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WOMEN IN DEVELOPMENT

WOMEN AND ENERGY:
PROGRAM IMPLICATIONS



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WOMEN AND ENERGY:
PROGRAM IMPLICATIONS

BY

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The energy crisis affects human activity at every level of complexity, from subsistence farming to electronics manufacturing. Since to a large extent development comes about through the use of more efficient energy, the current crisis requires a rethinking of developmental policies and priorities. Because the current energy crisis has been triggered by the steep rise in the cost of oil, the debate has tended to focus on oil usage. In doing so, the energy uses and needs of the world's poor women are too often overlooked.

At subsistence levels, women are the major providers and consumers of energy. Traditionally, animal and human energy have been used to grow, harvest, and prepare food, while fuelwood or dung were collected for the fire. This distinction is important. Development programs have focussed on replacing human and animal energy with all manner of machines, usually powered by some form of oil. As oil costs rise, human and animal energy will once again be used, inefficient though they may be. Substitution of human and animal energy for modern forms marks a de-development trend observable already in many Sahelian countries. On the other hand, there can be no human or animal substitute for fuel used in cooking. Thus in program design it is important to distinguish between substitutable and necessary energy. Intermediate technologies can increase human or animal power through mechanical means. But cooking requires heat; the only alternative is cold food.

Shortages of burnable materials have become increasingly severe in many countries; the current price increases in oil have exacerbated the criticality of the problem due to the interplay of three pressures:

- the strain increased population puts on traditional energy sources resulting in ecological imbalances and environmental degradation;
- the concentration of existing remedies to the energy shortages of developing countries on fossil fuels and the needs of the industrialized sector;
- the constriction of traditional energy supplies when the very poor find themselves now in competition with those who are no longer able to afford kerosene and return to traditional fuels.

The end result of these pressures is that the poor in developing countries are caught up in a rapidly changing environment of dwindling energy supplies and increasing drudgery.

This crisis among the poor is reflected at all levels of energy consumption. Most modern industrial processes were designed in the cheap oil era when consideration of energy was a low priority. Transportation systems require the gas-guzzling buses instead of more efficient trains. Buildings are designed for air-conditioning. It is clearly essential to reconsider these modes of modernization in future development programming. In the meantime, most economists will argue that if the development of the nations is to continue, the modern sector must remain healthy and growing. Further, leaders of the less developed countries argue that foreign assistance, focussed only on the poor, is a welfare approach, one that "wastes" money in unproductive areas rather than contribute to industrialization and development. In response to this type of criticism, the Policy, Planning and Coordination Bureau of AID has issued a new policy paper for energy in which it is argued that the current focus of AID programs solely on the poor must be reinterpreted to include programs concerned with energy needs for basic development.

Such an expanded view of development is probably necessary both politically and economically. In the face of these broadened policies, and

the consequently fewer resources available to the poor, programs meant to relieve the energy crisis among the most needy must be even more carefully designed, and the priority needs of poor women recognized and incorporated. A discussion of these energy needs, and their program implications, constitutes the remainder of this paper.

WOMEN'S WORK - REALITY AT SUBSISTENCE LEVELS

The growing literature of "women in development" has chronicled the extent to which the penetration of a modern economic sector has tended to benefit men by employing them while at the same time its products have reduced or eliminated markets for handicrafts generally produced by women. Cash crops have been introduced to men even in areas where women traditionally did the bulk of farming. The strain within family groupings caused by men having access to money while women were left in subsistence activities has undoubtedly contributed to the worldwide rise in the number of women-headed households. Today it is estimated that one out of three families has a woman as de facto head; further, this trend is more common among the poor.

Even where families remain together as a unit, severe inequities develop in those societies where men and women continue to maintain separate money budgets and separate spheres of responsibility. In much of Africa women continue to be expected to provide food for the entire family without help from the man. Thus, there are many examples of villages where development has raised the gross national product but the nutritional levels have fallen because women had less opportunity to raise their own supplemental food and had little access to money with which to buy it. In the Mwea irrigated rice scheme in Kenya, these problems were exacerbated by the scarcity of fuel in this resettlement area which meant that women also had to find money to buy firewood.^{1/}

This tendency of developers to target economic opportunities at men has its parallels in the introduction of technology and hence of new types or forms of energy at the village level. Since such substitution of more efficient means of mechanical energy for human and animal energy is at the heart of our modern society, men have been pushed into the modern sector, leaving women behind. Women traditionally pound grain, but grain mills are typically run and maintained by men; women fetch and carry water, but men are given control of water points and the responsibility of pump maintenance. Such choices may appear logical if the image of a modern society is one where men work and women are kept in relative leisure at home. Few societies can afford the luxury of so large a leisure class; in subsistence economies every member of the family had important economic tasks - from watching the animals to carrying wood and water. That development economists do not class these efforts as economic simply contributes to the failure of those economic theories to explain contemporary reality.

NECESSARY AND SUBSTITUTABLE FUEL

As energy costs rise, there is a tendency to drop back to human or animal energy. Women go back to handpounding grain, men again use bullocks for ploughing. Women cook fewer meals, or change to faster-cooking foods. Energy consumption may be going down, and conclusions are drawn that energy is used more efficiently. Yet in fact the quality of life may have deteriorated. Are tractors essential to increased production? Are high energy solutions always better than low? It may help us to answer these and other questions if we distinguish between those activities for which fuel is necessary and those for which human or animal energy might be substituted.

Necessary Fuel: Fuel of some sort is necessary for cooking, heating, and lighting. Human energy cannot heat water and space, or provide light. Any

available fuel will be used to meet these requirements since insufficient fuel means eating uncooked food, getting cold, and living in the dark. As fuel costs rise or traditional fuel sources disappear, most poor households will seek wood, animal waste, leaves, or other energy sources wherever they can, ignoring property rights as well as national concerns for forest reserves or erosion control.

Households operating under such crisis conditions are likely to be more responsive to changes in cooking methods, in cooking utensils or stoves, or in types of fuel than cultural traditions would suppose. New technologies designed to reduce the amount or type of necessary fuel consumption must be judged with several thoughts in mind.

1. New alternatives must serve the same multiple needs that current methods do.

If smoke from the fire cures meat or dries grain, or if it destroys insects or provides heat or light, these functions must also be done by the new energy sources or other methods.

2. Before alternative stoves are introduced, it is important to know the variety of cooking methods, and the relationships between food cooked and fuel used.

Even in subsistence villages, water for tea might be boiled over kerosene while grain is cooked slowly on fuelwoods or breads are baked in an oven. Will new technologies be acceptable if they require new cooking methods? In Bardoli, Gujerat, solar cookers, which are actually ovens, are being used to boil pulses. Is such adaptability possible elsewhere? A squatter's home in Cebu, Philippines, uses pressurized gas with a modern ring during the work week, and cheap sawdust with a clay cooker on weekends.

3. As new types of bushes or trees are introduced to increase biomass availability, the ownership, maintenance, and uses of currently grown trees must be known.

In many societies ownership of trees is distinct from land ownership. Yet, ownership is irrelevant if the trees cannot be protected. Who has the right to grow trees on the rights-of-way? How can trees be protected there from animals or people? It is important to recognize that trees whose bark might be used for medicines, or leaves for fodder, or nuts for food, are more likely to be allowed to mature than those grown only for burning.

Communal or cooperative attitudes of the villagers must be surveyed if village wood-lots or communal ovens or other community solutions are to be tried. In all of these questions, it is important to ask who will benefit from the new trees, and who must do the work in watering and maintaining them. If women plant and maintain wood-lots but men sell most of the harvest and keep the profits, women are unlikely to give wood-lot activities a high priority.

4. Solar ovens may be too expensive for individual use and may therefore be more practical if designed for communities. Consequently, this requires information on local social organization and cultural attitudes toward food.

In an Egyptian village, solar ovens for baking are being used by the entire community. However, communal baking facilities are traditional. In India, ovens using reflectors and black boxes may be too expensive for a single family, but caste divisions may make village-wide use impractical. Cooperatives or women's groups which can administer the effort or can help organize this system might use such an oven to produce and sell some foods, or to parboil grain. Cultural attitudes toward food cooked outside the home must be considered if the success of this method is expected.

5. Biogas digesters require substantial amounts of available wastes.

Many countries have been experimenting with these anaerobic digesters which can convert animal or vegetable wastes to methane gas and usable sludge. To date,

it is clear that digesters have had the greatest success where pigs are a traditional part of the diet and so widely raised. Pigs can easily be penned in a small area that facilitates collection of their wastes. Feeding penned pigs is also no strain on the household time. In subsistence societies, cows are usually allowed to graze freely most of the day. Gathering the scattered dung is time-consuming. Stabled cows require feed which someone must gather. Generally only dairies can afford the time and money to do so.

Where cattle wander, ownership of waste may become an issue as value is assigned to formerly free goods. Who owns the leaves being swept up in Delhi streets? Currently they belong to the sweepers who sell them to eke out a bare existence. What would happen if the tree owner taxed them? Who owns the cow dung on a village path? If the cow's owner pens the cows, where would the poor get their fuel?

Water hyacinths can also be used in a digester. This pervasive weed chokes many ponds and rivers. Collecting it is a disagreeable task. In one area in Indonesia, the government has agreed to pay collectors the amount presently paid for the mechanical clearing of the waterways. This added subsidy may make water hyacinth digesters economically attractive.

6. If digesters are to be used, their benefits must be obvious to the users.

Collecting wastes for and feeding the digester requires time. In most subsistence societies women work much longer hours than do men. Chores adding tasks to an already intolerably long day are unlikely to be done unless they reduce other necessary activities. Collecting dung for a community digester, for example, would take as long as making dung cakes for fuel. Yet the women would have to carry the waste to the digester's central location. If the women only receive gas in return for the dung, do they consider that a benefit? Is the supply as

reliable as dung cakes? Will she have to learn a different cooking style to use the methane gas? Is there any additional incentive - or payment such as fertilizer for her garden - for the waste collection task?

7. Improved treatment of human waste is considered an important advantage arguing for the use of digesters.

Certainly in China where untreated night soil has traditionally been used, the improved sanitation in villages has been a stimulus for building digesters. In the Philippines and India at digester demonstration projects, human waste has been mixed with animal and vegetable wastes without social reaction. Is such tolerance possible among the general public? Is the present energy crisis grave enough to challenge long-held cultural biases against this combination?

Substitutable Energy: Mechanical technologies can readily be substituted for human and animal activity and can reduce drudgery through a wide range of activities at the subsistence level. These include pounding or grinding grain, hauling water, or pressing oil. The tendency has been for planners to introduce complex technologies and therefore increase costs, frequently pricing the service beyond reach of the poor.

A diesel-powered millet grinder in Upper Volta was used by the poor women farmers only in the dry season when they had to work long hours in the fields; the cost of the grinding kept the women from utilizing the technology most of the time. Similarly, in Indonesia, the women continue to pound rice to husk even though small rice mills with rubber rollers are competitively priced and result in more usable rice per amount ground. While such rice mills clearly benefit the commercial users of rice, their rapid introduction between 1970 and 1974 displaced some 7.7 million women from their jobs of hand-pounding the rice!^{2/} If the women had alternative means of making money and could afford

the electric powered rice mills, the technology would clearly benefit them. Under present circumstances, use of the rice or millet mills depends on the substitutability of human labor to counteract cost of the new service.

The Appropriate Technology (AT) movement is designed to match technology and need in order to avoid large-scale displacement. Often the AT solution is a hand- or foot-pump to provide energy for grinding or pumping; plastic pipes and gravity-feed can often supply water to a village easier than a deep well. Appropriate control and maintenance also evolve as an issue. If women, as primary users of public water sources, are trained in simple repair, pumps or spigots are more likely to stay in continually operating order.^{3/} It has also been found that women trained to repair small pumps or motors are more likely to remain in the village than are men similarly trained. Women benefit from the new technology which they utilize constantly, particularly if they lack the mobility to move to other work locations as men often do.^{4/}

AT solutions are seen as more people-oriented. Proponents also argue that intermediate technologies are often more efficient than more complicated and larger machines. A study in Nigeria compared two techniques for processing gari from cassava. Not only was the product perceived by the consumers as better when the smaller machine was used, but the unit costs of production were about 20 percent lower with the intermediate machine.^{5/}

When assessing energy for substitutable activities, a broader set of variables will govern whether and when the technology is utilized. Issues of who benefits, who pays, who controls, who maintains, and who introduces any given technology are central to estimating whether the technology will remain in use and what its impact will be. Perhaps the key question is, who benefits? Local people or the nation? Men or women? Rich or poor? Is the benefit in terms of

time or money or food? What might be the impact if the energy costs restrict or reverse its usage?

Total Energy Systems: Having distinguished between necessary as opposed to substitutable fuel, it is useful to see how these types of energy are used in a total energy system in order to see where there might be savings from the completed product. Take, for example, the growing, harvesting, processing, and cooking of millet. Millet takes a long time to cook. In Upper Volta the increasing costs of fuel have caused a reduction in the frequency millet is cooked. It has declined from cooking done normally twice a day to once a day or even once every other day, with the family drinking millet flour mixed in water for other meals. Would some sort of processing of millet, similar to parboiling of rice, reduce family cooking time and also cost incrementally less than the cost of fuel-wood? Could women's cooperatives process the millet using solar ovens? Could income from this be used to buy mechanical grinders, thereby freeing women from that onerous chore as well?

To take another approach, would digesters provide sufficient fuel to substitute for the presently burned millet stalks that might then become fodder? Would the added value of the fertilizer increase the crop to give the total energy budget a better balance? What type of organization of energy supply would benefit the greatest number of poor?

Before any of these possible interventions can be tried, much better data on actual village functions and relationships must be collected. But the crisis in energy use is such that long-term studies are neither possible nor desirable. Reasonably accurate information is needed about present and changing usages in order to identify points where the system is straining or even breaking. To accumulate data about household energy, it is necessary to reach women themselves.

Measuring consumption of fuel, number of logs, amount of dung, etc., used by a household without also knowing something about uses of this energy gives only a limited idea of consumption patterns. However, the desired data need not be overly detailed. Local women might be recruited as informants who could monitor consumption at home and in their neighborhood. Short training courses in survey techniques can be given to these women who can then re-survey the area at frequent intervals, providing data on changing stress and use patterns, a sort of village Gallup poll. Even quicker samples might be taken by utilizing school children who interview their own mothers.

CONCLUSION

Women are the primary users of household energy and they provide much of the energy needed for subsistence activities. Preconceptions about their economic roles have masked the significance of their daily work and the necessity to plan for new roles resulting from development changes. Interventions to change energy use at the village level, whether for necessary or for substitutable fuels, must take into account the roles of women and the total time spent for carrying out their daily responsibilities. Similarly, any attempt to change the type of fuel used must include consideration of the several functions performed by present fuel. Additional information is also needed about the variety of fuels used in cooking, as well as the variety of human and animal tasks that might be more efficiently done with other forms of energy. This information must be gathered from women, by women or children, so that the replies are reasonably accurate. Interventions have the potential for great improvements of the human condition among both rural and urban poor, only if the total world of women becomes an integral part of planners' framework and strategy.

- 1/ Palmer, Ingrid, "Rural Women and the Basic Needs Approach to Development," International Labour Review, Vol. 115, No. 1, 1977. For a detailed discussion of food technologies, see Irene Tinker "New Technologies for Food-Related Activities: An Equity Strategy," Women and Technological Change in Developing Countries, to be published by Westview Press for AAAS in the fall of 1980.
- 2/ Timmer, Peter, "Choice of Technique in Rice Milling on Java," Indonesian Economic Studies, Vol. IX, No. 2 (July 1973), reprinted by the Agricultural Development Council, September 1974, p. 20 and Collier et al., Comment, reprinted by the Agricultural Development Council, September 1974.
- 3/ The Peace Corps in Nepal brought water to villages through plastic tubing to village taps. Only after women were trained to do repair did the taps stay in constant use.
- 4/ UNICEF surveyed the conditions of hand pumps in South India which it had installed previously and found four-fifths not in use. They then instituted a system of repair which has reversed the percentage, with four-fifths now in use. Villagers are trained in repair techniques but also provided with a pre-addressed postcard to mail to the county center if they are unable to make repairs. If the county technologist cannot repair the pump, he calls someone in Madras. This three-tiered system depends on the villager who notices breakdown; the village women trained in this program have stayed while several men have sought higher-level technical jobs in the towns.
- 5/ Carr, Marilyn, Appropriate Technology for African Women, African Training and Research Center for Women of the Economic Commission of Africa, Addis Ababa.