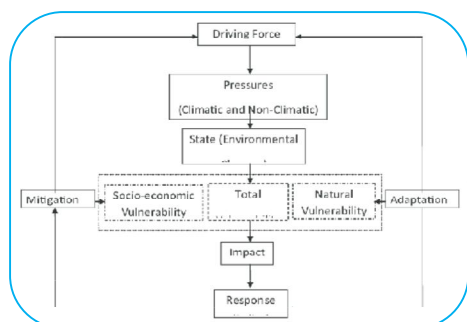




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## ENVIRONMENTAL INVESTIGATION OF FACTORS AFFECTING POLLUTION CAUSED BY URBAN DEVELOPMENT USING DPSIR MODEL FOR ACHIEVING GREEN CITY

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### ABSTRACT:

*Sustainable urban development is one of the most important issues of the day for urban communities and the future of the environment and cities. Today, many urban*

*people live in poor conditions and poor environmental quality, which is expected to be doubled. Urban poverty is defined by the lack of adequate and safe income for providing food, shelter, clothing, health, education and development for each household member. At the same time, income and wealth are not just indicators of urban poverty; it has also an inseparable relationship between the reduction in income with social and physical insecurity, vulnerability to crises and problems caused by illness, unemployment, natural disasters, and marginalization in terms of ethnicity and culture. Today, environmental problems are spreading and becoming more complex all over the world, and thus, ecosystems in the world are much more fragile than before and are approaching their thresholds. Under these conditions, the lack of awareness of the environment and making false decisions may result in severe and unpredictable consequences. This issue is especially evident in urban ecosystems, as areas of great human use and, therefore, the most varied and most sensitive types of ecosystems. The environmental status report using the DPSIR model has been able to provide accurate, systematic and targeted information to decision makers in order to empower them to make informed decisions about environmental conditions and achieve an optimal and sustainable environmental management in the city. It has also helped to increase the citizen's environmental awareness of issues and problems in this area.*

**KEYWORDS:** Urban Management, Green City, DPSIR Model, Environment.

### INTRODUCTION:

One of the most appropriate and comprehensive tools for illustrating the changes in the complex urban ecosystems is the periodic and intermittent preparation of the environmental status report. In

the case of the correct detection of indicators of the changes and the causative factors causing them, the regular assessment of these indicators, the environmental status report can well indicate the status quo, the process of changes from the past and the prediction of future environmental conditions of the city. In fact, comprehensive environmental reporting that

ultimately leads to the production of environmental status reports is one of the most valuable ways to achieve information on the status of natural resources and the sustainability of resource use patterns for policymakers, civil society and other stakeholders such as natural resource planners and managers, industry, media, educational institutes, and

international organizations. In the environmental status report, the overall environmental process or system attitude governing it is presented in the form of a causal conceptual model, so that the collected information and analyses respond to the fundamental questions of the research. The environmental status report describes the status of the selected environmental parameters in a specific time frame. If these reports are periodically and regularly arranged, they can accurately reflect changes in the status of the environmental parameters being investigated. In this way, it is necessary to determine appropriate and traceable indicators for each component of environment ineological (physical, biological), economic, social and cultural sections (SOE Report of Tehran, 2013).

### GENERALITY

The approach of driving forces, pressures, state, impact, and responses, known as the DPSIR model, is a valuable tool for assessing socio-economic and environmental parameters. It is able to describe environmental issues and understand the linkages between emissions and their impacts (Lundin, 2002). The DPSIR approach has been first used by the European Environment Agency. This tool provides an organized structure for analyzing environmental issues of different spatial scales from small watersheds to global systems. The DPSIR approach is a developed form of the PSR framework created by the Organization for Economic Development and Cooperation. This conceptual framework is used to organize environmental information and the relationship between human activities and potential environmental changes. This approach is based on the causal relationship that begins with human activity (driving force) and pressure on the environment, and then, leads to social responses through quantitative and qualitative changes in natural resources. The concept of ecosystem goods and services is a continuous and growing attraction for environmental scientists, managers and decision-makers.

Many studies have been done on ecosystem services and environmental assessment using the DPSIR model. For example, Muller and Burkhard (2012) examined the interaction between ecosystem service concepts and ecological indicators to answer the question of "can ecosystem services be used as ecological indicators?" Given the positive response, they determined the state of the ecosystem services as a central impact component in the framework of the DPSIR ecological indicators (Müller & Burkhard, 2012). In a study by Atkins et al. (2011), ecosystem services were integrated with the social interest in the DPSIR approach for the management of marine environments. This approach provides a framework for supporting decisions in marine environments.

Zacharias et al. (2008) carried out a study entitled as "a DPSIR model for Mediterranean temporary ponds: European, national and local scale comparisons". The purpose of this study was to identify the state of ponds and develop strategic management for the conservation and restoration of temporary ponds in Europe and Greece with the DPSIR approach. In this study, human activities including agriculture, livestock and tourism were evaluated as a driving force on Mediterranean ponds with socio-economic impacts.

In another study, Saadati et al. (2013) carried out a study on sustainable management indicators of pond ecosystems using the DPSIR approach. In order to create a DPSIR structure for Hamoon wetlands, available resources were first indexed and investigated with the aim of understanding and identifying wetland problems (such as wind erosion, migrating birds and etc.). Then, each index was placed in the group of the components of driving force, pressure, state, impact, and response. Finally, they established the relationship between the various defined components in the conceptual model.

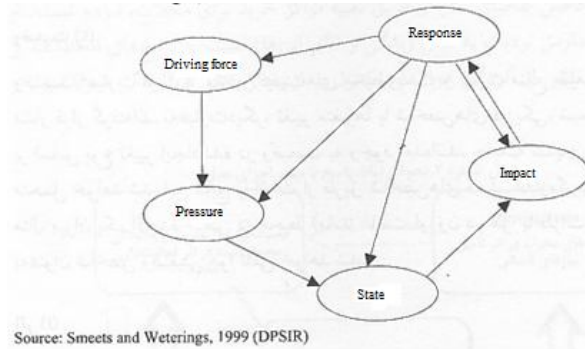
### MATERIALS AND METHODS

In general, a comprehensive assessment should be presented as a conceptual model so that the information gathered is capable of answering the questions raised. Among the methods and models available in this field, the DPSIR model can be considered as one of the most comprehensive methods. This model was proposed by the United Nations Environment Program (UNEP) and is used in the evaluation of the European Environment Agency. While classifying economic, social and environmental information, the causal relationships between them is identified and presented. The DPSIR model

consists of the acronym for the five words of driving force, pressures, state, impact, and responses, which represent the cause and effect of the model variables.

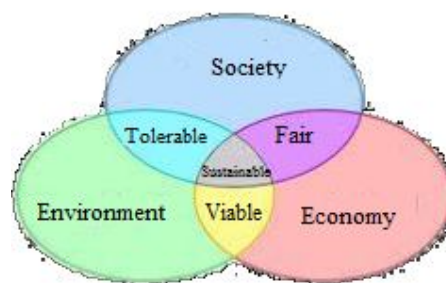
DPSIR is an evaluation model that identifies the cause and effect of a phenomenon in an applied perspective. The following basic questions are answered:

1. Why and how has this phenomenon occurred?
2. What is the state at the moment?
3. What are the impacts of this phenomenon?
4. What actions and policies have been taken to deal with it?
5. What necessary actions and policies should be taken?



**Figure 1: DPSIR model**

One of the important issues surrounding urban areas is the concept of sustainable urban development, which is in fact development based on real needs and rational decisions, taking into account different economic, social and environmental considerations. Sustainability can have four aspects: sustainability in natural resources, political sustainability, social sustainability, and economic sustainability. In fact, sustainable development does not focus solely on the environmental aspect, but also focuses on its social and economic aspects. Sustainable development is the intersection of society, the economy and the environment. In the following, sustainable development shows the link between the three topics of economy, society, and environment.



**Figure 2: sustainable development**

In the middle of the three circles, the term "sustainable" is written, which is in fact the common area of the three circles of society, the economy and the environment. Sustainable development is possible considering the social, economic and environmental conditions. The goals of urban management include improving the working and living conditions of the urban community with respect to individuals and groups of low income, encouraging sustainable economic and social development, and

protecting the physical environment of the city. On the other hand, knowledge management in organizations and companies has led to improved decision making, increased flexibility, increased profits, reduced workload, increased productivity, and new business opportunities, cost reduction, increased market share, and improved staff motivation. Integrating and enhancing urban management and knowledge management together is another key step towards achieving urban development. As one of the pillars of sustainable development is environmental protection, urban management along with knowledge management that is in the process of protecting the environment is one of the methods for achieving sustainable development of green city. In environmental and non-environmental studies, the green city should be implemented considering all environmental and non-environmental objectives with the minimum impact on environment. Thus, knowledge management is more evident with the urban management approaches reviewed by the DPSIR model.

**Table 1: Comparative Comparison of Different Cities**

City	Time period	Conceptual model	Components and issues studied	Report creator
London	Ten years (how London's environmental conditions have changed in comparison with the base year data)	Report preparation is not in the form of the conceptual framework, and focuses on important components of the area under study.	Climate change, flood risk, water quality, water quantity, waste, air quality, transport and noise pollution, biodiversity, land cover and green infrastructure	London Authority, the Environment Agency, Natural England and Forestry Commission, 2010
Sydney	The environmental state report for the city of Sydney is provided from 2001 on an annual basis	No specific model has been used from data analysis and data representation is done using diagram.	Energy and climate change (distributed generation of energy and water and waste, energy efficiency in buildings, greenhouse gases, electricity, green energy), air pollution (transportation and its contribution to pollution), waste and recycling, water, urban ecology, noise	Sydney State of Environment Report, 2011
Auckland	From 1999 for a five-year period	It follows DPSIR framework. Three major driving forces of population growth, economic growth, and consumerism are identified.	Environment and biodiversity (air quality, land and soil, water resources, marine ecosystems, land biodiversity), natural hazards (earthquakes and volcanoes, floods, droughts, severe storms, landslides, coastal and tsunami hazards), cultural	Auckland Regional State of Council Environment Report, 2007

			heritage (natural heritage, human heritage)	
New Delhi	Delhi's environmental report is prepared annually.	Investigation of environmental parameters and optimal responses is important, but it has not completely used DPSIR model.	Air, water resources, soil and waste management, forests and biodiversity, greenhouse gases and climate change	State of Environment Report for Delhi, 2010
Johannesburg	Since 2000 with the support of the United Nations Environment Program (UNEP), it has been updated over the three-year period.	DPSIR framework and the most important driving forces of population growth, growth of poverty, and agricultural and industrial products	Air quality, water, waste, land and outdoor resources, biodiversity	Johannesburg State of Environment Report, 2003
Dakha	The Dhaka city environmental report was issued only once in 2005.	DPSIR framework and driving forces of city and population growth, poverty and migration, unplanned industrial development, lack of relationship between key organizations	Air, resources, water, land, environmental health, solid waste, waste management, marginalization, and natural disaster	Dakha State of Environment Report, 2005
Tehran	Ten-year period from 1998 to 2007	DPSIR framework	Air, water, soil, biodiversity, waste, natural disasters and human habitats	Center for Urban Planning Studies of Tehran Municipality, 2010
Tehran	Three-year period from 2008 and 2010	Complete DPSIR framework	Air, water (water quantity, water quality), sewage, soil, solid waste, natural disasters (earthquake, flood, other natural disasters), human habitat	Center for Urban Planning Studies of Tehran Municipality, 2013

In fact, using process orientations and recognizing the causal processes is a proper and systematic approach to studying the causes of environmental problems and the relationship between environmental systems to provide appropriate solutions (Atkins, Burdon, Elliott, & Gregory, 2011).

## DISCUSSION AND CONCLUSION

Comprehensive attitude to policies and operational plans is important in urban development plans. Also, the formulation of integrated economic, social and environmental objectives that are at the head of policy in the management of city managers is also a priority. In order to achieve these goals, we need a series of evaluations for economic, social, cultural and environmental changes and require major changes in the organization of urban planning and management. In an age where productivity and innovation are a way of improvement and progress, the organization must be able to apply the appropriate knowledge appropriately with proper management and use of its elements to operationally implement it in the right place. In order to guide individual knowledge towards organizational goals, an organization must create an environment with knowledge sharing among members and educate individuals in order to convey their interactions. Each organization should determine the main elements and frameworks for using knowledge and make the necessary changes to establish it based on its mission and tasks, which is the reason for its existence.

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