

Dhanya John “Impact of urbanization on sustainable environment in Kerala - a study based on Thrissur district.” Thesis. Research and Post Graduate Department of Economics, St. Thomas’ College (Autonomous), University of Calicut, 2019.

sufferings physically along with economic burden. Similarly, the magnitude of air pollution in the state is also high which produces respiratory diseases and related uncomfortable situations to households. The generation of solid waste in the state is marked as high due to reasons like high amount of population, changes in consumption pattern, changes in standard of living etc. The wastes generated in cities are not collected and treated properly due to inefficiency in administration. Prevalence of mounting wastes in resident areas of the city is a common phenomenon in the slum areas of cities of Kerala. According to the survey finding, the solid waste pollution is a serious problem in slums where households are living in unhealthy environment. Similarly, growth of motor vehicles and construction activities in cities bring air and noise pollutions and associated health hazards. It is important to note that, all these environmental issues and related health hazards are affecting more the poor or slum households rather the rich urban households.

Therefore, the government should adopt programs for improvement of living conditions of poor households more and should take care of the environmental goods from further degradation in order to achieve sustainable urban environment for sustainability in development. The sustainable urban development will consider economic, social and environmental aspects simultaneously and will inherit all the resources to future generations without damage. Throughout the study, it is revealed from the household side that as they have sufficient literacy standards and concerns about environment and health; they are willing to pay towards better environment protection. Overall majority of the respondents are ready to pay an extra amount to adopt environment friendly measures. They showed their willingness to use public transport networks to avoid noise and air pollution levels, proper waste treatment at the household and city level and are willing to conserve the existing water resources. Hence, the government authorities should adopt environment protection measures; which incorporates the support from the citizens for environmental friendly city life. This policy fructifies sustainable urban development.

7.3 Major Suggestions and Recommendations

For healthy living and achieving the goal of sustainable development more emphasis should be given to the measures to environment protection. Social awareness programs should be adopted to educate the public about the dangers of pollution of

land, water and air. The legislative measures along with citizen's attention can contribute to check the problem of pollution. The Environmental Protection Act was passed in 1986 in India with the objective to enhance the quality of environment by measures to check deterioration of environmental goods. Economic development and environment protection should be the prior developmental policies in cities. In order to develop healthy human resources which can contribute much to the economic development of nation the provision of clean environment is required. Hence, urban development should be planned as sustainable urban development which combines the major concepts of sustainable development (economic, social and ecological aspects). The suggestive measures to reduce pollution of land, water, air and noises are explained below.

7.4. (i) Suggestions for Improvement in the Quality of Water

1. Proper management of sewage treatment process to improve the quality of drinking water.
2. The city drainage system which contains large amount of polluted or waste water should be properly treated in order to avoid contamination of drinking water.
3. Run the dishwasher or clothes washer only when there is full load. This conserves electricity and water.
4. Minimize the use of pesticides and fertilizers. Avoid the dispose of chemicals and other automotive fluids into the sewer systems as this end at the rivers.
5. Use minimum amount of detergent or bleach for washing clothes or dishes.
6. Garbage disposal in the water sources should be avoided and solid waste should keep as solid. Compost pile from vegetable scraps can be used to treat solid wastes.
7. Ensure self hygiene and protective measures at home to keep drinking water clean.
8. Prevent the human and animal excreta to mix with the drinking water to avoid water pollution and related health issues.
9. Installation of water efficient toilets will reduce the use of water.
10. Proper awareness should be given to the public about the adverse effect of water pollution and the need for water protection and conservation.

11. Voluntary organizations should initiate program to educate people about environmental problems.
12. Legislative measures and laws should be implemented related to environmental protection and conservation and each citizen should be responsible to follow the laws.

7.4. (ii) Suggestions for Improvement in the Quality of Air

1. Follow stricter testing and controls of vehicles to reduce emission of NOx.
2. Adopt vehicle bans in city centers.
3. The usage of public transports should be promoted to reduce the use of private vehicles.
4. Promote the use of bicycles. This will reduce fuel emissions.
5. Promote the use of e-mobility (battery driven vehicles) instead of fuel vehicles.
6. The pollution control board of the state should monitor air quality frequently to check the pollution level arising out of fuel emissions from increasing vehicular population.
7. There should be proper monitoring of the quality of fuel supplied to vehicles.
8. Avoid waste burning in open spaces. This will help to reduce the spread of harmful gases.
9. To reduce dust problems in the construction activities, proper regulations should be adopted.
10. Introduce campaigns through voluntary institutions to educate public about the need for preservation of air quality to reduce health issues.
11. To improve city's air quality environmental enhancement program like 'greening the city' can be implemented.

7.4. (iii) Suggestions to Reduce Noise Level

1. Measures should be adopted to control noise level near sensitive areas.
2. Authorities should ensure that the limits of noise level are strictly followed.
3. To avoid unnecessary usage of vehicular horns traffic regulations should be implemented properly.
4. The Government should concentrate on proper maintenance of roads for avoiding traffic congestion and resulting noise pollution.

5. For monitoring the fitness of the motor vehicles periodical checking should be undertaken and old & poor vehicles should ban.
6. Creating quiet areas in parks and other recreational areas.
7. Installing noise barriers in public places.
8. There should be complete ban of loudspeakers from 8p.m to 7a.m.
9. Keep the volume of radio, T.V and other equipments at a low level.
10. There should be minimum use of loud speakers and amplifiers in sensitive areas.
11. There must be separate Noise Pollution Act at the government level.
12. Planting trees and shrubs along roads is an effective measure to reduce the level of noises to a considerable limit.

7.4. (iv) Suggestions to Reduce Solid Waste pollution

1. Consume less to avoid more wastes.
2. Unnecessary packaging should be eliminated.
3. Do not accept bags for purchases if it is really needed.
4. Take a bag or basket to the grocery and market.
5. Buy vegetables loose rather than in Plastic Bags.
6. Don't waste food items and try to store leftovers in a reusable waste treatment system.
7. Compost vegetable or green wastes properly by adopting a suitable waste treatment system.
8. To reduce the purchase of products frequently, design them as they last for longer.
9. Products which are easy to repair, reuse, manufacture, compost or recycle should be given more importance.
10. To produce less waste and pollution redesign manufacturing processes and techniques.
11. Policies should be implemented by the Government like 'Shuchitwa Mission' and 'Malinya Mukta Keralam' to reduce the amount of wastes in public places.
12. In cities proper waste treatment plans should be started and the concerned authorities should ensure its regular functioning.

13. Public should give awareness about the threat of pollution on healthy living conditions.

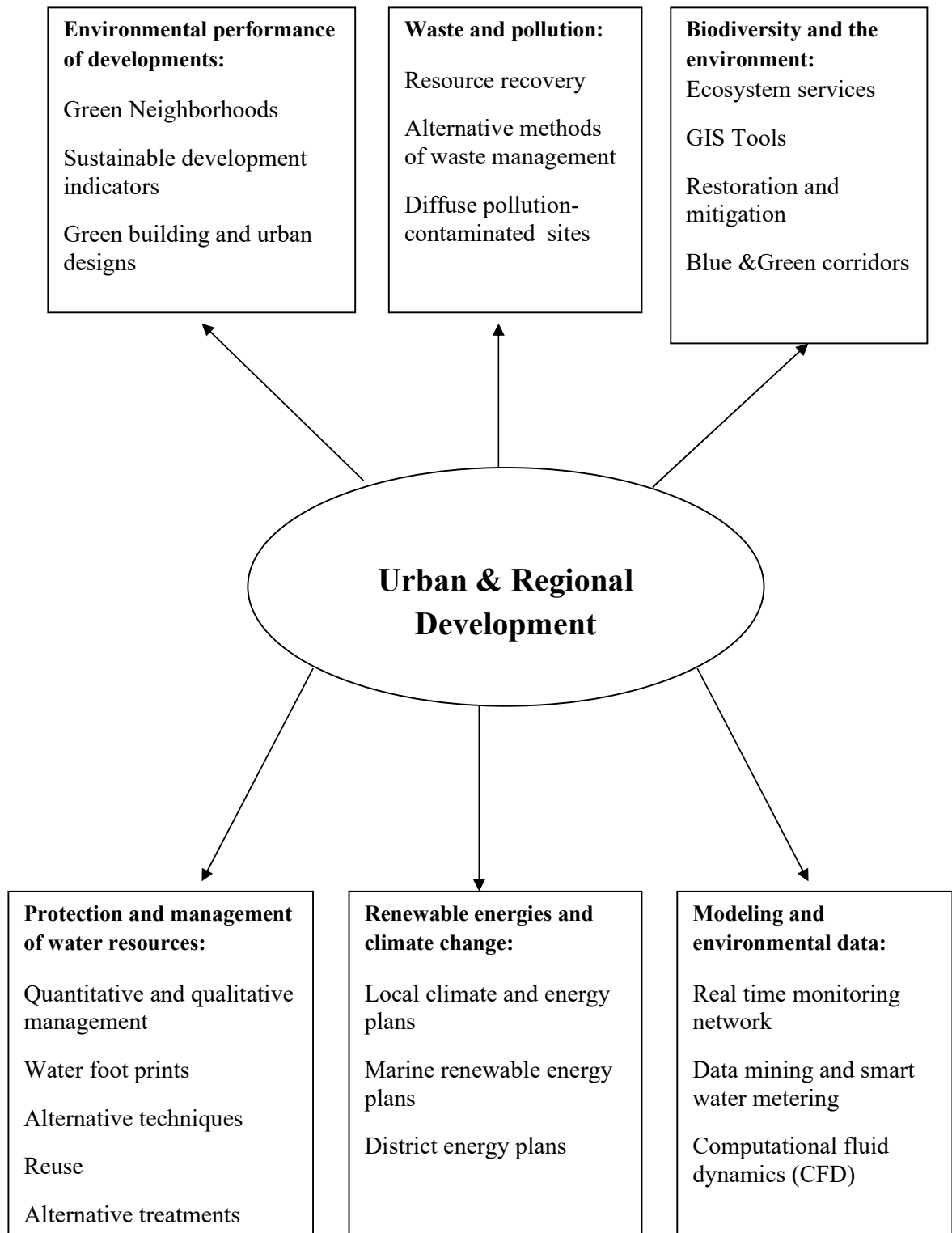
7.5 Need for Sustainable Development

For making urban development a progressive environment friendly, the focus should be given to enhance sustainable development. The concept of sustainable development has been the subject of discussion since the publication of the Brundtland Commission Report (WCED, 1987). The World Commission on Environment and Development (WCED) defines sustainable development as “development is sustainable if the present generation can satisfy its needs without compromising the ability of future generations to meet their own”.

There are three pillars that support the concept of S.D. They are; (1) Economy, (2) Society and (3) Environment (ecology) (UN, 2002, Munasinghe, 1993; Ciegis et, al; 2009b) where the three should be mutually supportive and involved in the development process.

Chart 7.1 shows the aspects of urban development with special consideration of sustainability. In urban and regional development, the sustainability concept can be included aspects like; (1) Environmental performance of developments; (2) Waste and pollution; (3) Bio- diversity and the environment; (4) Protection and management of water resources; (5) Renewable energies & climate change; and (6) Modelling and environmental data. The concepts or factors associated with these aspects are needed to be identified (Ulgiati and Brown, 1998, Parris and Kates, 2003).

Chart 7.1 Concept of Sustainability in Urban and Regional Development



Source: imgsoup.com [Bohringer and Joschem, 2007]

The environmental performance of developments needed to concentrate on the aspects like ensuring green neighborhoods, maintaining sustainable development indicators and implementing green building and urban designs. Resource recovery, adopting alternative methods of waste management in cities and diffusing the pollution contaminated sites are the strategies which come under the concept of waste and pollution. Similarly for maintaining biodiversity ecosystem services, implementing blue and green corridors GIS tools with ecosystem services needed. For protecting water resources quantitative and qualitative measures along with reuse strategies and alternative techniques which reminds water footprints are required. For protecting energy sources more concentration should be given to renewable energy plans and marine energy plans. Lastly, each and every aspects of sustainability needed to be monitored with methods like data mining, computational fluid dynamics and real time monitoring.

In short, urban planners should consider economic, social and environmental conditions of the city and policy decisions should be concerned about decreasing economic disparities & environmental damage and increase the possibilities for long-term sustainability.

7.6 Scope for Future Research

The present study deals only with the impact of urbanization on sustainable environment in Kerala based on an analysis of Thrissur district. In this study the emphasis was laid only on components of the environment, namely – Air, water, and land with special emphasis on their pollution. Due to constraints of time and resources other aspects of environment could not cover in a detailed manner.

The area of environment and ecology is a wide one where there are several aspects of ecosystems with special dimensions of sustainable development. The present analysis is undertaken in a city, but cultural and other aspects of cities may be different. Similarly, the environmental impacts and health issues may be different in different cities. So a comprehensive study is needed to have better outcome of environmental and urbanization research. Hence, the present study is useful for researchers from different disciplines and from different cities to have a better outline about the relationship between urbanization and environment.