

INSTITUTE OF CURRENT WORLD AFFAIRS

DGD - 6
A Wood Fuel Dependency

P.O. Box 1615
Kathmandu, Nepal
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Mr. Peter Martin
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Dear Peter,

In January I attended a workshop on community forest development in Nepal; one of the district forest officers present submitted that the hill farmers would be interested in cultivating cardamon. A perennial herb of the ginger family, cardamon grows in damp, shady ravines up to an elevation of about 1800 meters. Its seeds, which may be used whole or powdered as a spice, must be dried immediately upon harvesting. In the high rainfall areas of eastern Nepal, this process is carried out over wood fires. When I pointed out that the promotion of cardamon cultivation might increase the overall demand for firewood in already fuel-short areas, several people shrugged and commented that farmers would be able to buy fuel with cash earned from the sale of the new crop. I suspect, however, that marketing agents would reap the greatest profit and that any cash the farmer received would be reserved to pay taxes or purchase items such as clothes, kerosene, matches and soap. Certainly the farmer would not be inclined to purchase fuelwood if he and his family can take wood freely from local forests. The larger costs to society of deforestation are rarely considered by the individual woodcutter. Despite dire warnings of the environmental consequences of continued decimation of the forests for fuel, fodder and cropland, generous assumptions are made regarding the availability of wood fuel in Nepal. This illusive attitude probably persists largely because wood, as a traditional fuel, has always been obtainable. No doubt part of the problem stems from a general ignorance of the extent of the country's dependence on wood fuel.

Ninety-five percent of all wood taken from Nepal's forests is destined for use as fuel. Statistics compiled by the Energy Research and Development Group of Tribhuvan University in Kathmandu indicate that 87 percent of the nation's total energy consumption is in the form of fuelwood, most of which is consumed by the rural population in open fires or crude clay stoves. Generally, the firewood used by rural villagers is taken from neighboring forest and scrub lands. The scarcity and high cost of wood in urban areas discourages the use of firewood in favor of agricultural wastes, including rice hulls, straw and corncobs. From local woodworking shops city dwellers buy sawdust and wood shavings to burn in small metal stoves. Within Kathmandu women and children collect the leaf litter of city street trees for fuel. In response to extreme fuel shortages in Nepal's heavily populated central valleys, the government in 1965 organized the Fuel Corporation, whose responsibility it is to transport fuelwood from timber harvesting operations in the Terai to firewood depots

scattered throughout Kathmandu and Pokhara. A 1973 report by the National Planning Commission estimated, however, that only one fourth of the wood fuel consumed in Kathmandu Valley is provided through the Fuel Corporation. The remaining three quarters is supplied by private timber contractors and individual woodcutters from the surrounding hills. Estimates of the average amount of wood fuel consumed vary considerably, in fact, by a factor of sixteen. Although it is often difficult to distinguish primary from secondary sources, available estimates cluster around 0.8 cubic meters to 1.0 cubic meters (approximately 600 kilograms) per person per year. Many of the estimates are merely educated guesses. Given the scarcity of wood fuel in many areas, the figures may not reflect the optimal level of consumption from the point of view of the consumer. Moreover, little attention has been given to the manner in which wood cycles through the homestead or the rural community. Understandably, it is difficult to delineate wood fuel usage when saplings, cut ostensibly for fencing, first have their leaves stripped for cattle fodder and ultimately come to rest in the hearth fire.

Fuelwood is used primarily in cooking food for both humans and animals, especially milch buffaloes, working bullocks and domestic dogs and cats. In many homes the open hearth is also the only source of heat and light. Dehydration, the most important method of food preservation in rural areas, often takes place over the fire. Smoke from the hearth fire drives insects from stored grain and house timbers. In addition, funeral pyres consume a considerable amount of fuelwood, roughly 40 kilograms per person. Availability appears to be the main factor affecting wood fuel usage, though other factors, such as local climate season, family size, type of food cooked and the method of preparation, can also be influential. Substitution by non-wood commercial fuels is limited by the availability and cost of the alternative fuels and the appropriate cooking apparatus. All fossil fuels must be imported through India, and in the case of Kathmandu, over tortuous mountain roads; as a consequence, their supplies are very undependable. The cost of a specialized stove may be prohibitive, or the type of stove available may be unsuitable to traditional cooking habits and utensils. Although the shift to non-traditional energy supplies is most common in the more modernized urban areas, the low amperage and inadequate wiring of many Nepalese houses often precludes the use of electrical appliances. The scarcity, high cost and poor quality of the available appliances further discourage their use. In a few homes gas burners and gaslights are fueled by the methane produced in biogas plants; these installations, however, are found generally in the houses of the wealthier farmers.

Domestic energy consumption merges with commercial and industrial consumption in the realm of cottage industry. Statistics for wood fuel consumption by small scale industry and commercial enterprises in Nepal are all but nonexistent. J.E.M. Arnold of the United Nations' Food and Agricultural Organization in Rome estimates that in the developing countries of Africa and Asia, wood fuel utilization in processing and service activities amounts to between 2 percent and 15 percent of total wood fuel consumption. The 1976 energy sector study by the Energy Research and Development Group in Kathmandu

dismissed the role of non-commercial fuel, including wood, in the nation's commercial and industrial sectors as "insignificant in comparison to the total energy consumed by the industrial sector and ... safely omitted for the purposes of this study." On the other hand, research done by the government National Planning Commission showed that in Kathmandu Valley fuelwood consumption by the commercial and industrial sectors in 1973 accounted for 31 percent of total energy consumed by those sectors and 23 percent of total wood fuel consumption. A total of 20,699 metric tons of fuelwood was used by industry, restaurants, sweet shops and hotels of every class. Brick factories, bakeries, distilleries and the local shoe factory were reported to be the heaviest industrial users of fuelwood; brick production in the valley consumed approximately 1500 metric tons of wood. It is estimated that an average of 260 kilograms of wood is consumed annually for each occupied room in Kathmandu's hotels. In addition, wood charcoal is utilized by cooking establishments, laundries, metal crafts workers and others; the use of charcoal by various commercial and industrial enterprises in Kathmandu Valley resulted in the combustion of an additional 1785 metric tons of wood in 1973. Although the consumption of wood energy is poorly documented, the list of industries dependent on wood fuel is quite long: bakeries, distilleries; breweries; brick, tile and pottery manufacturers; fruit, cardamon, turmeric, tea and tobacco processors; cheese and clarified butter producers; metal crafts; paper factories; soap makers; brown sugar refineries and so on. From statistics supplied by the Cottage Development Board, it appears that the production of one bottle of fruit juice requires almost one kilogram of firewood, and the production of one kilogram of brown sugar consumes two tons of wood fuel.

As with domestic consumption, the availability and dependability of fuel supplies and initial equipment costs heavily influence the type of fuel used. Projections of commercial and industrial wood fuel demands exist only for Kathmandu Valley. While the total consumption of hotels was expected to increase by 25 percent between 1973 and 1978, that of industry was projected to rise by 140 percent. In many cases the demand for wood fuel for use in agricultural processing has been rising more rapidly than household demand. Although the majority of small scale industrial and commercial enterprises enterprises that depend so heavily on wood fuel are dispersed throughout the country, many give rise to very large demands locally. The primitive condition of the nation's transportation facilities almost ensure that the impacts of industrial and commercial fuel demands will be localized. The effects of increased industrial demand are well illustrated in the town of Surkhot in far western Nepal, where a fourfold increase in brick factories has severely stressed local forest resources. The smelting of iron ore in the hills has ceased in recent decades mainly due to a fuel shortage. The bark of the Daphne shrub and a very large quantity of firewood are the two main raw materials required for the production of handmade paper in Nepal's high mountain forests. Approximately four kilograms of fuelwood are required for each sheet of paper produced by traditional methods. This cottage industry has died out in many areas due to deforestation. Government attempts to improve the paper-making process in recent years have resulted in the establishment of many licensed paper factories which have done little to adopt less ecologically

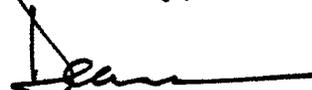
damaging techniques. Likewise, the government promotes the development of the dairy industry in the hill region. Cheese factories, however, are dependent on fuelwood. Small hydroelectric generators could be suited to these factories, but in many areas water supplies are insufficient due to degradation of watershed forests.

In addition to environmental effects, the use of wood fuel for industrial and commercial purposes can have socioeconomic impacts. A business enterprise may bid up the price of fuelwood in local markets. Receding forests mean that more time must be spent by women and children in the collection of fuel and fodder. Consequently, these family members have less time for tending field crops, maintaining terraces, vegetable gardening, food preparation and general household chores. Ultimately, agricultural production lags and family nutrition and health may suffer.

Most of the government prepared industrial feasibility studies that I have observed ignore the problem of energy supplies in Nepal. It appears that energy supplies are assumed to be adequate and readily available. My experience in Nepal so far indicates just the opposite. Electricity is intermittent and supplies of petroleum products are unreliable and in some cases adulterated. Recently local gasoline supplies have been contaminated with kerosene, which itself is often diluted with water. Wood fuel supplies have the advantage of being produced domestically. The use of wood fuel may have tremendous social costs, but for the individual firm it is cheaper and more readily available than imported coal.

Recent reports of various national and international groups have described vividly the worsening condition of Nepal's hill forests due to demands for fuel, fodder and cropland. The demand for wood fuel overshadows all other forms of wood use in terms of volume and area affected. Although, for the most part, the demand for fuelwood derives from domestic energy needs for cooking and heating, it must be recognized that the processing of various agricultural and forest products in rural areas can give rise to heavy demands concentrated often in a single locality. Nepal's National Planning Commission, as well as several foreign assistance groups, point to the need to develop cottage industry in order to provide the rural population with an alternative to further encroachment on already diminished and degraded forest areas. It is vitally important that the introduction and expansion of rural industry does not exacerbate the problem of fuel scarcity in the Himalayan region. An investigation of the energy requirements and technological options for small scale industrial and commercial enterprises is necessary to ensure that the net economic and environmental effect of industrial development in Nepal will be positive.

Sincerely,



Deanna G. Donovan
Forest and Man Fellow