that supports the growth Elkin et al. state that "sustainable urban development must aim to produce a city that is 'user-friendly' and resourceful, in terms not only its form and energy-efficiency, but also its function, as a place for living". Ecology is the relationship of all living things, including people and their biological and physical environments. Eco-planning is a tool that human should reasonably plan their activities, not to destroy nature but to coordinate with the environment. Furthermore, it

is the basic of sustainable development. Infrastructure Research Theme Postgraduate Student Conference 2009

eco -planning concept is a vital planning approach of our vision of creating sustainable cities in balance with nature. This research aims to answer the issue of building a sustainable urban future by developing a planning tool entitled 'Eco- Planning Model for Sustainable Urban Ecosystems '. This model will be an effective tool for decision-making, used to evaluate the probable environmental impacts and identify the ecological sustainability of a proposed development.

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