TOWARDS SUSTAINABLE URBAN DEVELOPMENT OF YANGON CITY: WOODFUEL UTILIZATION

Ph. D. DISSERTATION

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Summary

In Myanmar, most of the studies on woodfuel have been carried out in rural areas by the Forest Department. Attention is being rarely put on woodfuel uses in urban areas. The Report of 1997 Household Income and Expenditure Survey conducted by Central Statistical Organization indicated that, in Yangon City, 60.73 per cent of the total households used woodfuel, mainly charcoal and firewood for household cooking. It seems that charcoal and firewood will continue to be one of the main sources of energy for cooking in Yangon City. Consideration of sustainable urban development of Yangon City is interesting if the households are relying on woodfuel, which is directly extracted from the natural environment.

The study emphasizes on the woodfuel utilization process of Yangon City. Transportation routes of woodfuel to Yangon City from various producing areas and the distribution within Yangon City to consumers through urban markets are examined.

The objectives of this study are: to review energy supply for Yangon City within the framework of energy uses in Myanmar, to gain insight into how the commercial woodfuel market functions in Yangon City by studying the trading and marketing practices and by characterizing the mode of transport and distribution pattern from producing areas to consumers, to quantify the consumption of woodfuel by various sectors in the City, and to explore the controlling factors of this consumption in order to estimate the future demands as a basis for appropriate policy measures to meet these demands, to assess the impact of woodfuel uses both at the production areas as well as in Yangon City, and to evaluate the woodfuel utilization in Yangon City within the context of sustainable urban development.

The main limitation in this study is the difficulty for obtaining data. The data specific for Yangon City is not available and there is no previous study on woodfuel utilization of Yangon City. Thus, even for basic information and for preparation of questionnaires, many observations and open interviews are made. Afterwards, three questionnaire surveys: 'Household Fuel Use Survey', 'Fuel Use by Commercial Business' and 'Urban Woodfuel Trader Survey' are conducted.

The dissertation starts with an introduction of the wide scope of sustainable development. Emphasis was put on sustainable urban development and the importance of energy sector to any development activities and the role of woodfuel in developing countries and in Myanmar. The introduction presents the most urgent challenge confronting the present woodfuel utilization of Yangon City and sustainable urban development.

This is followed by chapter 2. where the objectives, scope of the study area, explanation of the research design and methodological considerations, and a brief explanation of the structure of the three questionnaires.

In chapter 3, emphasis is put on energy supply situation of Yangon City. The current energy use pattern of Myanmar is reviewed and the institutional policies of energy related

departments are presented. An overview of the present energy situation of Yangon City and major influencing factors of woodfuel uses in Yangon City are also explained as it is important, to know as background, for later evaluation of sustainable urban development of Yangon City in the context of woodfuel utilization.

Chapter 4 concentrates on the woodfuel demand and supply of Yangon City, which is the core of the dissertation. This chapter has two parts, the first is woodfuel demand of Yangon City and the second is the supply. In the first part, woodfuel uses in households and commercial business like teashops (cafes), restaurants and food vendors are examined. The main reasons for using woodfuel by household and business sectors are examined. Based on questionnaire surveys and interviews, the daily average use of woodfuel is calculated for each type of business. The supply sources of woodfuel to Yangon City and their transport routes, estimated amount of flow to Yangon according to transport routes are shown in percentages. Woodfuel distribution system and prices are also analyzed.

The consequences of woodfuel uses of Yangon City, not only on supply sources, but also on Yangon City itself, are reviewed in chapter five. For this chapter, data from the Forest Department on land cover changes are used. The major impact was on the mangrove forests in Ayeyarwady Division, from which charcoal is produced mainly to meet the demand of Yangon City. The other effect is on forests of all types at supply sources. The rate of forest degradation and depletion is alarming during the recent decades. About 50% of depletion is mainly accounted for by woodfuel extraction. Interviews as well as some questions included in the household fuel use survey enables to detect the impact of woodfuel uses in Yangon City itself. Although indoor air pollution has a strong impact on the health of members of households, no research on this aspect in Yangon City has yet been carried out.

Chapter 6 attempts to find out the most feasible ways to sustainable urban development of Yangon by lessening the negative impacts not only on supply sources but also on Yangon City itself. It highlights the role of integrated energy planning which incorporates wood energy in planning and points out the role of leapfrogging technologies to lessen the wood waste during production and in end-use.

On the basis of previous chapters, recommendations on how to overcome the unsustainable situation of the City's woodfuel use and development towards sustainability are suggested in chapter 7. Steps which should immediately be undertaken for woodfuel utilization of Yangon City with sustainability-oriented aim are also suggested.

This research points out that, further research is needed in the fields of policy-making and planning, in efficient cooking stove technology, in advancing the charcoal production, and impact of woodfuel use on health through indoor air pollution in Yangon City. As research and development go hand in hand, continuous research on this matter is needed.

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