CHAPTER I

INTRODUCTION

1.1 Scope and Background

The dynamics of demand and supply relationships of domestic fuel deserve an in-depth analysis to understand its economic significance and the related aspects of demand–supply management with a futuristic perspective. Given the present conditions of low income and poverty in LDCs, the demand for fuelwood may not pose immediate serious problem. When a poor household cooks only once a day, and that too not an elaborate one for want of adequate income, the need for cooking fuel may be limited. The shortage of fuel, if any, is met from fuel gathering from public lands in the villages, and fuel gathering may not involve a significant opportunity cost in the context of surplus labour scenario. Due to lack of alternative sources of income and consequent to low opportunity costs of fuelwood collection, cooking fuel is not seen as a priority problem (Vidyarthi, 1985).

However, it must be noted that the fuel demand, being an increasing function of household income, may rise over time as the income goes up. Both in urban and rural areas, the income elasticity of energy consumption is high. The per capita energy consumption of the poorest is about one half of that non-poor (MIDS, 1988). It is in this context, the fuelwood shortage becoming a serious problem in the near future and the long- gestation involved in growing biomass for fuel purpose, the demand-supply management emerges as a significant economic question.

The prevalent conditions of fuel demand and usage in India suggest that biomass including agricultural waste is going to dominate the household energy consumption even in the long run. The share of fuelwood, cowdung and agricultural waste in non-commercial (domestic) uses are estimated at 65 per cent, 15 per cent
and 20 per cent respectively, indicating the dominance of firewood. Rural energy consumption, particularly household consumption, is thus heavily dependent on non-commercial sources (Planning Commission, Government of India, 1979).

According to FAO estimates (FAO, 1985) fuelwood and charcoal form nearly one third of the world’s annual wood consumption. But perhaps the actual utilization is close to half of the total wood harvested in the world (White and Plaskett, 1981) and it is largely used for cooking and heating by more than half of the world’s population (Hall et al, 1982). For LDCs alone, Openshaw (1978), on the basis of sample surveys of household and non-household consumers, estimated that 82 per cent of the wood harvested was consumed as fuel. In terms of energy-use biomass represented about 40 per cent of the total energy use in LDCs, with over 90 per cent of domestic energy supplied by wood. In contrast, developed countries relied on biomass for only about one per cent of total energy supply (Hall et al, 1982).

That fuelwood and agriculture residue continue to account for a major share in the fuel budget of rural households even in the long-run has been well brought out by re-survey of two North-Indian rural regions after a gap of about 10 years. During the period 1974-83, the re-survey estimated an increase of 0.16 quintal per head in the non-commercial fuel consumption (Sagar et al, 1985). Possibly an increase in income might have induced this increase of fuel consumption per head.

Given the aggregate supply and demand conditions of fuel in a village, there are significant differences in the extent to which and the ways in which different socio-economic groups obtain their fuel. These are generally a function of village typologies, which vary on the basis of factors such as proximity to forests or urban centers, extent of irrigation, cropping pattern, cattle stock, availability of porambokes and land distribution. Land owning households are able to meet their requirements, whether wood, dung and agro-wastes, from cattle or land owned by them while relatively affluent non-agricultural households (such as service personnel receiving
salaries) are in a position to purchase firewood. The poorer households, who have
neither home-grown sources nor the money to buy fuel, depend for the most part on
the fuel that they are able to and allowed to collect from public, community and
private lands in and around the village (Social Forestry Monitoring Advisory Board,
Tamil Nadu 1982).

The fuel gathering by the landless labour and small and marginal farmers
has been, of late, subject to severe constraints partly because of growing
commercialization in village fuel economy (Department of Economics,
Bharathidasan University, 1982) and partly because of decline in village common
lands that are being privatized by government assignments, encroachments, or
appropriation by private persons (Jodha, 1986).

As a result of commercialization in fuelwood, the rich and middle income
landlords tend to use inferior types of fuel such as twigs, brushwoods, loppings and
agricultural residues and reserve the fuelwood trees to be sold for a higher price in
the market. Thus, what were previously left over in the lands (inferior fuel) to be
collected by the landless and poor people, are at present collected and consumed
by the richer landlords, on commercial considerations. The concern for making a
good return out of selling fuelwood has been brought out by empirical study, which
does not support the general expectation of liberal use of fuelwood with the
increase in availability from own sources (Negi et al, 1986).

Under these conditions, fuel gathering by the poor has become more time-
consuming, to the extent of affecting their employment elsewhere, particularly
during busy seasons of agricultural operations. It has been estimated that a family
member must spend two days, gathering a week’s worth of wood.

Among the various studies on variables that would explain demand for and
supply of fuelwood, mention may be made of Morgan et.al (1981), Reddy (1982),

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1.2 Objectives

In the context of above discussion, the following objectives relating to demand-supply aspects of fuelwood among rural households form the main focus of the study:

1. To estimate the magnitude and composition of fuelwood consumption by different socio-economic groups;

2. To analyse the determinants of fuelwood consumption including size of the household, occupation of the head of the household, land holding size and income of the household.

3. To estimate the magnitude and composition of fuelwood accessible to different socio-economic groups;

4. To analyse the determinants of fuelwood gathering;

5. To assess the over-all village-level magnitude and composition of fuelwood supply, consumption and disposal of the balance;

6. To make future projections and policy implications arising out of the study on experience of the select village.
1.3 Hypotheses

1. The magnitude of gathered fuelwood of inferior heat equivalent brush wood (twigs and thorns) particularly of the commonly available Prosopis juliflora in the village community-lands is likely to dominate the fuel consumption of small farmer and landless households while the large farmer and relatively richer households tend to use greater proportion of firewood with higher heat equivalent.

2. There is a positive relationship between income and demand for firewood.

3. There is a perceptible degree of economies of scale in fuel consumption. As the household size increases, there is an economy in fuel consumption.

4. The poorer households tend to gather fuelwood from public lands partly for their use and partly for making income by selling the surplus of the gathered fuel. The income tends to be negatively related to fuelwood gathering.

5. The households with more of women and children members have an edge over other households in fuel gathering.

6. The availability of Prosopis juliflora in the immediate neighborhood of the village tends to minimize the travel time and also time spent on fuel gathering.

7. At the village level, thanks to the adequate supply of Prosopis juliflora for household fuel consumption, there is a significant surplus of fuelwood, which is disposed in the form of firewood and charcoal.

1.4 Methodology

The conceptual and methodological issues have been dealt in detail in the chapter II.
The study, being a micro level one, is confined to an intensive and complete analysis of all the 517 households in a select dry village called Suriyur in Tiruchirapalli District, Tamil Nadu, India. It was decided to go in for a predominantly dry village in a backward area of Tiruchirapalli District. Accordingly, on the basis of the secondary data on the District profile, Suriyur village was purposively chosen with a view to study the fuelwood position obtaining in a poor dry rural sector. The village profile is given in the chapter IV.

Having chosen the village, it was decided to go in for complete enumeration of all the households and hence the question of sample selection did not arise. The composition and the characteristics of the respondent households are explained in the relevant sections of the analysis chapter. The data on village profile including the land-use pattern and other agronomic conditions have been collected from the village records. The primary survey on households has covered all the possible variables that could have direct or indirect bearing on demand and supply dimensions of fuelwood. The primary data pertain to the reference period of one agricultural year (July 1996 to June 1997). The questionnaire is appended to this thesis for reference.

The primary data have been analysed using various statistical techniques including Step-wise multiple regression technique for the analysis of demand and supply dimensions and their determinants.

1.5 Limitations

Among the study limitations, mention may have to be made of the difficulties encountered in the data collection. Because of free availability of Prosopis juliflora in public lands, many households were not able to recount in precise terms the exact quantity gathered, and consumed. Further, the disaggregation of fuelwood posed operational difficulties. The assessment of differences between brushwood, fuel stick and firewood involved some conceptual and measurement problems. The
respondents had to be informed of the relative differences and then the data collected. When it came to assessment of the aggregative village level fuel stock, it was extremely a complex affair to make a complete enumeration, including use of some other method of stock assessment of the fuelwood vegetation in the village.

1.6 Scheme of the Thesis

The thesis has been presented in the following six chapters:

The first introduction chapter gives the background, objectives /issues, hypotheses and methodology and scheme of the thesis.

The second chapter deals with the conceptual issues and review of literature.

The third chapter gives a broad background to the fuel economy especially the bio-fuel aspects pertaining the global and Indian scene. This chapter also highlights the significant role played by the Prosopis, a commonly found exotic fuel potential tree/shrub.

The fourth chapter brings the socio-economic profile of the study village and the respondent households.

The fifth chapter deals with the analysis of the issues relating to demand dimension of fuelwood and the issues relating to the supply side of fuelwood.

The sixth and the last chapter summarises the findings of the study and the policy implications.