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CHAPTER- 2

*THEORETICAL BACKGROUND AND REVIEW
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2.1 Introduction

The perception and issues of development in economics have been central focus of discussion on all over the world. Appropriate eco-friendly economic policies will be the relevant ones for today's dynamic world. Development is a basic feature of any nation and without development no society can progress. At the same time, it is true that development is not possible without some adverse effect upon the ecology and environment. Rapid growth of urbanization is the modern trend which is present in more developed as well as less developed regions of the world. People on a large are moving towards cities in search of better living conditions and other comforts of life. This resulted in high population pressure in urban areas and subsequent environmental problems. Hence, Environmental problems associated with urban development have given rise to the concept of sustainable urban development.

Sustainable development is a balancing concept between ecology and development. It demands an integrated development and simultaneous preservation of environment. It contemplates economical, ecological and social sustainability. The urban development should concentrate on establishing a pattern of development which is viewed to reduce the detrimental effects of urbanization and enhance the attitude of conservation of environmental goods. In other words, sustainable urban development is a process, in which development can be sustained for generations. It means improving the quality of human life while, at the same time living in harmony with nature and maintaining a balance with the life supporting the eco system. It is viewed that due to uncontrolled urbanization, environmental degradation is occurring very

severely and causing many problems in urban areas like water contamination, excessive air pollution, noise pollution and problems related with solid & hazardous wastes. Hence there is an urgent need for studying the relationship between urbanization and environment on the basis of review of existing literatures.

2.2 Urbanization and Environment Theories

The economics of urban sustainability is more than environmental economics, because it includes the development of an economy and society, not just management of environmental issues. To understand the importance of healthy environment in development of a city, and a nation as a whole it is important to understand the theories and concepts related to the emergence of urbanization and environmental degradation.

The debate about whether Earth's limited natural resources will continue to provide life support to humanity's burgeoning population began with the famous work named 'An Essay on the Principle of Population' by the English Political Economist Thomas Malthus in the early 1800's (Dixon and Fallon, 1989). In his work, Malthus framed the basic tenet of environmentalism – that “because human population, when unchecked, tends to grow in a geometrical ratio, and subsistence for man in an arithmetical ratio”. Hence, population needed to be checked by “misery, vice and moral restraint” (Eblen and Eblen, 1994).

Smith (1776) and Ricardo (1817) in their theories were concerned with the economic valuation of three most important factors of production: land and the natural environment; capital, by which they meant the development of land and nature; and labour, through which land is transformed into real assets. Then, Marx in 'Das Capital' (1867) focused on the key factors of labour and capital and considered land as an unimportant factor (Cambridge Biographical Encyclopaedia, 2000).

It was until after World War II or in the early 1950's that land rejoined capital and labor to form a complete economic picture. This is the base of modern environmental economics, which reemphasizes the

importance of land as an economic factor. By 'land' today's environmental economists mean 'ecosystems' (Rogers, Jalal and Boyd, 2008).

The Limits to Growth (The Club of Rome, 1972) was the first prominent work which analyses whether the current paradigm of world economic development is 'Sustainable'. Meadows and their team at the Massachusetts Institute of Technology concluded that since the world is physically finite, exponential growth of population, industrial production and pollution must eventually hit a limit. Similarly 'A Blue Print for Survival', a distinguished British Panel wrote that our 'industrial way of life with its ethos of expansion' is not 'sustainable'. Hence, a stable society would cause minimum ecological disruption, practice maximum conservation, and maintain a constant population (Editors of The Ecologist, 1972).

The concept of sustainable development evolved between 1972 and 1992 through a series of international conferences and initiatives. The United Nations Conference on the Human Environment at Stockholm in 1972 created the doctrine of 'Global Trusteeship' upon which the doctrine of 'Sustainable Development' would later be founded (Boyle, 1995).

The term 'sustainable development' was first appeared in the World Conservation Strategy drafted by the United Nations Environment Program (UNEP) and the International Union for the Conservation of Nature (IUCN) in 1980 (Eblen and Eblen, 1994). The most important step towards sustainable development is the publication of an international report titled "Our Common Future" by the World Commission on Environment and Development (WCED or Brundtland Commission) in 1987. This Commission defined Sustainable Development as "development that meets the need of the present without compromising the ability of future generations to meet their own needs" (Le Blanc, et.al, 2012:1). According to this report, the major objective of development should be to ensure the satisfaction of human needs and aspirations of a material kind. The Rio Declaration on

Environment and Development is considered as the cornerstone of Sustainable Development. The Earth Summit held in Rio De Janerio in 1992 was one of the defining moments for sustainable development as the member States agreed to launch a process to develop a set of Sustainable Development Goals (SDGs) that could be a useful tool for pursuing focused and coherent action on Sustainable Development (United Nations 2012: 15, Le Blanc, et.al, 2012: 17). The Summit framed ‘sustainable development as the overarching policy of the 21st century (Keating, 1993). Hence, after three Earth Summits held under the auspicious of United Nations Conference on Environment and Development (UNCED) in 1992, 1997, and 2002, the sustainable development has become a universal theme to describe the amalgamation of environmental opportunities and human wisdom.

Twenty years later was celebrated the United Nations Conference on Sustainable Development (Rio+ 20), held in June 2012, was the agreement by member States to launch a process to develop a set of sustainable development goals (SDGs) that could be useful tool for pursuing focused and coherent action on sustainable development (Le Blancet. al, 2012: 16).

2.2. (i)Theoretical Framework of Urban Sustainability

Since the last few decades, many scholars have begun to turn their attention to strategies that balance improvements in the urbanization process and the environment. Many theories viewed that urbanization, economic development and environment are linked by a series of positive and negative effects.

During the end of the 19th century, the British scholar, Howard, developed the Garden City Theory which attempted to employ rational planning to coordinate the development of urbanization and the urban ecological aspects. Later, Li addressed the casual relationship between urbanization and its resulting environmental pressure and concluded that the relationship between urbanization and environment is representing a U-shaped curve. Similarly Halkos observed an inverted

U-shaped relationship between environmental efficiency and percapita GDP.

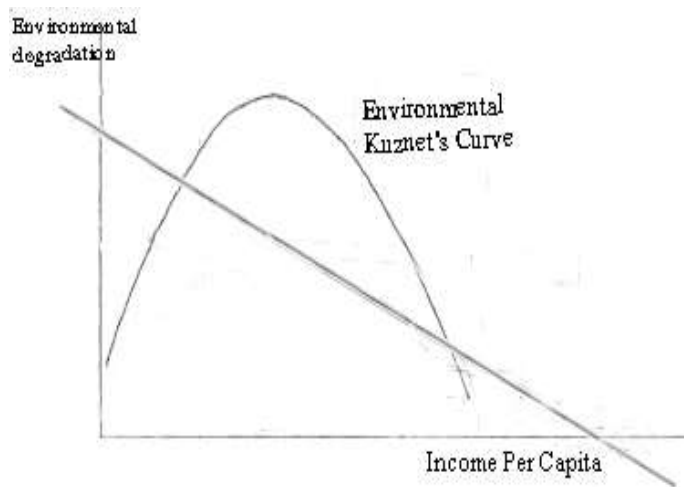
Today urban planners and theorists around the world are behind the concept of 'Urban Sustainability'. 'Sustainability' is regarded alternatively as either the proper means or the proper end of urban development.

The analytical study of Goldstein(1990) examines the urbanization issues of densely populated cities of developing countries. In the developing countries where there are densely populated cities, the impact of urbanization on education and health is relevant in one side; but on the other there are certain connected conditions such as environmental degradation, economic inequality, and housing issues. Environmental problems pose serious health hazards to urban population in these countries. Pollution in the form of emissions from motor vehicles & industries, insufficient water supplies, water pollution, inadequate solid waste management etc are leading to the proliferation of disease vectors, contaminated food and noise.

The Environmental Kuznets Curve of Simon Kuznets (1995) is considered around the world as the perfect theory that clearly specifies the relationship between economic growth and environmental situation. The theory explains the dilemma of urban cities that, with slow economic growth many environmental problems arises and this expresses the nature of relationship between environmental quality and economic growth. The Curve suggests that the increase in economic activities would cause the environmental degradation until a point of inflexion, from where environmental degradation started decreasing. This implies that the environmental impact indicator is an inverted U-shaped function of income per capita or economic growth.

Figure 2.1

Environmental Kuznet's Curve



Some Scholars define ‘Urban Sustainability’ in terms of ‘economic sustainability’ of a city without considering social aspects (Ewers and Nijkamp, 1990). Environmental activists link ‘Urban Sustainability’ to social principles of futurity, equity and participation (FoE, 1994). Hence, the Agenda 21 the Earth Summit pact is considered as the most remarkable step towards the idea of urban sustainability as it proposes a number of concrete measures to achieve sustainability in the socio economic realm. These include equity, entrepreneurship and technology transfer (Keating, 1993). Similarly, Kahn in 1995 expressed the idea that the paradigm of ‘sustainable development’ described in Agenda 21, rests on three conceptual pillars. These are ‘economic sustainability’, ‘social sustainability’ and ‘environmental sustainability’ and these three must be integrated and interlinked. Thus the comprehensive coordination of these three conceptual pillars will ensure urban sustainability.

2.3 Review of literature

The relation between environment and urbanization is relevant, as far as sustainable development is concerned. Positive and negative impacts of urbanization are central theme of study for many decades.

The literature on environment and urbanization are immense, but fragmented in nature. It is often found concentrated on very specific issues of environment. The literature available on environmental economics, are much less developed and it is only in recent times that economists are involved in the analysis of environmental problems. Here an attempt is made to review the available literature on the topic concerning urbanization and related environmental issues focusing sustainable development.

Environmental entitlement as well as economic entitlement is essential for improving the livelihood of the people in a sustainable way. According to Sen (1984), the perception and issues of development in economics have been the central focus of debate, and discussion over a long period of time and reasonably now it is viewed as 'freedom of choice' which may be realized through expansion of people's entitlements and capabilities.

The World Commission on Environment and Development –WCED (1987), provided a balanced approach by defining sustainable development that “meets the needs of the present without compromising the ability of future generation to meet their own needs”, which accepts obligation to pay attention on improving the economic condition of the poor for better environment. Further, recognizing the importance of people and their roles both in economic and ecological consideration, Douglas (1984) distinguishes between sustainability concepts - “food self-sufficiency” (an economic perspective),” stewardship” (an ecological perspective), and “community” (a sociological perspective).

Brian and Kanaley (2006) argued that across developing Asia, there is an increasingly urgent need for large- scale urban environmental improvement programs and for strengthening urban governance and the capacity of local institutions to plan, implement and finance infrastructure provision and service delivery. They put forward seven Sustainability Criteria to analyze sustainability in urbanization. Good governance, improved urban management, financing& cost recovery, effective and efficient infrastructure and service provision, social and environmental sustainability,

innovation& change, and leveraging international development assistance- are the criteria given by them for judging urban sustainability.

World Urbanization Prospects (2014) Revision highlighted the fact that the global urban population is projected to grow by 2.5 billion urban dwellers between 2014 and 2015, with nearly 90 percent of the increase concentrated in Asia and Africa. The report also argued that trends in urbanization are integrally linked to sustainable development. With good planning and governance, the increasing contribution of people in urban settlements can facilitate economic and social development. The impact of consumption and production on environment can also be lowered by this. However, rapid and unplanned urban growth threatens unsustainable development when the necessary infrastructure is not developed or when policies are not implemented to protect the environment and ensure that the benefits of city life are equitably shared.

Tietenberg and Lewis (2012) emphasized that new sustainable forms of development are possible, but they will not automatically be adopted. Economic incentive policies can facilitate the transition from unsustainable to sustainable activities. Solution for the threat to sustainability is possible with an association of market forces. These forces should be channeled in directions that enhance the possibilities of sustainable outcomes. Hence, thinking and acting in unconventional ways will help the world community to achieve sustainable development.

The report of the UN(2007) expressed the need for indicators of sustainable development. The Commission of Sustainable Development (CSD) by the United Nations has identified revised indicators of sustainable development. They are: poverty, governance, health, education, demographics, natural hazards, atmosphere, land, oceans- seas& coasts, fresh water, bio diversity, economic development, global economic partnership, and consumption& production patterns.

The report of EPA (1997) revealed the fact that, a large amount of anecdotal information can envisage which identifies hydrologic impacts on streams. This is caused by increased impervious area such as roads, driveways, parking lots and rooftops in urban development. The study observed the fact that urbanization negatively affects streams and results in water quality problems such as loss of habitat, increased temperature, and loss of fish populations.

Viederman (1996) stated that, “sustainability is a community’s control and prudent use of all forms of capital to ensure, to the degree possible, the present and future generations can obtain a high degree of economic security and achieve democracy while maintaining the integrity of the ecological system upon which all life and production depends.

The idea of sustainable development was tossed by Brundtland Commission (1987) and popularized by World Bank and United Nations Environment Program. The definitions of ‘Sustainable development’ therefore are many, depending on the nature of the problem addressed is the view developed by Arnold (1989). For this concept, no single definition is yet available which everybody accepts and hence ecologists, conservationists and economists all have different views is given by DeGroot (1987).

Barbier (1987) viewed that the totality of sustainable development is yet difficult to grasp analytically. He defined sustainable development as one which is directly concerned with increasing the material standard of the living of the poor at the grass root level which could be quantitatively measured in terms of increased food, real income, educational services, health care, sanitation and water supply, emergency stock of food and cash etc... and only indirectly concerned with economic growth at the aggregate, commonly national level. In more specific terms, sustainable development aims at reducing the absolute poverty of the world’s poor through providing lasting and secure livelihoods that maximize resource depletion, environmental degradation, cultural disruption and social instability.

Bohringer and Loschel (2006) have emphasized the three dimensions of sustainability impact – economic, environmental and social which require good policy designs from the government. These three dimensions are subject to trade offs. Hence what we need is to develop a computable general equilibrium model to measure the impacts of policy designs related to economic, environmental and social impacts of sustainability. The study gives appropriate computable general equilibrium models for government agencies in order to assess the impact of sustainability.

Holling (2000) viewed that sustainable development and management of global and regional resources is a combination of ecological, economic and social problems. But the actions to integrate all these problems (aspects) have short- changed one or more. Sustainability policy designs by the conservation point of view often ignore the needs for adaptive economic development. Similarly policy designs driven by economic interest ignored the uncertainty of nature and its protective actions. Those driven by social interests are aimed for community development and empowerment without considering the imagination and initiative of local groups. Thus these views are having partial prescriptions like regulation and control, get the prices right, empowerment, stake holder ownership etc.. Hence he viewed policies by the government, private foundations, international agencies and NGOs which consider all the three aspects simultaneously.

Mulder and Bergh (2002) expressed the view that sustainable development is the prominent concept of modern scenario as it envisages the interactions between the economy and environment, as well as a generally accepted goal of environmental policy. In order to understand the economic problems and transformation of economic system towards sustainability, an evolutionary approach is required which focuses the attention on irreversible, path – dependent change and long run mutual selection of environmental and economic processes and systems. This study provides an overview to such evolutionary contributions to environmental economics along with suggestions for including co-evolution of economy and environment, sustainable consumption, endogenous preference change, and climate change modelling.

Hwang and Tan (2010) have pointed out the need for green building construction suitable for sustainable construction. Such type of construction of green buildings in Singapore, are subject to problem such as lack of proper project management. This study aims to identify common obstacles encountered during management of green construction projects based on survey and interview results from 31 industry experts. It also proposed some solutions to overcome the barriers. The findings of this study revealed that project cost is the main barrier in green building construction management. However a project management framework for green building construction should be developed to overcome the barriers. They also suggested that promotion of sustainable construction in future projects will be the best option that the world require.

Manal, Salloum and Karam (2008) have pointed out the development of an action plan to establish a decentralized environment and sustainable development monitoring network through local authorities using agreed upon environment and development indicators. This is done in collaboration with the Lebanese Environment and Development Observatory at the Ministry of Environment, the Faculty of Health Science at the University of Balamand. After several workshops and applying a participatory approach, appropriate list of indicators were identified. A total of 110 indicators were generated and they are grouped into four major categories. They are (1) population and socio-economic; (2) economic activities; (3) environment; and (4) sustainable development activities and policies.

Giddings, Hopwood and Brien (2002) have stated that sustainable development is usually presented as the intersection between environment, society and economy. But these are conceived of as separate entities. Usually the economy given priority in policies and the environment is viewed as apart from humans. In reality they are interconnected; the economy dependent on society and the environment while, human existence and society are dependent on and vice versa. So the differentiation of environment, society and economy leads to narrow techno- scientific approach.

Sauve (1996) suggested that the whole education process should be reshaped for sustainable development. The study viewed that according to UNESCO's recent documents, sustainable development is the "ultimate goal of the Man- environment relationship". Hence this article presents certain theoretical tools that can be used to undertake a critical analysis of constructs like environment, education and sustainable development. It also suggested introduction of environmental education for development of responsible societies.

Anand and Sen (2000) made an attempt to integrate the concern for human development in the present with that in the future. They viewed economic stability as a matter of intergenerational equity. They argued for a concept of ethical "universalism" between generations. The study also explores the relationship between distributional equity, sustainable development, optimal growth and pure time preference.

Kasemir, Asselt, Durrenberger, and Jaeger (1999) have made an attempt to provide an Integrated Assessment (IA), an approach aiming at providing decision support on

complex environment- related problems. They argued that integrated assessment should synthesize inter disciplinary scientific insights with a wide variety of societal views. This paper also argues that the sustainability issues cannot be fully described or solved in any unique way. Hence multiple perspectives are included in integrated assessments and this paper also discusses some new avenues in integrated assessment modelling. They also recommended the application of a well-established social scientific tool, namely focus groups, in integrated assessments.

Harishima (2000) argued that the core issue of environmental governance is the way that societies deal with environmental problems. For proper identification of environmental problems, interactions among formal and informal institutions and actions within the society, is essential. This study aimed to review and survey the current state of environmental governance in Asian developing countries in a comparative manner, with special reference to case studies of China, Thailand and India, the most influential countries in each sub-region of Asia. This study also highlighted the fact that although many positive trends have found recently in environmental governance of Asian countries, their environmental governance systems have not yet developed satisfactorily at the national level.

Imura, et al (2005) analysed the urban environmental issues and trends in Asia and observed an overview of the linkages between population growth, urbanization, economic development, and environmental issues in Asian cities. The study focused on the areas of transport planning and air pollution, solid waste management, water supply, and sanitation. It highlighted the major environmental issues faced by cities in the region. The present paper viewed that from the perspective of the environmental Kuznet's Curve hypothesis, it should be possible for governments to continue to pursue economic growth while reducing environmental impacts with appropriate policies.

Satterthwaite (1997) presented a framework for assessing the environmental performance of cities in relation with meeting of sustainable development goals. The study considers how the environmental goals fit with the social, economic and political goals for sustainable development. It also highlights the need for national as well as international frameworks to encourage city-based consumers, enterprises and governments to progress towards the goal of sustainable development.

Kals and Maes (2002) highlighted the relationship between emotional aspects and sustainable development. They suggested changes in individual behavior patterns and decision making processes to establish national and world wide sustainable development. It is argued that environment-specific cognitions and emotions are decisive for sustainable behaviour and environment endangering decisions. Cognitions like environment-specific control beliefs, ecological responsibility attributions, environment- specific moral emotions, such as indignation about insufficient sustainable political decision-making, are the most powerful predictors for sustainable behavior. Hence emotional perspective on sustainable behavior needs to be included on the level of model building as this will ultimately lead to sustainable development.

Naess (2001) expressed the idea that based on the Brundtland Commission's report on the processes in the UN Committee on Environment and Development, a sustainable urban development would require more ambitious policies in order to limit energy consumption, reduce pollution and to protect natural areas and arable land. In this concern, re-use of urban areas and effective utilization of building sites is the suitable strategy to be adopted. The study highlights the need for planning which is oriented towards long-term goals, and utilization knowledge about the environmental consequences of different solutions. This is considered as the suitable planning for sustainable urban development as it includes equity and environmental values of sustainability.

Adishesiah (1989) defined the concept of sustainable development as "the development which meets the basic needs of all, particularly the poor majority for employment, food, energy, water and housing, and ensures growth of agriculture, manufactures, power and services to meet these needs. In that sense, sustainable development merges economics and environment both in theory and decision making".

Parikh et al, (1991) highlighted that urban populations interact with their environment. Urban people change their environment through their consumption of food, energy, water, and land. And in turn, the polluted urban environment affects the health and quality of life of the urban population. The author also pointed out that people who live in

urban areas have very different consumption patterns than residents in rural areas. Urban populations consume much more food, energy, and durable goods than rural populations. Many of the effects of urban areas on the environment are not necessarily linear. Bigger urban areas do not always create more environmental problems. And small urban areas can cause large problems. Much of what determines the extent of the environmental impacts is how the urban populations behave- their consumption and living patterns- not just how large they are.

Brennan (1999) expressed the view that currently, 81 million persons are added annually to the world's population (95 percent of them in developing countries). Similarly between 1995 and 2030, the world's urban population is projected to double from 2.6 to 5.1, by which time three- fifth of the world's population will be living in urban areas (United Nations 1998b). This article also highlights the trends in urban growth, particularly in the developing world. The author also tried to find out the critical linkages between urbanization, public health and habitat, population growth, the environment and international security. Apart from this, the study addressed issues like migration to the urban centers, the immediate environmental and health impacts of urban pollution on developing country cities, and the link between crime and security.

Medina (2010) has explained that many cities in Africa, Asia, and Latin America face serious problems in managing their wastes. Insufficient collection and inappropriate final disposal of wastes are the two major problems in cities. Despite spending increasing resources, many cities- particularly in Asia and Africa- collect less than half of the waste generated. Most of the wastes are disposed in open dumps, deposited on vacant land, or burned by residents in their backyards. This leads to pollution problems and risks to human health and the environment. Over one billion people living in low income communities and slums lack appropriate waste management services. Given the rapid population growth and urbanization in many cities, the management of wastes tends to further deteriorate.

Newman (2006) has examined the environmental impact of growing urbanization. The author introduced three approaches to understand the environmental impact of cities, namely pollution impact, ecological footprint, and sustainability assessment. Although the pollution impact model provides some perspective on local impact, and the ecological footprint model on global impact, only the sustainability assessment approach allows us to see the positive benefits of urban growth and provides policy options that can help cities to reduce their local and global impact while improving their livability and opportunity, which continue to drive their growth. This approach is then applied in the city of Sydney.

Raja(1986) revealed that, the history of urbanization in Indian subcontinent goes as far back as about 2500BC.It is viewed that in the Indus valleys like the Valley's of Tiger, Nile and Euphrates the urban communities were flourished on a large. The Indus valley experienced early urbanization associated with the first agricultural revolution.

Kundu (1994) made a study about the pattern of urbanization in India with special reference to small and medium towns. He exhibits some interesting features of urban growth in India across the size categories. Till the nineties, Class I cities in developed states grew at a faster rate compared to small and medium towns. Whereas small and medium towns grew at a similar of higher rate than that of Class I cities in the less developed states. During nineties, many of the less developed states like Assam, Bihar, Himachal Pradesh, Orissa, and Rajasthan experienced high urban growth in Class I cities as compared to smaller towns. During 1981-91, million plus cities grew at a rate of 3.25 percent and in 1991-2001, it marked to 2.88 percent.

For us (In India) in the views of Gopal Iyer (1996) sustainable development is both a challenge and an opportunity. The obstacles are however great and making the concept of sustainability precise, is difficult. It is not possible to argue that there should be zero use of natural resources for development; successful development will inevitably involve some amount of depletion of natural resources,

resulting in environmental damage. Further, policies and programs of accelerating environmentally responsible development will happen by themselves. It is, therefore important to seize the current opportunities to bring about real and effective change in the country.

Agarwal (2010) has examined the issue of environment from the ethical point of view. The author argued that environment and climate change are the biggest challenges facing humanity. Ethics can be defined as a set of standards that society places on itself which helps to guide actions, options and behavior. The author commends that environmental problems raise fundamental questions of ethics and philosophy. Mere technical solutions to problems are insufficient. The sustainability of physical prosperity without moral values is examined in this article. He also argued that spiritual values are the prime requirements for sustaining moral values. Hence, the author suggested collective approach by citizens and nations for problem solving in an increasingly independent world.

Munasinghe (1993) has addressed the concept of sustainable development and discussed three approaches of the same.

- Economic – maximizing income while maintaining a constant or increasing stock of capital.
- Ecological – maintaining resilience and robustness of biological and physical system; and
- Social-cultural - maintaining stability of social and cultural systems.

Shrivasthava (1994) viewed that all strategies for sustainable development should have the basic theme of environmental stability, ecological balance, food, fodder, fuel wood, security, employment generation, raising income level and removing regional disparities. Moreover it is viewed that, to ensure the sustainable development of the economy environmental degradation should not increase with time but be reduced or at least remain constant if it increases, we will more

further away from sustainability; while if it decreases we will be more closer to it.

Duraiappah (1996) examined the poverty- environmental degradation nexus. The study is viewed to analyze the literature reviews of this area. In this paper a formal structure of analyzing the complex web of factors related to the link between poverty and environment is formulated and used to review the existing literature on the links of poverty and the degradation of four natural resource sectors. This paper also analyses the role of conflicts between different agents (income groups) in the poverty-environmental degradation nexus. The study also examines the presence of feedback loops between poverty and environmental degradation.

Chaudhary (1995) has made a detailed and beautiful case study about Global population growth, Economic development, and Environmental Impact with special reference to India. The study discussed about the challenge of sustained economic development without environmental damage that both developed and developing economies face today. Sustained economic growth is a necessary condition for eradication of poverty and increase in human welfare. In general, there is a positive relation between economic problems and environmental problems. The nature of environmental problems depends upon the level of economic development, the nature of industrialization, the degree of urbanization, and the effectiveness of public policies. This study also focused on the problem of global warming between 1991 and 2001, with special reference to India.

Nadkarni (2000) has studied about the nexus between poverty, environment and development. The study reveals the fact that the rates of growth of the country's GNP have jumped from below 3 percent up to the 1980's to above 5 percent during the 1990's. But this jump enough has not been enough to make a substantial impact on poverty. Along with direct, target-oriented programs, economic development is a suitable strategy for eliminating poverty. Hence more resource

allocation which is environment friendly is necessary for proper development.

Mawdsley (2004) made a study about India's middle classes and the environment. She argued that recently there has been increased interest in urban environmental issues, and to some extent, in India's (variously defined) 'Middle Classes'. This article reviews a range of literatures such as environmental, social-cultural, and political in order to draw out themes and arguments concerning the relationships between India's middle classes and the complex meanings and material aspects of the environment. The importance of recognizing diversity and dynamism within the middle classes in relation to the environment is also explained in this article. The study also highlights the need to develop situated understandings of what constitutes 'the environment' amongst different middle class groups; and underlines the ways in which environmental issues reflect.

Roy (1998) studied about the social crisis arising out of energy & material shortage and resulting ecological imbalance; that is going to hit the entire world. The improper and unscientific disposal of solid wastes generated by the urban folk, poses a serious threat to the habitat. For a balanced and economic urban solid waste management, technological innovations are necessary. The study focused on the socio-economic analysis of the traditional methods of urban solid waste management. It also highlighted the strategies for economic solid waste management in the Indian context.

Amis (1995) aimed to examine the nature of urban poverty in India and the policy response. The study focused the importance of an employment creation or environmental improvement approach to poverty alleviation. It also explores the policy responses aimed at creating employment and increasing incomes as well as environmental improvement initiatives. It highlighted the independent nature of environmental problems in India. Hence, the recommendations made by the Planning Commission's Task Force (1983) and the National

Commission of Urbanization (1988) made tremendous changes in urban policy developments.

Singh (2003) expressed that it is true that in no way development is possible without some adverse effect upon the ecology and environment. Environmental problems associated with development have raised several questions regarding the type and nature of development, and this has given rise to the concept of sustainable development.

In Oxford Dictionary, the term 'sustainable' means to nourish, to encourage and able to sustain. Sustainable development may describe as an integration of development and environmental imperatives. Development and environment must step together. In other words, development and environment should not be at the cost of each other, but there should be development while taking care of and ensuring the protection of environment. Thus, according to Websters (1975) sustainability meant 'to give support' or to 'keep up'.

Aggarwal (1995) expressed the idea that economists have also provided a definition of sustainable development as being an economic process in which the quantity and quality of our stocks of natural resources (like forests) and the integrity of biogeochemical cycles (like climate) are sustained and passed on to the future generations unimpaired. AIR (1996) revealed that 'sustainability' is a characteristic or state that can be maintained indefinitely whereas, 'development' is defined as the increasing capacity to meet human needs and improve the quality of human life.

In views of Singh (2014) the goal of sustainable development is to improve the quality of life. What we can do, is take good care of it. For instance, we encourage the use of natural gas like CNG as a fuel and can adopt natural, organic farming practices on a wide scale. Moreover Good Land (1995) pointed out that sustainable development should based on three components – (i) Social system, (ii) Environment or Ecological system and (iii) Economic system. Sustainable

development can be achieved when these three components are balanced and weighted equally at the same time.

World Bank Report (1998) viewed that urbanization and rising incomes, which lead to more use of resources and therefore more waste, are the two most important trends that factor into rising waste generation rates. In the words of Chaudari (2001) the term urbanization usually refers to the process of concentration of people in the densely populated settlements where majority of the people derive their livelihood from non-primary occupations. One of the chief factors behind the urbanization is the natural growth rate in population.

Rapid urbanization has been a worldwide phenomenon in the 21st century. According to the report of United Nations (2011), the world population is estimated to be 9.3 billion by 2050 from 7 billion in 2011. Between 2011 and 2050, the world population is expected to increase by 2.3 billion, passing from 7.0 billion to 9.3 billion. At the same, the population living in urban areas is projected to gain 2.6 billion passing from 3.6 billion in 2011 to 6.3 billion in 2050.

Satterthwaite (2007) wrote that most of the population growth expected in urban areas will be concentrated in the cities and towns of the less developed regions. Asia, in particular is projected to see its urban population increased by 1.4 billion. Population growth is therefore becoming largely an urban phenomenon concentrated in the Developing world. The Asian Region has been very dynamic as revealed by the diversified level of urbanization. Among the Asian regions, India's urban population is second highest in the world after China and higher than the total population of all countries –HDR(2000).

Button and Pearce (1989) defined sustainable urban growth in terms of "... the basic hypothesis that sustainable urban development requires the urban environment to be improved as a factor contributing to the quality of life and as a factor contributing to the development of the urban economic base". They define this by urban welfare (i.e. the well being of the urban residents) as a function of quality of life (which

depends on quality of environment) and on urban real incomes (which depends on the economic inputs).

The UNCHS (1990) in its report identifies four sustainable development criteria for judging a settlement;

- The quality of life it offers to its inhabitants;
- The scale of non-renewable resource use (including the extent to which secondary resources are drawn from settlement by product for re-use);
- The scale and nature of renewable resource use and the implications for sustaining production levels of renewable resources;
- The scale and nature of non-reusable wastes generated by production and consumption activities and the means by which these are disposed of, including the extent to which waste's impact on human health, natural systems and amenity.

The UNCHS (1991) in connection with its sustainable cities programme defines a sustainable city as “.....a city where achievements in social, economic and physical development are made to last” and a city which “.....has a lasting supply of the natural resources on which its development depends and the lasting security from environmental hazards which may threaten development achievements”.

Dattari (1992) pointed out the following seven steps which are considered to constitute the Environmental Planning and Management concept for the urban development to be sustainable.

- Clarifying environmental issues to be addressed;
- Involving those whose cooperation is required;
- Setting Priorities
- Negotiating issue specific environmental management strategies;
- Agreeing on environmental action plans;
- Initiating priority projects; and
- Strengthening environmental planning and management capacity.

Similarly, Anand (1992) defined a sustainable city “one which meets the needs of the present generations with equity, efficiency and improved economic and social opportunities without decreasing the ability of the future generations to meet their own needs equitably and efficiently.

Basu and Rao (2008) explained that, today three billion people, half of the world’s population live in cities. Sustainable urban development, including adequate provision of water and sanitation, is inextricably linked to poverty reduction and other Millennium Development Goals, Agenda 21 and the Plan of Implementation of the World Summit on Sustainable development. They also stressed the view that urban poverty will become the most significant and politically explosive problem of the 21st century.

Heynen (2003) has given a different view about urbanization. He argued that the rapid rate of urbanization throughout the world has led to the creation of increasing amounts of waste and this in turn poses greater difficulties for disposal. Urban environmental problems result from intricately interwined economic, political and cultural processes. This problem is more acute in developing countries such as India, where economic growth as well as urbanization is quite rapid.

Based on the definition of sustainable development, “meeting the needs of present generation without compromising the needs of the future generations”, Brundtland Commission (1987) argued that we have not adequately taken care of the needs of the future generation, because various natural resources like water, land, forests etc. have been over exploited locally, nationally and globally.

Similarly Erach(2006) revealed that as populations in urban centers grow, they draw on resources from more and more distant areas. The ‘Ecological footprint’ corresponds to the land area necessary to supply natural resources to a community and disposal of its waste. At present, the average ecological footprint of an individual at the global level is said to be 2.3 hectares of land per capita. It is estimated though, that

the world has only 1.7 hectares of land per individual to manage these needs thus leading to an unsustainable use of land.

Again, Singh (1999) has stressed the view that the enormous growth in world economy, reflecting both population growth and rising affluence, is taking place on a finite planet. Consequently, the world is on an economic path that is environmentally unsustainable. This is evident from the indicators given below as;

- Falling water tables;
- Increasing pollution of air and water;
- Food shortages;
- Increasing degradation of land;
- Shrinking/collapsing fisheries; and
- Increasing incidence of natural calamities such as floods and droughts.

Bathwal (2000) has highlighted some important indicators of sustainable development. They are;

- GDP growth rate
- Population stability
- Proportion of urban population
- Clean Air Index
- Government allocation for environmental protection
- Energy Industry
- Renewable energy protection
- Material Intensity
- Environmental awareness of the people etc.

Chopra and Gulati (2001) argued that in India, there are increased migrations of poor people to urban areas in search of jobs. In a study conducted by them in India's arid and semiarid regions, found that out-migration was largely due to the push factors operative at the place of origin such as environmental degradation process and shrinkages of CPRs. Keeping this view Strong (1992) wrote that, sustainable

development involves a process of deep and profound change in the political, social, economic, institutional and technological order, including redefinition of relations between developing and more developed countries. Similarly, Rogers, Jalal and Boyd (2008) have identified factors such as, poverty, pollution, population, participation, policy and market failures (including good governance), and prevention and management of disasters as the key factors governing sustainable development. According to them these can be regarded as the major pillars on which sustainable development rests.

Gregary (1979) has argued that man now recognize that different aspect of environmental quality such as pure air, fresh water and uncontaminated resources tend to be scarce and exhaustible. Here, man's relationship with the environment demands the attention of economists and so they have a growing involvement in the design and implementation of environmental policies to support economic development with sound ecological management.

In Sen's (1992) view environmental problems faced by nations may vary with their stages of development. The extensive exploitation of natural resources for economic development ultimately results in substantial damage to the environment. In fact, environmental pollution and economic development goes together.

Andrew(1996) has pointed out that there is a crucial and potentially positive link between environment and economic development. Some pollution problems noticed during the early stages of a country's development tend to diminish when economy gains adequate resources to abate these problems. This happens because at low level of income, people tend to value development over environmental quality and when income increases they are willing to spend more resources for environmental quality improvements.

Barrow (1999) expressed the view that pollution has been with us since human beings built the first fire, smoke rising from the fire and ashes left on the ground changed the natural environment. The wandering

hunter gathers contaminated the water streams and faced health risks as a consequence of slaughtering animals and living in smoke filled dwelling. The cities are considered as the main symbol of human civilization and centers of incubating growth and innovation. The serious environmental problems faced by them threaten the sustainability of future growth and development.

De and Soni (2009) have highlighted that anthropogenic climate change of post industrial era is expected to impact on all sectors of the society and needs strategic steps to reduce it. The authors made a comparison between mitigation efforts and adaptation measures on this issue. Mitigation efforts include global effort leading to curtailing the emission of green house gases. Adaptation measures on the other hand, compliment the mitigation measures by reducing the impact of global warming. Historically mitigation has received more media attention due to its global canvas; while the adaptation measures have remained in the background. The authors presented certain simple concepts in the field of mitigation through which people can reduce emission by reducing their consumption and demand for energy. They suggested the use of;

- Energy efficient gadgets
- Eco friendly transports, such as cycle for short distances, and bus or car pool for longer distance travel.
- Schools can encourage travels to and from by school buses rather than by individual transport.
- Local products of food and clothing, thus avoiding energy expended in transportation.

The study also expressed the fact that the phenomenal increase in the population during the last fifty years has led to rapid industrialization and high rate of urbanization which have created tremendous pressure on natural resources like land, air, and water. This led to wide spread damage to existing eco system, deforestation, and loss of agricultural land. This resulted in the formation of 'Heat Island' which is an urban effect, and is felt in all major cities in India. Hence action is needed

now, before it becomes too late to repair the damage to climate and environment due to urbanization.

In its report World Bank (1990) highlighted that air pollution is more widespread in its effect than other forms of pollution. Urban growth translates, more vehicles, causing more traffic, more factories, refineries, chemical plants and more people cooking and heating. The pollutants arising from these sources cause damage to vegetation and hence have adverse effect on human health. The largest and gravest source of air pollution in urban areas is the motor vehicles.

Chaplin (1999) examined the political circumstances in India which help to explain why the insanitary living conditions of such a large section of India's urban population have been ignored, and contrasts these with the circumstances which explain successful sanitary reform in Britain in second half of the nineteenth century. She viewed that in India, there is little middle class pressure for sanitary reform as modern medicine and civil engineering have lowered the health risks that might face from the sanitation-related diseases that lower income groups suffer.

Mahadevia (2001) has studied about sustainable urban development in India. She reveals that the mainstream debate on urban development looks either on urban development or sustainable cities, and tends to miss out on people centered approaches to development. The former addresses the issues of economic growth, whereas the latter that of environmental problems, to the exclusion of development concerns of the poor. The new perspective of the sustainable cities in the South is an 'Inclusive Approach', which puts the vision of the poor and marginalized sectors at the centre and includes all the dimensions of development in a holistic and synergetic manner. The paper presents such a vision of sustainable cities in India and describes activities aimed at reaching this vision.

Manivasakam (1995) pointed out that human beings defiled the air, water and soil with pollutants by their unscrupulous behavior, and it

may soon be tilting the balance of natural forces on earth, atmosphere and oceans in a way that could be disastrous for mankind.

Roy and Tisdell (1992) commended that the process of technological change and development by extensive use of non-renewable resources, population growth and greater penetration of market forces had led to detrimental changes in environment and in the structure of rural and urban societies. Again, Macniell et al., (1991) expressed the idea that the world has now moved beyond economic dependence to ecological interdependence. The third world countries and parts of industrialized countries through over exploitation and depletion of natural resources yielded financial gains in short run, but it resulted in a steady reduction of the economic potential over the medium and longer term, and pollution problem that were once local will become global in nature.

Lahiri (1997) found that industrial revolution that had ushered in the last quarter of the 18th century and progressed at an ever increasing pace through centuries, proved to be a vital factor in the hike of urban consumerism and consequent degradation of environment.

Meadows and Rensers (1992) examined and explained the obvious causes of ecological degradation with the help of a formula known as PAT formula. The formula denoted as;

$$I = PXAXT \text{ where;}$$

‘I’ is the environmental impact,

‘P’ is the population,

‘A’ is the materials through put associated with Affluence, and ‘T’ is the technology.

The formula showed that environmental degradation is not the result of increased population or increased accumulation or the introduction of less environmentally benign technology. It is the product of all these variables, therefore improvements in any one of the variables has a beneficial environmental impact.

Varshney (1993) has argued that the environmental problems became transnational and trans- generational in character. Therefore what we need is to have an interdisciplinary approach as far as the matter of environment is concerned.

Pearce and others (1993)) in the book entitled “World without end” combined environmental pollution with increase in income so that the amount of environmental goods consumed tend to rise more rapidly as income increases, or environmental goods tend to be consumed more proportionately by the rich than by the poor. This view was accepted and supplemented by Paul (1992) commenced that “the poor tread lightest on the earth, the higher our income the more havoc we wreak. Similarly, Goldman (1994) commended that, “the richer we became, the more we consume and the more we have to throw away”.

Foster (1999) highlighted the impact of development on planet as changes in four key areas, viz, population, energy, industrialization and urbanization. In his view, environmental degradation is not a result of increased population, or increased accumulation or the introduction of less environmentally benign technology. It is the product of all these factors. Therefore improvements in any one of these variables can have a beneficial environmental impact and vice versa.

Doria (1990) examined the problem of environmental pollution and divided it into two categories, namely those arising from conditions of poverty and underdevelopment and those arising out of negative effect of the very process of development. The first category affected the natural resources as a result of poverty and inadequate availability of resources. The second category related to the side effects of economic growth.

Kamath(1976) treated urbanization as a menace to the survival of human beings and a crime against humanity. He commended that, urbanization is growing at a tremendous pace leading to a world of agglomerations, mega polis piled on mega polis. He also argued that

as the urban man satisfies his needs and desires, he spoils the environment.

Padam and Singh (2004) have examined the features of urban transport in India and trends of urban population. The paper studied about the quality of past urban population projections and finds that there has been considerable diversity in their quality by geographic region, level of development and size of country. The paper also discussed about the impact of urbanization on environment and quality of life. In the pace of urbanization; provision of infrastructural facilities are required to support the residents, which is lagging behind in many cities. Similarly, the urban environment particularly in large cities is deteriorating rapidly. All cities have severe shortage of water supply, sewerage, developed land, housing, transportation and other facilities. Proper access to drinking water, sanitation, basic health services and education are the main problems in urban areas.

Michael (1993) examined the impact of rapid urbanization in developing economies and expressed the idea that, there is health hazards associated with city life, overcrowding, accumulation of human excrement and household waste, occupational hazards and various forms of social disorder. These adversely affected the urban environment. He also argued that the spread of cities, its effluent and the concentration of human domestic and commercial discharges put more pressures on urban ecosystem.

Dwivedi (2007) has argued that urbanization is a natural consequence of economic changes that takes place as a country develops. The positive role of urbanization is often shadowed by the evident deterioration in the physical environment and quality of life in the urban areas caused by widening gap between demand and supply of essential services and infrastructure. The broad objective of urbanization policy should be to secure balanced development between large, medium sized and small industries, and between rural and urban areas.

Angotti(1993) commended that the environmental problems may be very serious in less developed regions and they are not comparable with those of more developed regions. The air pollution, noise pollution, solid waste disposal and land contamination seen in developed nations were considered less serious than a life threatening situation of drinking water contamination by human waste in less developed nations.

Kasarda and Rondinelli (1990) highlighted that urban environmental problems in less developed countries were more acute and intense than developed nations. The scale and type of environmental problems found in the cities of less developed countries are different from those in more developed countries.

A study conducted by MIDS (1992) concluded that the urban environment had been deteriorating due to a number of reasons. The major among them are the gap between the demand and supply of infrastructure services, the accumulated backlog in urban housing with increased population of urban poor and the resulted proliferation of slums and squatter settlements. The weak financial and organizational base of urban administrative bodies also led to inequitable supply of urban services.

The Down to Earth Report (1988) regarded urbanization and industrialization linkages. The report revealed that along with industrialization and urbanization, there is a steady destruction of the nature. Cities and industries had polluted the clean air, and water, industries produce a lot of hazardous wastes and city life produce a lot of garbage. Similar view was expressed by IRC News Letter (1992). The explosive urban growth led to a downward trend in the coverage of basic urban services, such as water supply, sewage and drainage. The capacity of existing system is often stretched to the limits. Their function is deteriorated due to management problems and maintenance procedure. This leads to production of large and increasing amount of human, and other organic, liquid and solid waste pollution.

Trivedi and Raj (1996) traced out the reason behind urban environmental problems as the industrial revolution. This led to concentration of people in urban areas and added new sources of waste by shops, institutions and factories.

Madhiwalla (2007) has examined that the growth of cities has always been accompanied by the growth of slums. The industrial revolution in Western Europe led to the migration of people to slums in cities which created new conditions to ill health due to overcrowding, poor housing & unsanitary environment, coupled with poverty. In earlier times the institution of family and church were primarily responsible for care and relief for health crisis.

Prasad and Kochher (2009) have attempted to explore Global Warming an important aspect of climate change is primarily a consequence of accumulation of green house gases in the atmosphere. The study identifies the impact of climate change in the global as well as Indian context. The paper also highlights major international developments related to climate change including the UN Framework Convention on Climate Change (UNFCCC), 1992 and Kyoto Protocol are described along with significant meetings like those at Bali and Bangkok and outcomes at these international exchanges. The authors also suggested that it is important for us to stick to the principle of common but differentiated responsibility in our negotiations and to take forward the concept of equalizing per capita emissions of countries proposed by the Prime Minister of India.

Mrinal, et al., (2005) have studied about the public health implications of vehicular emissions. The particulate matter, particularly that is less than 10m in size, can causes allergic disorders. Based on the data of air monitoring stations, SPM, RPM, NO_x, SO₂, CO and PM indicate very high level which is dangerous to human health. The study proposed strategic air pollution management in cities, to reduce air pollution levels and advocated measures to maintain environmental balance.

Nagdeve (2006) has examined the relationship between population, the environment and growing population. The study reveals the fact that the country's population growth is imposing an increasing burden on the country's limited and continually degrading natural resource base. The increasing population and growing affluence have already resulted in rapid growth of energy production and consumption in India. The environmental effects like ground water and surface water contamination, air pollution and global warming are of growing concern owing to increasing consumption levels.

Raghupathi (1993) has classified the urban environmental problems and their consequences into different levels;

- (i) Micro level environmental problems related to the residence and immediate surrounding
- (ii) Macro level problems related to countries and the globe as a whole. She argued that the problem of solid waste is severe in urban centers as the ground water or even the surface water is polluted by the discharge of solid wastes into open dumps.

Vyas and Reddy (1998) have pointed out that urban centers face environmental problems at two levels as, one is the impact of high growth oriented development on environment and the other is the direct impact of the improved standard of living through different life styles.

Agarwal (2011) observed that India has the world's second largest urban population (after China). The study expresses the large disparities within urban population in health related indicators. He observed the large disparities in eight cities between the poorest population (the population in the city that is within the poorest quartile for India's urban areas), the population living in settlements classified as "slums and the non-slum" population. He also highlights the poor performance in some health related indicators for the population that is not part of the poorest quartile in several states; for instance in under-

five mortality rates, in the proportion of stunted children and in the proportion of households with no piped water supply to their home.

Sinha (1998) described municipal solid waste as all solid wastes generated in a community except the industrial and agricultural waste. He divided solid wastes into three categories as household, hospital and industrial wastes. The term municipal solid waste is also described as those waste materials that are collected by the municipality itself or by authorized organizations or by persons and it included sewage sludge, combustion ash and other organic and inorganic wastes.

According to Clain (1995) the trend in consumption habits and changes in life styles resulted in generation of more waste. At the same time, existing landfills neared the capacity and new landfill become difficult to site, moreover the secondary markets had contributed much to the rising popularity of recycling to reduce the volume of wastes.

Khambe and Bamane (2003) studied about the garbage treatment problems of hospitality industries of urban India. In each and every urban centers of the country there are many big and small hotels which contributes large quantum of solid wastes. These wastes are either dry wastes or wet wastes. For attaining pollution free environment in cities, these wastes are needed to be treated through proper waste treatment methods. Hence, the study suggested the reuse or recycling method for dry wastes and vermi- composting method for wet biodegradable wastes.

Madhuban(1992) recommended waste management in the sense that the waste if allowed unused led to severe and potential environmental hazards by spreading diseases and leaching of unwanted chemicals into life support system. He also pointed out the resource conservation advantage of waste management.

Leach (1998) has suggested three alternatives to protect and conserve environment. They are;

- (i) Reduce the use of resource;
- (ii) Reuse of resource; and

(iii) Recycle the waste material.

Mehta (1995) explained the results of the study conducted in the city of Delhi and found that the city generated 4,000 tonnes of waste everyday and the municipal authority did not have the resources and technical capacity to deal with this problem. This led to severe detrimental effects on environment and sustainable development.

Bhagat (1997) has examined the conceptual issues regarding the relationship between population and environment. The result shows that the preponderance of economic variables viz-a-viz population variables in explaining the level of greenhouse gases at a cross-country level. The transportation and constructive requirement of increasing urbanization are also reflected in the positive relationship between percent urban populations with per capita CO₂ emissions. Similarly Bhaduri (2008) attempted to study the growth and impact of vehicular population with particular reference to personalized transport in the mega cities of India. The study concluded that urban transport systems in Indian cities can become sustainable and provide mobility with minimal adverse effects in the environment only if safe and affordable transport for all sections of people is made available.

Ramachandran (1992) has analyzed the process of urbanization and urban systems in India. His study is classified into two aspects. Firstly, he wrote about the Indian point of view in order to correct imbalances which arise from the western dominated literature. He introduced Indian statistics and application of urban geographical principles to India's history of urban development. Secondly, the study addressed the current urban problems in India, including proliferation of slums, the inadequacy of city transport, deficiencies in infrastructure, inflated land values and the unequal spatial distribution of urban services. The author deals with the policy of urbanization. He viewed that India has an unequally long and varied 5000 year history of invasions and successions of cultures and peoples with their contrasting expression of urban development.

Bhan and Jana (2015) have attempted to study urban inequality with the help of two indices. The first is a proxy wealth index (PWI), which creates a distribution of households by the assets they own as a proxy to measure relative levels of wealth or impoverishment. The second is a quality of housing index (QHI), which measures the material adequacy of housing conditions as well as access to basic environmental services such as water and sanitation. On the basis of these indices the study argued that the slum is not a proxy for urban poverty and inadequate housing patterns, it underscores the need for newer methods to spatially trace multidimensional urban poverty and vulnerability.

According to the report of the Central Statistical Organization (1999), the growth of motor vehicles in metropolitan cities of India is at a high level which is not affordable to the existing road networks in India. The major share of vehicular population is two wheelers (70%), followed by jeeps and taxis. The increased number of vehicles in metropolitan cities are found to be responsible for traffic congestion and air pollution.

Greenstone, et al., (2015) have studied about India's air pollution in the context of growing urbanization. Air pollution in India is severe. The paper attempts to estimate the life expectancy loss from fine particulate air pollution in India, and in doing so highlights air pollution as an urgent public health problem that deserves policy attention. The study reveals the fact that 660 million people, over half of India's population, live in areas that exceed the Indian National Ambient Air Quality Standard for fine particulate population. By reducing population in these areas, it is possible to increase the life expectancy for these Indians by 3.2 years on average for a total of 2.1 billion life years. Hence, to fulfill this objective efficient environmental policy is required.

De and Soni (2009) highlighted that vehicular emission is the single most important source of air pollution in India since the last few decades. It is estimated that around 70% pollutants in air are

contributed by motor vehicles. The growth of motor vehicles since 1960, is faster than that of population growth. The data revealed that the total number of cars in 1950 all over the world were 50 million, which have risen to 600 million in 2002 and will be touching to 1 billion in 2020. Similarly, vehicular population in India is increasing at the rate of around 20 percent in every year.

Cropper, et al., (1997) have studied about the health impacts of air pollution due to increased levels of particulate matter in Delhi in between 1991 and 1994. Delhi is one of the most populated cities of the world and hence, the impact of particulate matter on trauma deaths in the city is found to be higher in the age group of fifteen to forty four years. On the basis of contingent valuation method and cost of illness estimates the study revealed that, deaths in the city associated with air pollution causes lost of more life- years compared to many cities of the developed countries.

Nagdeve (2004) has made an attempt to study the impact of rapid and unplanned urbanization on air pollution. Growth of motor vehicles and associated air pollution is adversely affecting environment and health conditions of people. Based on the available data, the study revealed the detrimental impacts of air pollution in major Indian cities due to automobile emission and its concomitant health hazards. Similarly, Trivedy and Goel (1986) admitted that the number of vehicles in Indian cities including metropolitan cities is still insignificant as compared to that of developed countries like USA, Europe and Japan. But, it is shocking to note that the air pollution levels in these countries are low compared to that of India. The study reveals that, this issue is due to inferior maintenance of vehicles in combination with lower combustion efficiency and resulted vehicular exhausts. This is found to be the reason behind growing number of acid rain in Indian cities.

The Central Air Pollution Board (2013) in its annual report has reported that, high levels of NO₂ were observed in the majority of urban centers in India. The air quality monitoring data revealed that, the gases pollutants (SO₂ and NO_x) showed lower concentrations and SPM and RPM showed higher concentrations in ambient air which

resulted in higher rate of respiratory diseases among the residents of selected cities. Hence, the study concluded that under long term exposure, there is high correlation between particulate concentrations and mortality from lung diseases in Indian cities.

Maiti and Agrawal (2005) have analyzed the magnitude of environmental degradation in the context of growing urbanization. The study examined some of the important environmental problems caused by over population growth and rapid urbanization process in the metropolitan cities of India. There was about three fold increase in the percentage of total urban population in Class-I city followed by almost a fifty fold increase in the total population in the Million plus cities in India from 1901 to 2001. Despite several Government housing policies, 41 percent of the total slum population of India is residing in Million plus city alone. In all the four metro cities the problem of solid wastes is found the highest. The noise pollution was noticed more than the prescribed standard in all the four metro cities. Along with these there is an acute shortage of piped drinking water in these cities. Hence, there is an urgent need to tackle the urban environmental problems in rational manner giving attention to the need for improving urban strategies.

Mukhopadhyay and Revi (2009) have studied about India's urbanization and economic growth and related impacts on climate change. They argued that the existing urbanization models are unsustainable. The paper explores a limited set of emergent issues that will have to be considered as India develops its domestic approach to urbanization, while negotiating its international position of climate change. Further this paper is structured into three broad sections; (a) the feedback loops from urbanization to climate change and vice versa, (b) actions needed at multiple levels to influence these processes, and (c) the implications of these for India's negotiating position on climate change.

Dutta (2006) concentrated on urbanization in India with special attention to urban policy issues. The study advocated policies which relate to proper urban planning

where City Planning will consist of operational, developmental and restorative planning. The study also suggested development of strong economic base for urban economy and urban planning should concentrate on housing for slum people with human face for a better living of urban people.

Ghosh (2005) has analyzed that India's environmental problems are gaining global significance because of the rapid and aggressive speed of urbanization and lack of infrastructure. India is the first country, which has provided for the protection and improvement for the environment in its constitution. Therefore the author made an attempt to throw light on the trends in India's planning for the reduction of environmental degradation. For that purpose she used data from the Planning Commission Report of Government of India, from first five year plan up to tenth five year plan. Report shows that there is an increasing importance in planning and policies throughout the plan periods to reduce environmental degradation.

Kundu (1997) argued that Class I cities of India such as Kolkata, Bombay, Delhi, Madras etc. have reached to a point of saturation in case of employment generating capacity. These cities are suffering from urban poverty, unemployment, transport, water supply & sanitation, water pollution & air pollution, inadequate provision for social infrastructure etc. Because of these problems these large cities cannot absorb rural migrants from distant areas.

Naik and Purohit (2003) had attempted to study the noise levels of ten residential locations at Bondamunda city during day and night. The results revealed that during day and night, the noise level exceeded the CPCB recommended limit. The sources of noise are many in the area, which are responsible for health problems in the industrial complex. Similarly, Sing and Kaur (2014) revealed that rapid urbanization along with road network expansion are responsible for noise pollution in the city. As per the study, the main agents of noise pollution in India are vehicular population and industrial sector. Similar view is given by Panday and Varma (1997). The study viewed that the increased levels of noise pollution in Indian cities are contributed by rapid urbanization, industrialization, transportation etc. The study also highlighted the idea that, for assessing the noise pollution level in cities a systematic study needed to be introduced with objective measurement and subjective reaction of people who are affected by the noise pollution.

Rajashekariah (2011) has attempted to analyze the impact of urbanization on biodiversity in the two Indian Cities of Coimbatore and Kolkata. It also aimed to discuss the key environmental issues of these cities. This study showed the fact that rapid growth of these cities has led to the destruction of natural eco systems and an increase in the ecological foot print. It is also argued that developing sustainable cities requires creation of new governance structures and changes in the behavior of citizens. What we need is showing solutions that are affordable, easy and replicable, and ultimately we will attain a sustainable solution to the problems of urbanization. So the urban planning should take into account eco system services and long term sustainability of nature- society relations.

Battacharya (1998) revealed that urbanization of Kolkata and its neighbouring areas have had severe impacts on environment, especially on the Sundarbans. Growing infrastructure construction and increasing demand for natural resources from the city had led to large scale deforestation of mangroves, siltation and pollution. This affected the ecology and sustainable development of this area.

Kaur (2006) has attempted to study the growth and structure of infrastructure section in Punjab and revealed that when a country moves from a low income to middle income category, the relative share of power, telecom, and roads tends to increase, while irrigation, and railways decrease. The study attempted to analyze the growth, direction, structural transformation in the infrastructural developments by using secondary data analysis.

Vaidhya (2009) has analyzed the major issues of urban areas. India has to improve its urban areas to achieve objectives of economic development. This paper has analyzed urban trends, projected population, service delivery, institutional arrangements, municipal finances, innovative financing etc. It has also described the status of government launched urban investment program JNNURM. As per population projection for 2026, level of urbanization would be different in various states. Hence, India's future urban strategy should focus on: (a) inter-government transfers with built-in incentives to improve performance; (b) integrate urban transport with land use

planning; (c) capacity building of ULBs; (d) investment on asset creation and management; (e) integrate various urban development and related programs at local, state, and national levels; (f) strengthen urban institutions and clarify roles of different organizations; (g) different approach of supporting reform linked investments needed for different states based on level of urbanization; (h) second generation of urban reforms should further focus on regulation, innovative financing and PPP, and climate change initiatives. It has recommended constitutional amendments as well as administrative actions to improve India's urban areas.

Salvi(1996) has studied the problems related with solid waste disposal in the city of Mumbai. She argued that the improper decomposition of waste resulted in unsanitary conditions at the dumping site not only affected the people in the vicinity but also the distant areas where the suffocating gases spreads.

Rao and Shantram (1995) revealed the fact that, in a majority of the urban centers of our country, waste is being disposed of by depositing the same in low lying areas. The disposal sites are selected on the basis of their closeness to the collection areas and new disposal sites are normally identified only when the existing areas are completely filled.

The CPCB (2000) in its report specified that India's population will increase to 600 million by 2030 and hence, the greatest challenge before us will be the proper management of municipal solid wastes (MSW). The country has more than 5000 cities and towns, which generate about 40 million tonnes of MSW per year. It is estimated by The Energy Research Institute (TERI) that the generation of MSW will reach to 260 tonnes per year by 2047.

Agarwal and Taneja (2005)have made an attempt to study about the child health conditions among the urban poor. They observed that increasing urbanization has resulted in a faster growth of slum population. There are mounting disparities among slums in developing

countries. This has led to varying degrees of health burden on the slum children. Child health conditions in slums with inadequate services are worse in comparison to relatively better served slums. Hence, identification, mapping and assessment of all slums are important for locating the hitherto missed out slums and focusing on the neediest slums. In order to improve children's health in slums, an urban child health programme and community-need-responsive approaches are necessary.

Agarwal, et al., (2007) have analyzed about urban poverty and health of urban poor and revealed that nearly 48 percent of the world's population lives in urban areas and the prime locus of this spurt in city dwellers are the developing countries such as India. This paper analyses the association between urban poverty and health of the urban poor in India. The health situation among urban poor is described on the basis of analysis of the NFHS-2 data by economic status. The paper also outlines some of the challenges in improving health outcomes of the urban poor and the potential operational solutions to address such challenges.

Sacratees and Raihan (2014) have studied about the environmental impact of waste water discharge from shrimp farms of Thoothukudy District. The study emphasized the fact that the waste water discharged from the shrimp farms is supposed to be the most significant factor that contributes to the degradation of the environment and to cause self pollution within the culture system. Aquaculture is increasingly confronted with issues of environmental protection. However there is no systematic investigation on the total organic load released by the shrimp farms into the land. Hence, stronger commitment to responsible aquaculture is needed. Currently, the knowledge of potential ecological impacts as well as of negative social and economic side effects of a given aquaculture development is getting mass attention from every sectors.

Mariappan et al., (2000) have pointed out the problem of inadequate provision of water and sanitation facilities in urban areas with the

special implications of its impact on children's health and general development. The child mortality and morbidity rates in poor urban settlements of India were found to be higher than those in rural areas. This may be due to the water contamination problem of the cities. The ground water and its chemical composition are changed a lot due to external pollution agents and this has resulted in worsening the quality of water.

Tyagi(1998) has studied about the problem of water contamination in cities of India and viewed that, the organic material that is discharged with municipal wastes through sewages into the water sources results in biological degradation and ecological imbalance of rivers and lakes. Normally, natural ground water is bacterial free. But it gets contaminated with sewage or industrial seepage and hence, there is higher possibility of water contamination which is the main source of spread of diseases in cities.

Economic Review (2014) report expressed the fact that considering the special features of urbanization and geographical peculiarities of Kerala, the process of urbanization in the state requires special attention while moulding various urban infrastructure development programmes. The scattered pattern of urbanization and high density of population of the state together make a big challenge for the creation of urban infrastructure cities.

The Government of Kerala Status Report (1988) pointed out that the wastes discharged to marine water influenced the coastal fisheries and resulted to mass mortality of benthic organisms of commercial importance like Claus, Mussels and Oysters. Pollution also affected the growth and reproduction of marine plants.

Elangovan (2011) has highlighted that in the fast growing city like Kochi, an ideal mode of public transport must make efficient use of road space and reduce air and noise pollution. This will lead to environment friendly road transport system. Singh (2001) pointed out that the sluggishness of Cochin Corporation in cleaning the waste had resulted

in water logging in several places. This attitude shown by Cochin Corporation had invited flack from various quarters.

A study conducted by Jishi (2000) in the area of solid waste management, recommended the decentralized collection and disposal of waste as the most suitable and efficient system of waste management for Thiruvananthapuram city. She suggested the composting method not only due to its eco-friendliness but also its promotional role in agriculture.

Similarly Pillai (2000) conducted a study of Palakkad Municipality which revealed the fact that the daily collection of waste in Palakkad Municipality was around 30 tonnes and half of the daily produced wastes remain uncollected and this proved the inefficiency of waste collection.

Unni(1993) conducted a study of Calicut Corporation and expressed the idea that Calicut Corporation produced nearly 72 tonnes of municipal solid waste daily. He also proved that the waste generated had a direct connection with the widespread use of plastic covers and objects in a day to day life which is harmful to environment.

Soni(2014) has examined the significance of environment friendly housing development initiatives. The term 'Green Homes' is largely recognized as an extension of the broader concept of 'Green Buildings', often used interchangeably with the terms 'Sustainable Buildings', 'High Performance Buildings', and 'Environmentally Responsible Buildings'. It is a process that creates buildings and infrastructure that minimizes the use of resources, reduce harmful effects on environment and provide healthier environments for people. The concept of 'Green Affordable Homes' combines the two vital ingredients of eco-friendliness and affordability. The study made an empirical study of the attitude of the urban people towards the concept of 'Green Affordable Homes' with reference to Thrissur city in Kerala. The study suggested mass awareness programs to educate the stake holders regarding the urgency of 'Going Green' in all developmental

initiatives, particularly construction of buildings both residential and commercial.

Ullas and Mahvish (2012) conducted a study in Kerala which aimed to find out the magnitude to which, rapid population growth and industrial development is associated with the deterioration of environment. The result shows that large scale environmental degradation has resulted from population pressure, industrialization and indiscriminate use of forest areas for fuel, power generation and irrigation purposes. The relation between population and development is dynamic. They also suggested implementation of strict laws on Kerala Land Utilization to control land filling (ponds, farmlands, wetlands and other water bodies).

Basiago (1999) has attempted to make a comparative analysis of alternative models of cultural development in Curitiba of Brazil, Kerala of India, and Nayarit of Mexico which emphasizes the integration and inter linkage of economic, social, and environmental sustainability. The study reveals that, Curitiba's urban development suggests that economic sustainability requires, planning for people, making the city more 'green', and, hence, more livable, for people. Nayarit's development suggests that environmental sustainability requires planning that provides for ecological conservation in the formative stage of the development plan. Kerala has attained social harmony by emphasizing equitable resource distribution rather than consumption, by restraining reproduction and by attacking divisions of race, caste, religion, and gender. Kerala's development suggests that social sustainability requires planning that encourages people's cooperative rather than their competitive impulses.

Alberini and Krupnik (2000) in their article entitled "Cost of Illness and WTP Estimates of the Benefits of improved Air Quality: Evidence from Taiwan" have applied the willingness to pay and cost-of-illness estimates to analyze the respiratory symptoms associated with air pollution in Taiwan. The Contingent Valuation Method with the use of WTP is aimed to avoid minor respiratory illnesses and health diaries are analyzed to predict the likelihood. The result of the analysis revealed that the WTP is exceeding on COI depending on the pollution levels of the country.

The review of major works mentioned above on urbanization and environment shows that most of the studies are either region specific or deals with only particular problems of environment; studies which consider aspects of environment with

specification of its impact on health conditions of household are very limited. Therefore a meaningful study of the impact of urbanization on sustainable environment in Kerala with special reference to cities of Thrissur district would be highly useful for policy purposes. As far as Thrissur district is considered, it expresses the trend of fastest growing urbanization in Kerala. Though a vast literature on various aspects of urbanization and environment is available, no comprehensive work has done to examine the impact of urbanization on the life of people as well as on the ecology in a detailed manner. The present study also includes the problems of pollution & waste management in the urban study area and will try to suggest suitable policy measures for protecting environment.