

## INTRODUCTION

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The World Commission on Environment and Development, popularly known as the Bruntland Commission, has noted that "*a safe and sustainable energy pathway is crucial to sustainable development; we have not found it yet*" (WCED 1987). While some countries depend excessively upon fossil fuel to meet their energy needs, others still fall back upon forests and other traditional forms. In either case, the environmental implications are obvious. In developing countries the problem is further exacerbated by high population growth and the consequent increased demand for energy. Obviously, the present energy scene needs to be re-examined in an attempt to examine possibilities for promoting approaches that do not draw so heavily upon the fragile environment. Furthermore, in view of the crucial role that energy plays in economic development, it is apparent that the current low level of per capita consumption will increase as the national economy grows and the modern industrial sector becomes more important. If the additional demand were to be met solely from the existing sources of supply, it would have severe environmental consequences.

The energy sector in Nepal already demonstrates elements of unsustainability. Excessive dependence on forests, a low level of current per capita consumption which is expected to increase in the future, high population growth and its effect on energy demands, inefficient use of energy resources, and negligible conservation efforts are some of the contributing factors. At this point, it should be noted that, in Nepal, the prime reason for unsustainability is not the dependence upon an exhaustible resource base but the indiscriminate and excessive use of one type of renewable resource whereas other types of renewable resource have remained virtually unused. The excessive dependence on the forests when hydropower, biogas, and solar energy could also have been exploited to meet the energy needs illustrates this point. Therefore, energy planning and management in Nepal should attempt to redress the imbalance between energy resource endowment and its current use. An important associated issue, in this context, is that of ensuring that the energy sector positively affects the growth of the overall economy, while imbalances between use and endowment are reduced. Thus, the issue of energy transition not only relates to the substitution of one form of energy by others but also to the growth and development of the economy brought about by such a transition.

About 90 per cent of Nepal's estimated population of 18.8 million lived in rural areas in 1990. In the next 20 years, the population is expected to increase to about 31.2 million. Although the percentage of the rural population is expected to decline, it will still remain at a fairly high level; around 78 per cent of the total (Banskota et al. 1990). In absolute terms the population residing in rural areas will be around 24.4 million, and this is almost one and a half times the current number. The distribution of the population between the mountains (including the hills) and the *Terai* is approximately 53:47 at present, but it is expected to be 47:53 at the end of the next 20 years. The rural *Terai* accounts for about 45 per cent of the total at present and this is expected to increase to about 48 per cent in 2010 A.D. Clearly, development in Nepal cannot take place

without the active participation of these people, and, as energy and development are interrelated, it is the energy use pattern of the rural population that will have a crucial bearing on the nature and sustainability of the process of economic growth. It is in this context that rural energy occupies a central place in the planning and management of the Nepalese energy sector.

To understand issues relating to rural energy planning and management, the following questions have to be answered?

- o What is the aggregate energy demand and supply and how is it likely to change over the next few years?
- o What will be the demand and supply of individual energy sources? What end use will these energy sources meet?
- o What are the energy demands by sectors? Are they specific sector-wise?
- o What are the possibilities for inter-fuel substitution within and between sectors?
- o What are the energy technologies available by spatial region and how can they form a basis for integrated energy planning?
- o What are the policy objectives and investment priorities at national and regional levels?
- o How can a high degree of coordination be achieved among the various institutions associated with the energy sector?

These main issues will be examined in the succeeding sections of this paper, starting with an assessment of energy consumption patterns and trends, followed by a sectoral end use breakdown and demand projections by type of energy. An examination of energy technologies available by geographical regions, government policies and programmes in the energy sector, investment priorities, and institutional/organisational factors follows. The last section of this paper highlights the options related to rural energy, that are available to policy-planners and implementors.