

PN-AAP-132

IAN= 33134

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FUELWOOD RESEARCH IN AFRICA.

Paper prepared and presented by the United States Agency for International Development on the occasion of the Joint DAC/OECD Development Center Technical Colloquium on Fuelwood Research in Africa.

Paris, May 24-25, 1983

## SUMMARY

The paper initially points to the lessons accruing from the past ten years of rather concerted experience with forestry development projects in Africa. It highlights the wide swings in forestry development strategies that have characterized projects over time and postulates this evolution is due to uncertainty about the appropriate forestry science and technology and how to apply it. The paper briefly reviews the past experience with a number of these strategies, namely large-scale planting, village woodlots, improved stoves, agroforestry, farm and social forestry, and natural forest management. It concludes that added attention and support to fuelwood research is essential to consolidate the gains and attack the shortcomings.

The paper then goes on to review the situation and needs of forestry research in Africa. It points out the needs for more development orientation in that research, greater exchange of information within the region and improved national research capability.

Having reviewed the experience and problems of the research subsector, it discusses the options for donor action. There appear to be three fundamental ways of approaching the situation. The first is increased direct bilateral assistance projects for institution building, including long-term education and training, capital development and technical assistance. The second option is greater emphasis on research in ongoing fuelwood development projects. The third option proposes enhanced cooperation among the Africans themselves and their donor partners in the exchange of information on fuelwood research as well as certain core service and support functions to strengthen national forestry research capability. This third option has been termed fuelwood research networking and the paper briefly describes the activities that might be undertaken with such an arrangement.

The final segment of the paper describes past actions and future intentions of the United States in support of fuelwood research in Africa.

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## FUELWOOD RESEARCH IN AFRICA

### Introduction

In the last decade, forestry and particularly fuelwood production have acquired vital new importance in the development strategies of many of the countries of Africa and their donor partners. Since the early 1970's, after the disastrous Sahelian drought, a whole new generation of forestry projects were launched. Ten years down the road sufficient experience and results have accrued to draw some conclusions about these efforts. To-date these experiences have been less than satisfactory. Despite continuing high levels of support for forestry activities in Africa by the donor community, it is clear that the time has come to assess the progress and problems of the past and to isolate the constraints for special attention. Both Africans and donors alike have recognized that perhaps the major constraint is that of a relatively weak institutional base with limited trained and experienced personnel and limited financial resources to carry out the tasks. Strengthening this institutional capability can and should continue to be the centerpiece of the international assistance in the sector. More attention to planning will also be required so as better to marshal and efficiently use those resources, both human and financial, available to these institutions.

The last ten years have also yielded conclusions about forest science and technology as well that bear some scrutiny. Perhaps the most salient feature of the years past, has been the ongoing evolution of forestry strategies. As the problems were better understood there has been a continual rollover of "solutions" to the desertification problem or the fuelwood energy crisis. Large-scale fuelwood planting, village forestry, improved wood stoves, natural forest management and farm forestry have all been touted at one time or another, in one place or another, as the "right" direction. This fluid situation has both positive and negative aspects. No doubt a considerable degree of change and dynamism will be required to meet the wide range of problem situations. These shifts, however, have unfortunately been less rational than planned; the tendency has been for strategies to deteriorate into trends, indicating a persistent uncertainty about forest science and technology and how to apply it. It is beyond the scope of this paper to attempt to fully record the evolution of forestry development strategy in Africa, the projects that grew from it and the progress and problems obtaining. Some preliminary remarks do seem warranted, however, in the hope that they will point to the need for consolidating what is known and draw attention to the potential of forestry research in doing so.

## Past Experiences and the Need for Research

After the drought the linkages between declining tree cover, the incidence of desertification and the beginnings of the fuelwood energy shortage became readily apparent to natural resources professionals and development planners alike. Projects were undertaken by USAID and many other donors to confront this situation.

### --Large Scale Planting

Initially they were geared to establishing or rehabilitating forest resources through direct block planting in order to produce more fuelwood and to halt the physical spread of desertification. The results of these efforts continue to fall short of the optimistic expectations of project design. Among the problems encountered were: lack of trained forest service personnel to direct and supervise the plantations with resulting shortfalls in area planted and inefficient operations leading to escalating establishment costs; inappropriate choice of so-called "fast growing exotic species" leading to diminished growth and yield and thus higher costs per volume of wood produced, often beyond real market values; inadequate assessment and planning for recurrent costs associated with protection and maintenance of plantations, again lowering project efficiency. The record speaks for itself and yet the forestry development community seems at times unable to learn from the mistakes of the past.

One need only examine the persistent and problematic attempts over the years to establish large-scale fuelwood plantations of Eucalyptus camaldulensis in Upper Volta, Senegal, and Niger, in areas of low rainfall, to wonder if indeed the community is learning from experience. Large-scale block plantations cannot be discounted, especially for select situations adjacent to urban centers where fuelwood demand and prices will remain high. Such projects, however, will need careful design and planning based on a sound information base including data on soils and climatic characteristics of sites, species growth and yield, supply and demand projections, cost/benefit analysis, opportunity costs for the land to be planted and the natural forests and woodlands to be cleared, and on the institutional framework required to implement and sustain these plantations. More systematic use must be made of the information available today and further studies and research will be required if block planting for fuelwood in Africa is to be proven as an efficient and effective means to making a significant impact on the problems.

### --Village woodlots

On a second tier, projects promoting village or communal level forestry were launched in recognition of the need to better involve the people themselves in coping with the problems of desertification and fuelwood supply. These too seem to have considerable frailties which in the long-run may limit their

impact. Too little is known about the people themselves, about how they allocate resources or make decisions about land use, land tenure and possible production trade-offs when required. The notion of shared work and shared benefits remains elusive and those areas planted under these schemes merely a gesture, albeit in the right direction. Much greater attention will be necessary to identify and understand the complexities of distribution of both costs and benefits, if such schemes are to be successful.

#### --Improved stoves

Fuelwood conservation through improved stoves has also received considerable attention from both development assistance agencies and African governments. Early projections of potential savings in fuelwood through design of more fuel efficient stoves, ranging from 10-60% have however proved extremely difficult to accomplish in actual practice. Experience is showing that the use of fuelwood for cooking is intricately woven into the cultural habits of the people who are the intended recipients of the improved stoves, and as such, design and adaptation goes far beyond the laboratory. The true potential of improved stoves will require further study and research that explores the possibility of increased fuel efficiency based on a fuller understanding of how people are presently using fuelwood and coping with increasing scarcity. An assessment of present experiences appears essential in order to assist development planners to properly integrate an improved stoves program in the overall strategy of conservation and production.

#### --Agroforestry, farm and social forestry

In the recent past, increasing emphasis has been focussed on technologies aimed at greater direct participation of the rural population in forestry and fuelwood production schemes, namely through the approaches of agroforestry, farm forestry and social forestry. These trends, both in policy and programs, will continue because they represent a first tangible expression in the forestry sector of the well recognized need to approach rural development in a more integrated manner. Many people in Africa from development planner to the farmer himself have recognized that forest cover, either natural or planted, can help to sustain food production, the continent's number one priority. Trees and forests do so by helping to maintain the environmental stability on which agriculture so critically depends - whether this be in the drought prone lands, on the fragile tropical soils of the more humid zones or on the highly erodable upland areas. Exhortations and encouragement to farmers to plant trees for conservation purposes is not new but the response to date has been lackluster. A realistic opportunity, however, to achieve this holistic approach is now emerging in Africa. In many countries, fuelwood is becoming part of the market economy making it possible for the farmers to offset the costs associated with establishing or maintaining tree cover for environmental stability or rehabilitation with the income generated from shorter rotation

firewood crops. The fact remains, nevertheless, that only the first steps in this direction are being taken. If this trend is to fulfill its potential and become policy, strategy and action programs, strong support to research and development will be required. This research experimentation and demonstration will necessarily have to transcend the boundaries of traditional forestry research and delve deeply into the full range of factors which make up the basic production systems in which forestry could be integrated.

#### --Natural forest management

Of even more recent vintage is the emergence of the potential of natural forest management for fuelwood production. Almost all of the fuelwood currently being utilized in Africa comes from natural forests and woodlands but little has been done to assess this productivity or develop it. For too long, the classical notions of forestry science--multiple use and sustained yield--have been frequently evoked as dogma, first to the African foresters and now among them; little however has been accomplished on the ground. This is equally surprising because it has now become obvious that forests have long been used for just such multiple and sustained purposes by the rural people themselves for food, firewood, fodder, rustic building materials, medicines and numerous other household needs. Measured in terms of these different products, or indeed simply in terms of biomass productivity, it is small wonder that these forests and woodlands are finally taking on new importance. Basic information to manage these forests is still notoriously lacking but innovative work has begun. Studies on standing fuelwood volume, cutting yields and rotations are underway in a few countries. Even this modest start will soon provide the forestry authorities with important quantitative information with which to guide permit systems for fuelwood cutters - an important step towards rationalizing use and projecting returns to cover the recurrent costs of managing these forests. Much more must be done concerning silviculture and management as well as on present use by rural people and the options for organizing people's participation in forest management.

In short, forestry and fuelwood production in Africa is only just emerging from a first decade of concerted effort. This decade has been characterized by wide swings in policy and strategy and the evidence suggests that as yet too little is known about the correct technical packages to be applied and even less about the social, economic and institutional dimensions of the technology. The time has come to consolidate the gains, to identify the shortcomings, to learn from the experience and to strengthen the role and impact of the science and technology of forestry in contributing to rural development in Africa.

## The Situation and Needs of Forestry Research in Africa

As stated above, forestry and fuelwood development in Africa is going through some sweeping changes. Unfortunately one important component of sector development has not kept pace with either the needs or the rhythm of change: that is the forestry research subsector. Several studies (FAO, 1980; FAO/World Bank, 1981; CILSS/Club du Sahel, 1982) have addressed the problematic situation of the national forestry research institutions in the developing countries. African institutions have been even more susceptible to these problems which include: lack of trained staff; insufficient budgetary support; inadequate facilities; lack of continuity of research programs; an overload of critical short-term research problems in detriment to longer-term needs; and weak career paths for research workers. There can be little doubt that the present macro-economic crisis facing most African nations has served to exaggerate these difficulties and further curtailed the means to effective action.

### --More development oriented research

Even a cursory analysis reveals that there is a larger and perhaps more important dimension to this picture than that of the weak status of the institutions themselves. This is their relationship to present day development trends. Few examples can be found where forestry research is really addressing vital development problems in a meaningful way or indeed where the research programs are directly linked to ongoing development projects. Still fewer examples exist of fuelwood research programs that have been set up as a result of in-country exercises to identify priorities based on the present sector development needs nor are there many research programs which actually make use of the results and experiences accruing in local projects. Research should be on the cutting edge of maintaining and strengthening professional competence in any sector or country. Despite valiant efforts to keep up under trying circumstances, forestry research in Africa is lagging behind. Its directions remain traditional, focussing more often than not primarily on industrial forestry while development efforts center on the necessity of meeting basic human needs and maintaining environmental stability. There are exceptions to be sure and these must be applauded; the divergence, however, between potential and action engulfs even these small efforts in a general loss of credibility for the subsector.

### --More information exchange

Another critical dimension to the forestry/fuelwood research picture in Africa is the low level of information exchange among countries, whether this be research findings or development project results. This is particularly distressing because of the many similarities in sector problems that exist among certain subregional groups of countries. While there is no substitute

for site specific research, there is a great deal that can be applied both in terms of approaches to problem solving and in basic technologies which transcend national boundaries. Furthermore, many of the smaller countries will continue to find difficulty in assigning high priority to funding national forestry research. Donor resources likewise will probably remain modest and funding for full scale institution building projects can only be expected over time. It is therefore imperative to make the best use of the existing resources and capabilities to avoid needless duplication of research efforts and to insure that valuable information available throughout the region is better and more quickly disseminated to those who require it, i.e., the sector development planners and their donor partners.

#### --Improved national capabilities

There are many reasons for this unsatisfactory situation of forestry research in Africa. Principal among them is the urgency to get on with meeting the critical short-term development needs which at first glance appears to be unable to wait for the results of traditional long gestation periods of forestry research. It has now become obvious, however, that sustained successful forestry sector development will require a parallel system for problem solving on-the-ground in order to meet present and future challenges. Mediocre project results can often be traced back to unresolved technological and production system issues. There will be few shortcuts for bringing the fruits of science and technology immediately to bear on development issues. Well trained and motivated research staff operating within appropriately structured institutions equipped with the necessary facilities and adequately funded are all essential at the national level. Convincing African governments to devote scarce resources will be difficult if the development community cannot point to tangible results obtained from research. If the donor community expects to see sustained follow-up to development projects it will have to assist in overcoming this gap and resolving the chicken and egg dilemma of forestry research. Renewed, vigorous, concerted support to forestry sector research will be a necessary institution building step in order to maintain and increase the momentum of forestry development, so vitally needed in many African countries. Fortunately, in the case of Africa, fuelwood is of such predominant importance in country sector strategies that it provides a common denominator on which to focus concerted action in pursuit of improved national research capabilities. It is a unique opportunity now widely recognized among forestry development specialists concerned with Africa, both African and donors, that demands a timely response.

## The Options for Donor Action

There are essentially three options for increased donor support to strengthen fuelwood research capability in Africa. The first two are simple and explicit.

The first and most important will be increased direct bilateral assistance projects to improve national research institutions and programs through institution building that includes long-term education and training and capital development as well as technical assistance for research planning and programming and for specific skill areas. Such projects must be viewed carefully in terms of the probable large recurrent costs to African countries which would be associated with them. Nor can the personnel aspect be over-emphasized; finding the high calibre national staff necessary to man research institutions and attracting them to the positions is a constraint that will require years of investment in training and education for which there are no shortcuts. There is also a need for some perspective in addressing this option; are forestry research institutions necessary in every country?

The second option is greater emphasis on and attention to research in ongoing and planned fuelwood development projects. This means linking the projects with the research institutions, identifying development bottlenecks and providing technical and financial support to resolve them. It also means incorporating research results into project operations and extension activities. Naturally this option will be constrained where local institutions are weak or where such an effort would transcend project capabilities or responsibilities.

The third option is through enhanced cooperation among the Africans themselves and their donor partners in the exchange of information on fuelwood research results and experiences from development projects. Such cooperation would operate on the fundamental assumption that while research should ideally be site-specific, lessons are presently being learned, albeit in a haphazard and disorganized fashion, from one country to another and from one project to another. Given the similarities between the many countries in Africa, in terms of natural resources situations and development problems related to fuelwood, this process of interchange should be improved and institutionalized. In order to do this, the United States would propose what it and other donors have termed fuelwood research networking in Africa. This networking would have multiple objectives, as follows:

- Assisting African programs planning officials to gain access to current and future research results for better development planning;
- strengthening the role of these officials in identifying future research directions and priorities and giving them as well added incentive to support it;

- improving national research capabilities by helping avoid needless costly and time-consuming duplications of effort and thereby maximize the returns to be gained from the tight resources available for research;
- shortening the gestation period of fuelwood research by plugging in known information and thereby tightening the research to focus on more specific local problems, closing the gap between research and extension of new technology in the field.

Operationally a fuelwood research network would encompass a wide range of activities, both formal and informal, all designed to realize the above stated objectives. It should be noted, however, that the concept of a fuelwood research network does not suggest something entire or self-contained which can or should be put in place at one time. It is neither an institution nor a project but simply an agreement to cooperate in exchanging information and doing other things collectively to foster national research capability. A network should better be seen as the informal liaisons between researchers and field personnel that tend to cross-fertilize and stimulate the investigative process. What is intended here for Africa is something very similar to the present researcher/academician/administrator community which functions so successfully in the developed world; naturally, and at this stage, an African initiative would be considerably more modest.

The element that will initially give such a network institutional character and personality will be the development assistance and support provided by the donors and the performance of specific roles and tasks as these may be accepted by the Africans, and in some cases, the donor and international agencies' presence in those countries. By way of illustration, these tasks could include any and all of the following:

- an agreement and commitment by both African governments and donors to make research results and information available to the network;
- participation in regional meetings on specific research topics;
- eventual standardization of research methodologies and publications of guidelines as well as the use of uniform site and species data to facilitate comparative analysis;
- joint training exercises related to research and not justifiable for individual countries;
- twinning arrangements among African researchers themselves and with developed country researchers; and

- a regional recognition mechanism and awards for outstanding achievements to foster professionalism and bolster career development.

Furthermore the network could be designed with a central service and support function for fuelwood research in Africa which might be parceled out to African institutions and/or undertaken by donor provided staff and consultants. These central functions could include:

- A clearinghouse - distribution point for information storage retrieval and dissemination, including translation in French and English of documentation of wide relevance;
- the establishment and publication of a research newsletter(s) or an African Journal of Fuelwood Research to be widely distributed within the development community;
- making available consultative services to African governments to provide information on the importance or potential of fuelwood research, to lobby for appropriate levels of support, both at government level and in regional bodies, to provide a mechanism for trouble-shooting and needed short-term advisory services, to assist in identifying needs for development assistance for fuelwood research and channeling these to interested donors;
- providing an additional access point to search for and filter out appropriate research information from outside the region;
- and, possibly providing a source of small inputs that may not warrant full scale project activity, e.g. specialized equipment, information retrieval services, computer services, speciality wood testing and provision of select seed and germplasm.

Obviously the three main options mentioned above could all be achieved through ongoing long-term activities of the donors and international agencies presently operating in Africa; much of it should probably come on stream in exactly that way. However, in order to effectively reach a threshold of action that begins to service the myriad and diverse needs of the many African nations, the third option to launch such a fuelwood research network is considered essential. The intention is neither to duplicate nor displace on-going networks such as those of the Centre Technique Forestier Tropical, the African Energy Program or the CILSS/Club du Sahel. Rather, the first attempts should be to learn from the experiences of these efforts to improve the linkages between these subregional groups, to add support where necessary and to bring other African nations into the overall network whose focus on fuelwood would hopefully find resonance throughout Africa. Such a fuelwood research network can be built piece by piece

through careful study and integration of ongoing action programs. However, in order to get underway and seize the opportunity existing today, core support would be required. To be successful, though, regardless of the levels of support that can be generated for such a network or the form this support may take, cooperation and communication among African governments, international agencies and donors is a paramount first step. The options put forward above are intended as suggestions to stimulate discussions and not as limits to what can and should be done. The United States believes that frank and free discussion among the participants gathered here in Paris for this Colloquium will constitute a benchmark along the road to better cooperation and will hopefully serve to accelerate the pace at which science and technology can be brought to bear on the problems and potentials of forestry and fuelwood development in Africa.

### The United States and Support to Fuelwood Research in Africa

#### --Actions

The United States believes that an important indicator of development is the establishment of a national capability for problem solving. Well designed research efforts have been and will continue to be the source of one of the most powerful and lasting contributions that can be made to economic development and the productivity and well-being of the peoples of the developing countries of the world. Developing a capability for applying science and technology to development problems manifest in the creation and functioning of appropriate research institutions has long been an objective which the United States has strongly supported. That commitment is no less today.

In August of last year, the Administrator of the United States Agency for International Development directed his staff to conduct an expedited review of research priorities in four key areas and to prepare an implementation plan to reallocate agency resources based on that review. The four topics were: agriculture, population, health and, signifying the importance attributed to the theme in the United States, fuelwood. In the latter case, this review was carried out through an intensive exercise involving Washington staff and field missions and culminating in a panel meeting made up of experts from both the United States and the developing world. A draft indicative implementation plan has been prepared and consultations in the developing countries themselves are being carried out to finalize the plan and begin negotiations with host governments for action. The intention, based on this research priorities exercise, is to markedly increase agency resources devoted to the support of research. Priority research areas identified for early attention in the Africa Region include the following: multipurpose fuelwood species assessment and trials; soil/site relationships of fuelwood species; natural forest management; and, bioenergy inputs to agriculture. More will be said below about the modalities for implementing these priorities.

The need for support to fuelwood research is currently being highlighted during on-going forestry project evaluations of the Africa Bureau of USAID. These evaluations, in addition to helping to improve the subject projects, will provide basic data for a program-wide evaluation of forestry activities within the Africa Bureau. Fuelwood research has already been identified as a target of concern. A recent rough synopsis of the resources allocated to the 51 USAID funded projects in Africa which included forestry components or are exclusively devoted to forestry, demonstrated that roughly 3% of the total funding was going to research. Less than half of these projects presently include forestry research activities. It is clear that this situation will have to be improved.

Another forum in which fuelwood research has been raised is within the framework of the ongoing Forestry/Fuelwood Technical Committee of the Cooperative Development for Africa (CDA) donor group, presently being led by the United States. The other donor participants include: France, United Kingdom, Belgium, West Germany, Canada and Italy. The African country initiatives of this group, focussing on encouraging and supporting greater attention to sectoral planning and coordination between host governments and their donor partners, are now underway in five African countries (Upper Volta, Senegal, Burundi, Somalia and Malawi). At the last Technical Committee meeting the subject of the larger potential of cooperation was raised particularly in regards to fuelwood research concerned with species trials and tree seed availability. Cooperating donors have already begun to exchange research results and information among themselves and this information has been forwarded to the recipient African countries. These efforts are just getting underway but the United States considers it likely that increased efforts to support fuelwood research will be channeled at least in part through the CDA mechanism.

### --Intentions

As the above has indicated, fuelwood research has been elevated to one of the four highest priority areas for attention by the United States Agency for International Development. An indicative implementation plan has been prepared and steps are being taken to finalize it. It is still too early to make definitive statements about the exact nature and levels of funding which USAID intends to devote to this subject. Several initiatives are, however gathering momentum and will be mentioned below. Most are still in a design phase and USAID recognizes that what is required to strengthen them is more information about ongoing fuelwood research programs and needs in Africa.

This Colloquium will provide an excellent opportunity for fact-finding and USAID will make every effort to use to the fullest advantage the guidance garnered during this occasion. It is obvious, however, that the best advice and information can only

be obtained from the Africans themselves. Hopefully the report of this meeting can be circulated widely to African governments, development planners and natural resource professionals with a view to a followup meeting with the Africans themselves. Fortunately a vehicle for organizing and sponsoring such a meeting has already been identified. The UNDP and the World Bank have approved a global project to fund the Developing Countries Research Coordinator post recently established by the International Union of Forestry Research Organizations (IUFRO). The activities of this coordinator will be to assist in the organization of effective research networks for the Asian, African and Latin American regions and to aid governments and donors in preparing proposals for project assistance to forestry research. A series of regional workshops has also been planned and the World Bank has approached donors for support of these meetings. USAID has already signaled its readiness to underwrite the costs associated with financing such a workshop for Africa to be held in early 1984. USAID believes that this workshop would constitute an appropriate followup to the present meeting and encourages the participation of other donors at that meeting. Furthermore the United States hopes that its own activities and those of other donors in support of fuelwood research in Africa can be carried out in close collaboration and cooperation with IUFRO. IUFRO is the preeminent body of forest research scientists in the world and its own informal network has well served the countries, institutions and individuals that participate in it. Parallel and complementary networking would seem to hold great promise for the developing world and especially the African region.

Finally, to give effect to the fuelwood research priorities implementation plan and to provide at least some part of the core support to launch a fuelwood research network in Africa, the Africa Bureau of USAID is currently considering the development of a large-scale, long-term regional project. No decisions have as yet been taken on either formal approval of such a project nor on details of funding or project modalities. Much will depend on the outcome of present factfinding endeavors both in Africa and with other donors and international agencies.

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