GATEKEEPER SERIES No. 18

International Institute for Environment and Development

Sustainable Agriculture and Rural Livelihoods Programme

Energy for Livelihoods: Putting People Back into Africa's Woodfuel Crisis

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This Gatekeeper Series is produced by the International Institute for Environment and Development to highlight key topics in the field of sustainable agriculture. Each paper reviews a selected issue of contemporary importance and draws preliminary conclusions of relevance to development activities. References are provided to important sources and background material.

The Swedish International Development Authority (SIDA) funds the series, which is aimed especially at the field staff, researchers and decision makers of such agencies.

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ENERGY FOR LIVELIHOODS: PUTTING PEOPLE BACK INTO AFRICA'S WOODFUEL CRISIS[1]

Robin Mearns & Gerald Leach

The woodfuel 'crisis' of developing countries was 'discovered' in the mid 1970s at the time the world was gripped by the energy crisis that followed the oil price shocks of 1973-74. The scale of deforestation across the Third World was already recognised. As energy analysts and anthropologists began to pile up the evidence across the developing world about the huge scale of woodfuel use and the difficulties that millions seemed to be facing in getting enough wood as tree stocks declined, it seemed natural to regard both types of crisis as essentially similar.

How Big is the Crisis?

The woodfuel problem appeared to be a classic case of rising energy demand outstripping supply. Although the resources in this case were renewable - unlike oil, gas and coal - they were apparently being over-used at unsustainable rates. So a numbers game known as woodfuel 'gap theory' was conceived, which quickly came to dominate almost every attempt to measure the scale of both the woodfuel crisis and the remedies which would be needed to alleviate it.

The basic premise of gap theory, as normally practised, is that woodfuel consumption is the principal cause of deforestation and therefore of mounting woodfuel scarcities. To measure the scale of this imbalance, the first step is to estimate the consumption of woodfuels (and sometimes of timber, construction poles and other tree products) in a given region and compare it with the standing stocks and annual growth of tree resources. The latter may be scaled down to allow for controlled forest reserves, game reserves, and trees in remote places which are difficult to access.

Typically this produces a figure for consumption that greatly exceeds the annual growth of trees. Take the Sahelian countries, for example: recent studies have found that woodfuel use exceeds the growth rate of tree stocks by 70% in Sudan, 75% in northern Nigeria, 150% in

1. This paper outlines briefly the major arguments of a recent study commissioned by the Royal Norwegian Ministry for Development Cooperation. The eighteen-month study, carried out at the International Institute for Environment and Development (IIED), set out to identify the key issues and policy options in the field of biomass energy in sub-Saharan Africa. The full study is available as a book: Leach, G, and Mearns, R. 1989. Beyond the Woodfuel Crisis: People, Land and Trees in Africa. London: Earthscan Publications. 309pp. Maps, tables and diagrams.

Ethiopia and 200% in Niger, with a small surplus of 35% in Senegal.[2]

The next step involves projecting these present-day gaps. First assume that the difference - the 'gap' - is made up by cutting into tree stocks, since consumption has to be met from somewhere. Then project woodfuel consumption, usually in direct proportion to population growth, and calculate the resulting tree stock each year. As consumption rises and trees are felled, the annual growth falls, the gap grows bigger, and the tree stock is still further depleted. Inevitably, the stock of trees declines at an accelerating rate towards a final woodfuel and forestry catastrophe when the last tree is cut for fuel. One such estimation of the situation in Tanzania, published in 1984, showed that the last tree would disappear under the cooking pot by 1990[3]. There are still many trees in Tanzania.

The final step is to ask what must be done to close the gaps to bring consumption and tree resources into balance. With few exceptions, the answer is afforestation on a staggering scale. For instance, the World Bank study which did much to legitimise woodfuel gap theory estimated that tree planting in sub-Saharan Africa would have to increase 15-fold in order to close the projected gaps by the year 2000[4]. The vast scale of these remedies, and the calamitous consequences if they are not applied, naturally tend to combine to provide strong justifications for large, centrally directed, plantation forestry projects focused on woodfuel provision.

This is not to deny that there are serious and growing woodfuel shortages in many parts of sub-Saharan Africa, and that woodfuel consumption does often exceed renewable supplies. Moreover, afforestation is an admirable objective for a great many reasons. Criticism of the methods of gap theory should not detract attention from these important facts. Indeed, supply-demand analysis, of which traditional gap theory is just one model, is clearly a valid tool for resource assessments at the national or regional level.

However, legitimate criticism can be levelled at the serious practical flaws in gap theory as it has been, and still is, applied. By ignoring these flaws, gap methods have done much to exaggerate the scale of the woodfuel problem and foster inappropriate, large scale, energy-focused remedies at the expense of other actions which could have done much more to improve welfare, reduce deforestation, and generally assist the efforts of local people towards securing a livelihood on a sustainable basis.

Flaws in Gap Theory

One serious flaw is that the large-scale aggregate perspectives of gap theory help to obscure

2. Anderson, D. 1987. The Economics of Afforestation: a Case Study in Africa. Baltimore and London: John Hopkins University Press, for the World Bank.

3. Nkonoki, S and Sorensen, B. 1984. A rural study in Tanzania: the case of Bundilya Village. Natural Resources Forum 8, 51-62.

4. Anderson, D and Fishwick, R. 1984. Fuelwood Consumption and Deforestation in African Countries. Washington DC: World Bank.

the fact that woodfuel problems are location-specific and require precisely tuned and targeted interventions, usually on a scale appropriate to people's livelihoods.

The second flaw is that this numbers game is played with weak numbers. While this fault is widely acknowledged, the game continues and its conclusions continue to be taken with great seriousness.

A third and more fundamental flaw concerns the forecasting methodology, where consumption is usually assumed to rise in line with population, even while supplies dwindle to vanishing point. This is unrealistic: as scarcity worsens and wood prices or the labour costs of gathering fuels increase, many new coping strategies would come into play. Tree planting might increase, consumers may use fuels more economically, switch to more abundant fuels such as crop residues, or intensify efforts to encourage the natural regeneration of woody vegetation.

The net effect of these three major flaws is to greatly exaggerate the need for planned interventions. They imply that all supply-demand adjustments must be implemented by interventions whereas, in fact, many of them will be made naturally by ordinary people without any external assistance. This could be corrected by better information, thus putting gap theory on a respectable footing; but until this is done, the method must be regarded as a dangerously misleading planning tool.

Some Assumptions Challenged

Many of the most basic assumptions for planned, energy-focused interventions are false or highly misleading: for instance, that woodfuels are normally the principal cause of deforestation, or that the expanding circles of deforestation around cities inevitably force up woodfuel prices and hence provide a powerful economic rationale for all kinds of afforestation and conservation measures.

Far from being the principal cause of deforestation, woodfuels are more usually a by-product of land clearance for agriculture in sub-Saharan Africa. Although varying considerably in relative importance from place to place, the major sources of woodfuels are:

- surpluses arising from agricultural land clearance
- dead branches and twigs
- by-product wood from trees grown on farms or in woodlots
- dedicated woodfuel plantations
- tree cutting directly for fuel, especially to make charcoal

Even where trees are cleared directly for charcoaling, in many places this reflects inadequacies in the agricultural system. Much commercial firewood and charcoal destined for the cities is produced by rural people to supplement their incomes, especially in the

slack agricultural season, or in years when returns to farming are poor due to drought or to low agricultural producer prices.

The price-scarcity model which is so often assumed to underlie 'soaring' woodfuel prices in urban centres neither accords with what appears to be happening to woodfuel prices in many cities, nor begins to explain the many social and economic mechanisms which help to account for fuel prices.

A major obstacle to the analysis of woodfuel price trends is the poor reliability of the available data. The most robust, however, suggest that the considerable year-on-year and inter-seasonal price fluctuations which are frequently observed have more to do with the structure of the woodfuel markets than with the physical availability of wood. Woodfuel markets can be very complex and dynamic, with many actors and interested parties along the chain from wood harvesting and charcoaling, through transport to and in the city, to the great variety of wholesalers and retailers who sell to consumers.

Although remarkably little is known about these multimillion-dollar businesses, we know enough to establish two crucial points. First, costs and margins can be extremely variable; and second, there is usually large scope for reducing costs or otherwise increasing the economic efficiency of the market, whether as a result of natural forces or designed interventions. Such changes can make all the difference to urban woodfuel supply, its impact on tree resources and the prospects for sustainable wood production for urban markets.

Giving Scarcity a Human Face

Conventional woodfuel thinking is premised on the belief that physical scarcity of wood is the key issue to address. As typified by gap theory, analysts and planners have measured the scale of woodfuel problems in terms of volumes of wood resources and consumption and distances from resources to consumers.

In rural areas, the distance and time to collect woodfuels is commonly used as the yardstick of scarcity and the need for remedies. For urban centres, it is commonly assumed that woodfuel prices will rise as forest stocks are depleted and the transport distance from the city to its main woodfuel resources lengthens. Since increasing physical scarcity or distance can impose considerable costs on consumers, the basic aims of woodfuel interventions are to reduce these costs by reducing physical scarcity.

There is, of course, a good deal of truth in these assumptions. However, interventions are most unlikely to succeed if they do not recognise that physical scarcity means nothing unless it is related to the human dimension. We must ask whether these costs are the outcomes of physical scarcity itself or of much more fundamental issues such as labour shortages, land endowments, social constraints on access to wood resources, cultural practices or - as we have seen for urban centres - the structure of markets. These 'human issues' are both complex and dynamic and are frequently undergoing rapid and adaptive change which the outsider may easily miss.

Consider wood gathering, for instance. There is now compelling evidence from time budget studies for rural women[5] that the time spent collecting firewood:

- can vary greatly from one week or season to the next depending on agricultural and other labour demands;
- is often minor even in 'wood scarce' areas compared with time for collecting water, food preparation, cooking and other survival tasks; and
- is perceived as a more or less severe problem - and is adjusted accordingly - in relation to the totality of labour needs and time available.

The basic issue is therefore one of labour availability, not fuel availability. If spare labour is abundant it may not matter if woodfuel collecting trips are long or getting longer. If labour is very scarce, even the collection of abundant woodfuel supplies may be perceived as a serious problem. What matters is local perceptions of these questions and the coping strategies that people have evolved or are evolving to deal with them, not the outsider's simple physical measurements.

At the same time as these preconceptions are being challenged, it is now increasingly recognised that by narrowly addressing woodfuels and the symptoms of their scarcity, directly energy-focused approaches look only at the tip of the iceberg and ignore the much broader and deeper stresses in the environmental, social, economic and political systems of which woodfuel scarcity is only one manifestation.

They obscure the fact that woodfuels are only one of many basic needs and that their provision - for example, by "tree growing" -is only one single aspect of diverse household coping strategies and land management systems on and beyond the farm. Indeed, trees themselves can provide many other products and services besides woodfuel, which may be a relatively low priority claim on available wood resources. Top-down and over-specialised approaches have often failed to notice that in many places rural (and urban) people are already responding to woodfuel and other land use stresses in ways that are imaginative, innovative and with far lower cost than most project interventions.

New Remedies

The more comprehensive and objective view of woodfuels now emerging recognises that there are no single, simple answers and that the problems surrounding them are inseparably linked to the complex, diverse, extremely dynamic and multi-sectoral issues underlying Africa's broader crisis of population, food, poverty, land and natural resource management.

5. Tinker, I. 1987. The real rural energy crisis: women's time. Energy Journal 8, 125-46. Cecelski, E. 1984. The Rural Energy Crisis, Women's Work and Family Welfare: Perspectives and Approaches to Action. Geneva: ILO.

Successful remedies for woodfuel problems must be firmly rooted in these broader contexts. In particular, if planning, projects or other types of intervention are to create lasting successes they must recognise at least three basic factors.

- First, they must take into account the need for local assessments and actions and the unhelpful nature of large-scale averages. The biophysical and cultural 'landscapes' of Africa, especially, are extremely diverse. Problems, and the opportunities to solve them, are therefore specific to place and to social groups in each place. The aim should be to reach underlying causes rather than heal the symptoms.
- Second, there is a need for indirect approaches to woodfuel issues and greater participation by local people at every stage to help empower them to prioritise and solve their own problems.

  This follows from the first point, and also the fact that success normally depends on starting and strengthening processes rather than delivering technical packages. Concentrate on 'how' rather than 'what' things are done.
- Third, there is a need for decentralised and multi-disciplinary approaches, including the use of competent and trusted 'grassroots' agencies, to facilitate the above. However, this does not exclude the need for economic, legal and political initiatives at the macro-level to improve the broad contexts for local, positive change.

Some of these needs have been accepted, but less frequently acted upon. Although these perspectives are in tune with the broad paradigm shift which is now sweeping through governments, aid agencies and other parts of the development community, one has to bear in mind the enormous inertia and vested interests which can resist such basic changes to conventional structures as authority, responsibility and knowledge.

Narrow specialism, false diagnoses of problems and top-down attitudes are found in all of the many disciplines and institutions which work, directly or indirectly, towards the better management of land and natural resources. Getting off the beaten track and heading for new territory with unfamiliar allies will not be easy for them, or for woodfuel specialists.

But despite the enormity of the task of devising new and appropriate kinds of remedies, important lessons do at last seem to be being learnt; we can now point to cases where great progress is being made in practice.

For example, in the arid Turkana district of Kenya a rural development project funded by Norway has been working with local pastoral communities to help develop their remarkable system of individual ownership and management of riverine forests. These forests provide fruits, construction materials, medicines and fuelwood, and are an extremely important source of dry season fodder and browse for livestock, as well as having tremendous cultural importance attached to them since they are also commonly the sites of family graves. As the system has come under increasing pressure from outside development activities and the rapid growth of settlements, the project is seeking to support it by combining the best of

local knowledge with the most appropriate of 'modern' forestry and management techniques.

The emphasis is on a 'joint learning' approach based on seminars with local leaders and government foresters, and under the harsh, dry conditions of Turkana these efforts have led to notable successes in terms of tree growing and the natural recovery of vegetation by means of small-scale water harvesting and voluntary restrictions on the areas where livestock can graze.

This is just one example among the many innovative kinds of natural resource management interventions that are now taking place across sub-Saharan Africa.

They share some common attributes, such as seeking to build on local knowledge and management practices and addressing a number of problems at the same time. At least indirectly, many of these interventions also contribute substantially to easing woodfuel constraints at the local level. The signs are encouraging that more and more outsiders are beginning to see the need to put people's livelihoods first in the search for sustainable solutions to land management problems in all their complexity.

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Sustainable Agriculture and Rural Livelihoods Programme

The Sustainable Agriculture and Rural Livelihoods Programme

The Sustainable Agriculture and Rural Livelihoods Programme of IIED promotes and supports the development of socially and environmentally aware agriculture through policy research, training and capacity strengthening, networking and information dissemination, and advisory services.

The Programme emphasises close collaboration and consultation with a wide range of institutions in the South. Collaborative research projects are aimed at identifying the constraints and potentials of the livelihood strategies of the Third World poor who are affected by ecological, economic and social change. These initiatives focus on the development and application of participatory approaches to research and development; resource conserving technologies and practices; collective approaches to resource management; the value of wild foods and resources; rural-urban interactions; and policies and institutions that work for sustainable agriculture.

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