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STRATEGIC PREMISES FOR  
AID'S ENERGY PROGRAMS

by

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The energy crisis has affected development in two quite different ways. First, there is a growing concern about the availability of fuel supplies, both renewable and non-renewable. Second, there is a need to reconsider general development programs in light of their reliance on high energy consumption. In response to this heightened concern for energy, the Policy, Planning and Coordination Bureau of AID has drafted a new energy policy statement which is currently being reviewed. It is argued in this paper that the current focus of AID programs solely for the poor must be reinterpreted so that programs considering the energy needs for basic development may also be included within AID's portfolio.

The reason for this expanded view is a concern that monies poured only into the poverty sector would in fact perpetuate a welfare approach to development, while monies to increase the general productivity of the economy are essential as development plans stall for lack of conventional energy supplies. Such a re-focus is also a response to the complaints of a number of Third World countries that an emphasis on basic needs is a substitute for development that leads to a modern economy.

If the energy crisis required a broadening of the focus all along the spectrum of AID's programs policy makers must be encouraged to examine the energy needs of all sectors of a developing society--the poor as well as the elites, the traditional as well as the industrialized. For it is among the poor and the

traditional sectors that the energy problems are getting more serious more quickly. This is due to the interplay of three pressures:

- the strain placed on traditional energy sources by increased population, resulting in ecological imbalances and environmental degradation;
- the concentration of existing remedies for the energy shortages of developing countries on fossil fuels and the needs of the industrialized sector;
- the constriction of traditional energy supplies as the very poor presently find themselves 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 situation of dwindling energy supplies, increasing drudgery, and retrenchment. Indeed, these pressures raise the question of whether existing development gains can survive the growing crisis.

Given the criticality of the energy shortage at the household level, one should expect more programming designed to reduce the burden of the energy shortages on the poor. If these efforts are to succeed, two strategic premises must be kept in mind:

- that women are the chief gatherers and consumers of household fuel in traditional societies. One half of the energy in developing countries is consumed by household and homecraft activities--largely women's work.
- that there is a qualitative difference between the energy required for cooking and heating, and that used for other activities.

Because energy for cooking and heating requires fuel while energy for shaft power can be supplied by human or animal muscle, there is a tendency to separate these activities and emphasize programs and solutions for fuel energy needs alone. Such a division reflects the total trade-offs of women's time and energy between the two areas.

It is essential, therefore, to look at the continuum of energy consumption required for the survival of the poor family within the context of women's roles and responsibilities.

Women's Work - Reality at subsistence levels

The growing body of literature on "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 homecrafts, generally produced by women. Cash crops have been introduced to men even in areas where women have traditionally done the bulk of farming. The strain within the family caused by men having access to money while women are 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 are still 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 have less opportunity to raise their own supplemental food and 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 fire-wood.<sup>1/</sup>

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 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; certainly in subsistence economies every member of the family has important economic tasks--from watching the animals

to carrying wood and water. The fact that development economists do not class these efforts as economic simply contributes to the failure of those economic theories to explain contemporary reality.

#### Necessary/Substitutable Fuel

As energy costs rise, there is a tendency to revert 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 one may conclude that energy is being used more efficiently; yet in fact the quality of life may have deteriorated. Or has it? Are tractors essential to increased production? Are high energy solutions always better than low? It may help us to answer these 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: As has been stated above, fuel of some sort is necessary for cooking, heating, and lighting. Human energy cannot heat water or space, or provide light. Whatever fuel is available will be used to meet these requirements rather than to substitute for human energy. Insufficient fuel means eating uncooked food, getting cold, and living with the dark. As fuel costs rise or traditional fuel sources disappear, most poor households will seek wood, 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 other than cultural traditions would suppose. New technologies designed to reduce the amount of or change the 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 be carried out by the new energy or they must be accomplished by other methods, if the alternative solution is to be adopted.

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 and breads are baked in an oven. Will new technologies be acceptable if they require new cooking methods? In Bardoli, Gujerat, solar cookers, which are really solar 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 week, when everyone works, and cheap sawdust with a clay cooker on the weekends.

4. Solar ovens may be too expensive for individual use and may therefore be more practical if used by the community.

This in turn requires information on 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 might use such an oven to produce and sell some foods or to parboil grain. Cultural attitudes toward food cooked outside the home may limit its use.

5. Biogas digesters require adequate amounts of available wastes.

Digesters work best in countries where pigs are part of the diet. Pigs can easily be penned in a small area that facilitates collection of their waste. Feeding penned pigs is also no strain on household time. Cows in subsistence societies are usually let out to graze, scattering their dung. If penned, their feed must be collected. Generally, the cost in time to gather fodder is uneconomic except in dairies.

Where cattle wander, ownership of waste may become an issue as economic 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?

6. If biogas 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 biogas digester, for example, would take as long as making dung cakes for fuel. Yet the women would have to carry the waste to a central place. If their benefit is only the biogas, is the supply as reliable as the dungcakes? Will they have to learn a different cooking style to use the methane gas? Is there any additional incentive-- fertilizer for their garden, payment for the collection?

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

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

Substitutable energy: Mechanical technologies can readily be substituted for human and animal activity and reduce drudgery via a wide range of activities at the subsistence level: pounding or grinding grain, hauling water, pressing oil. The tendency

has been for planners to introduce technologies of greater complexity and therefore greater costs than are necessary, frequently pricing the service beyond the reach of the poor.

A diesel-powered millet grinder in Upper Volta was used by the poorer women farmers only in the dry season when they had to work long hours in the fields; the cost of the grinding keeps the women from utilizing the technology most of the time. Similarly, in Indonesia, the women continue to pound rice to husk it even though small rice mills with rubber rollers are competitively priced and result in more useable 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 hand-pounding the rice!<sup>2/</sup> If the women could make money another way and so afford the electrical energy of the rice mills, the technology would clearly benefit them. Under the circumstances, the utility of the rice or the millet mills depends on the cost versus the substitutability of human labor.

The appropriate technology (AT) movement argues the need 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 pipe and gravity-feed can often supply water to a village easier than a deep well. Appropriate control and maintenance then becomes an issue. Public water sources are quickly out of repair. If women, as primary

users, are trained in simple repair, the pumps or spigots are more likely to stay in use since the women benefit from their use.<sup>3/</sup> 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, and lack the ability to move.<sup>4/</sup>

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

When assessing energy for substitutable activities, then, 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 and 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 times that millet is cooked, from a normal 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 incrementally reduce the costs less than the cost of the fuelwood? Could women's cooperatives process the millet using solar ovens? Could income from this be used to buy mechanical grinders, freeing women from the onerous chore of grinding as well?

To take another approach, would biogas 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 village reality must be collected. But the crisis in energy use is such that long-term studies are neither possible nor desirable. What is needed is reasonably accurate information about present and changing usages in order to identify

these points where the system is straining or even breaking. To get at 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 data desired 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 energy in the household and provide much of the energy needed in subsistence activities. Pre-conceptions about their economic roles have masked their daily work. Interventions to change energy use at the village level, whether for necessary or for substitutable fuels, must take into account the total time budget of women and roles that they play. Similarly, any attempt to change fuel type must consider the several functions which the present fuel performs. More also needs to be known 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 of great improvement of the human condition in the villages or among the city poor, but only if the total world of women becomes an integral part of the planners' framework.

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- 1/ Palmer, Ingrid, "Rural Women and the Basic Needs Approach to Development," International Labor 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, 1978.