RELATION BETWEEN THE URBAN INDEX AND SOCIAL CONDITIONS IN AN URBAN AREA

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1.0 INTRODUCTION

The rapidly receding boundaries of population agglomerations in many regions of the world has given rise to many environmental problems demanding urgent attention. Each week over 1 million new urban inhabitants are added to the world.With this increase in urban population comes the need for building new urban infrastructure, providing more environmental and social services and creating new jobs. Effective urban planning requires access to authentic and continually updated information concerning the changing conditions of specific urban areas.In many developing nations such data does not exist, making the planning process difficult because of inadequate understanding of the existing urban system.However,recent developments in the field of remote sensing technology in addition to the advancement in micro computers, its related hardware and software components have made this technology more affordable and accessible to urban planners and engineers and is helping to overcome these problems effectively.

In this study satellite remote sensing data is related with social data of an urban area so that these relations could be used to evaluate the current social conditions of an urban area in the same region where new social data is not available,using remote sensing data. For this purpose the authors propose the Urban Index UI,using Landsat TM data and show that UI is strongly related to social parameters of development in an urban area by using social data of two urban areas with different developing
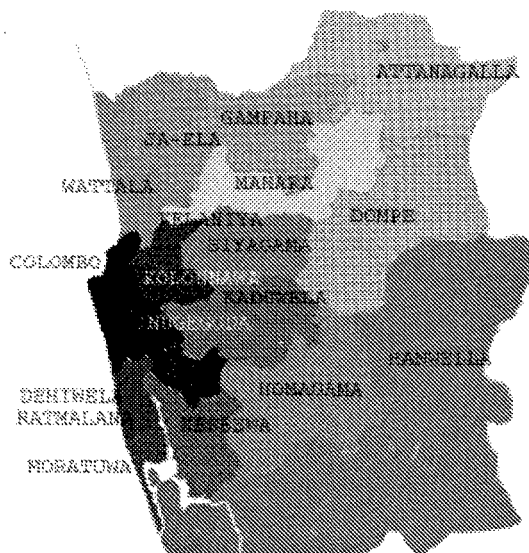

Fig: 1 Colombo Metropolitan Region
Sri Lanka

Fig: 2 Nagoya Region

situations.Namely,Colombo Metropolitan Region in Sri Lanka and Nagoya Region in Japan.

2.0 REMOTE SENSING DATA USED

Digital data from a Landsat TM scene covering the Colombo Metropolitan Region aquired in February 1993 and a Landsat TM scene covering the Nagoya Region aquired in July 1994 was used in the study.

2.1 THE PROPOSED INDEX UI

The proposed index UI was computed as shown below using Landsat TM bands 7 and 4.

$$UI = \left(\frac{Band7 - Band4}{Band7 + Band4} + 1.0 \right) \times 100$$

3.0 SOCIAL DATA USED

Data of population, labour force, housing and electrical energy consumption relating to administrative geographical units in the respective urban regions was used. These units considered in the Colombo Metropolitan region are shown in Fig:1.They cover 1386 Sq.km and have a population of 3 million.The administrative units considered in the Nagoya Region are shown in Fig:2.They cover an area of 2182 Sq.km with a population of 4 million.

4.0 ANALYSIS

The maps showing the boundaries of the administrative units in the two urban areas were scanned.Average UI values for pixels of 2X2 Landsat TM pixels were computed and these images were registered with the respective digitised maps.The average UI value for each administrative unit was then calculated.The relation between UI and the social data corresponding to the administrative units of the two urban areas is shown in the scatter diagrams of figures 3 to 6.

5.0 CONCLUSION

The figures show that UI is strongly related to the social parameters considered.They also reflect the difference in the level of development in the two urban regions.These relations could be used to investigate the social conditions in another urban area in the same region where new social data is not available using satellite remote sensing data.
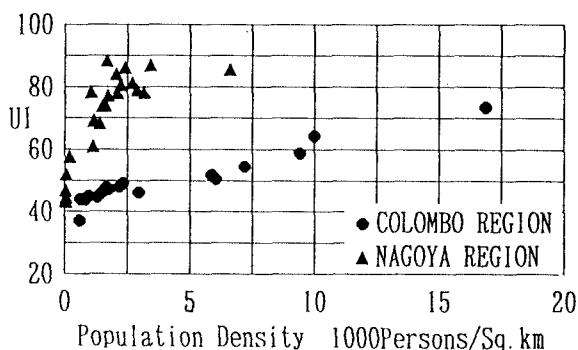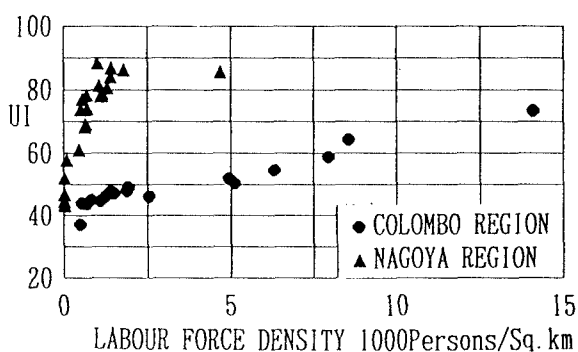

Fig: 3 UI-Population Density
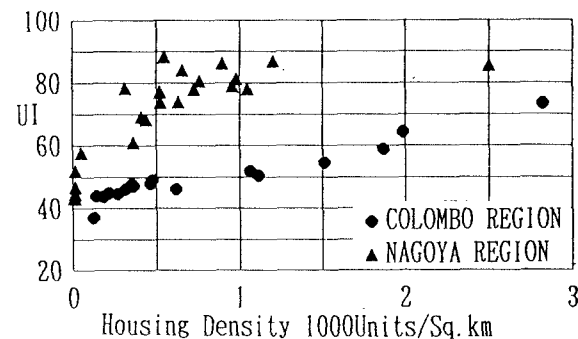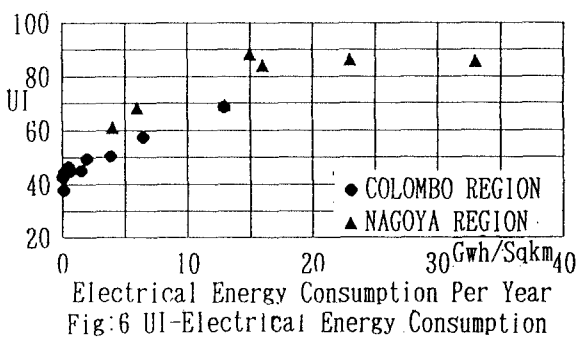

Fig:4 UI-Labour Force Density

Fig:5 UI-Housing Density

Fig:6 UI-Electrical Energy Consumption